Tennessee Valley Authority, 1101 Market Street, Chattanooga, Tennessee 37402-2801

May 17, 2002

10 CFR 50.54(f)

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20005-0001

Gentlemen:

In the Matter of	)	Docket No. 50-327
Tennessee Valley Authority	)	50-328
		50-390

SEQUOYAH NUCLEAR PLANT (SQN) UNITS 1 AND 2 AND WATTS BAR NUCLEAR PLANT (WBN) UNIT 1 - SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY," DATED MARCH 18, 2002 (TAC NOS. MB4578, MB4579, MB2675)

This letter provides TVA's 60-day response to the subject bulletin for SQN and WBN. Item 3.0 of the bulletin requested information pertaining to the addressees' basis for concluding that its boric acid inspection program provides reasonable assurance of compliance with the applicable regulatory requirements.

This response considers the effectiveness of TVA's Boric Acid Program by comparing SQN's and WBN's programs against the four criteria recommended for an effective program in accordance with Generic Letter (GL) 88-05, "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants." TVA is also a member of the Materials Reliability Project (MRP) Alloy 600 Issue Task Group which has developed guidance (i.e., response outline) for developing the 60-day response to NRC Bulletin 2002-01. Accordingly, TVA used both the four criteria contained in GL 88-05 and the outline developed by MRP to respond to NRC's request for information.

Enclosures 1 and 2 provide TVA's response to the requested information for SQN and WBN, respectively. Enclosure 3 contains the list of regulatory commitments contained in this letter for TVA.

A095

If you have any questions concerning this matter, please contact Terry Knuettel at (423) 751-6673.

Mark J. Burzynski
Mark J. Burzynski
Manager
Nuclear Licensing

Subscribed and sworn to before me
on this 17th day of May, 2002

Barbara K. Guertin
Notary Public

My Commission expires January 25, 2003

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ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

This enclosure contains SQN's sixty-day response to Required Information, Item 3.0, of the subject bulletin dated March 18, 2002.

NRC REQUEST

3. ***Within 60 days of the date of this bulletin, all PWR addressees are required to submit to the NRC the following information related to the remainder of the reactor coolant pressure boundary:***

   (A) the basis for concluding that your boric acid inspection program is providing reasonable assurance of compliance with the applicable regulatory requirements discussed in Generic Letter 88-05 and this bulletin. If a documented basis does not exist, provide your plans, if any, for a review of your programs.

RESPONSE

The response to this item is divided into two sections. Section I demonstrates implementation of Generic Letter (GL) 88-05, "*Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.*" Section II provides a response to the six topics that were developed by the Electric Power Research Institute (EPRI), Materials Reliability Project (MRP), Alloy 600 Issue Task Group for responding to this item of the bulletin.

In summary, TVA's responses to the four GL 88-05 criteria contained in Section I and to the six MRP topics contained in Section II form the basis for concluding that SQN's Boric Acid Inspection Program provides reasonable assurance of compliance with the applicable regulatory requirements discussed in GL 88-05 and the subject bulletin. TVA plans to perform an assessment of SQN's Borated Water Corrosion (BWC) Program by the fall of 2003. This assessment will be used to evaluate the effectiveness of enhancements and corrective actions made to the BWC Program in response to recent industry events.

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

SECTION I - RESPONSE TO GL 88-05 CRITERIA

GL 88-05 identified four criteria recommended for an effective Boric Acid Corrosion Program. Each criterion is provided below followed by TVA's response describing how SQN has incorporated the criterion into its BWC Program. Section II of this enclosure, which contains SQN's response to the aforementioned EPRI-MRP topics, is referenced when applicable.

CRITERION 1

A determination of the principal locations where leaks that are smaller than the allowable technical specification limit can cause degradation of the primary pressure boundary by boric acid corrosion. Particular consideration should be given to identifying those locations where conditions exist that could cause high concentrations of boric acid on pressure boundary surfaces.

Response

The principal locations where leaks that are smaller than the allowable Technical Specification (TS) limits or locations where conditions exist where boric acid might accumulate on pressure boundary surfaces and result in degradation have been identified in plant procedures and instructions. These procedures and instructions address principal locations where leakage could initiate (e.g., flanges, welds, packing, etc.) and also identify service sensitive components (i.e., carbon and low alloy steel) in the primary coolant pressure boundary requiring direct visual examination.

The BWC Program at SQN evaluates and tracks systems (safety, quality, and nonsafety-related process lines) containing borated water to provide reasonable assurance that reactor coolant pressure boundary will have an extremely low probability of abnormal breakage or a rapidly propagating failure as a result of corrosion by coolant leakage. This activity is addressed in plant procedures and identified issues are tracked in the BWC Program database that is maintained by site Engineering. Monitoring is accomplished by separate procedures and by the Inservice Inspection (ISI) Augmented

Inspection Program where there are specific requirements/actions regarding degradation of reactor pressure vessel boundary components (e.g., canopy seal weld leakage, potential leakage due to thermal stratification, etc.).

CRITERION 2

Procedures for locating small coolant leaks (i.e., leakage rates at less than technical specification limits). It is important to establish the potential path of the leaking coolant and the reactor pressure boundary components it is likely to contact. This information is important in determining the interaction between the leaking coolant and reactor coolant pressure boundary materials.

Response

SQN has procedures and instructions in place which address the detection of leaks including leaks in the primary coolant pressure boundary or in components of other systems that could impact the primary coolant pressure boundary. Identification of the leakage path and the potential for degradation of other non-leaking components is part of the BWP Program evaluation process. SQN's response in Section II, Topics 1, 2, and 3, provide the details of the procedures and instructions which define and implement the program.

CRITERION 3

Methods for conducting examinations and performing engineering evaluations to establish the impact on the reactor coolant pressure boundary when leakage is located. This should include procedures to promptly gather the necessary information for an engineering evaluation before the removal of evidence of leakage, such as boric acid crystal buildup.

Response

SQN procedures and instructions for the identification of leaks reference one procedure for the evaluation of borated water leaks. This procedure includes a form that provides step by step guidance in the collection of relevant data and the evaluation of the leak. SQN's response in Section II, Topics 1, 2, 3, and 5, provides the details of the procedure which defines the methodology for the collection of data and evaluation of leaks.

CRITERION 4

Corrective actions to prevent recurrences of this type of corrosion. This should include any modifications to be introduced in the present design or operating procedures of the plant that (a) reduce the probability of primary coolant leaks at the locations where they may cause corrosion damage and (b) entail the use of suitable corrosion resistant materials or the application of protective coatings/claddings.

Response

Over SQN's operating history, actions have been taken to prevent occurrences of leaks and corrosion damage. Leakage reduction techniques have been implemented in areas where packing leaks have been encountered that resulted in the degradation of pressure boundary materials. An example of a leak reduction technique is the use of graphite packing products for valves as recommended by EPRI which has significantly reduced the incidence of BWC degradation.

Pressure boundary bolting degradation has been corrected by the use of corrosion resistant materials in cases where leakage is encountered at bolted connections. These upgrades use materials with improved corrosion resistance.

SQN's response in Section II, Topic 1, provides the details of the procedures which include methods for prevention of BWC and identifies actions which have been taken to prevent leaks. SQN's response in Section II, Topic 5, provides the details of the procedures which define the corrective action program for BWC.

ENCLOSURE 1

TENNESSEE VALLEY AUTHORITY
SEQUOYAH NUCLEAR PLANT (SQN)
UNITS 1 AND 2

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

SECTION II - EPRI - MRP TOPIC OUTLINE

The basis for concluding that SQN's BWC Program complies with GL 88-05 and the subject bulletin is provided below in the form of six topics which cover the elements of the BWC Program. The six topics were developed by the EPRI-MRP Alloy 600 Issue Task Group for responding to this item of the subject bulletin. Compliance with those topics is addressed in the form of questions under each topic. Below are the responses to the questions which support each topic:

1. **Program Definition and Responsibility**

   a. ***Is the 88-05 program defined by a separate procedure, or included in other procedures?***

   The BWC Program is defined in TVA Nuclear (TVAN) procedure, "Corrosion Control Program," Appendix D, "Technical Requirements for the Borated Water Corrosion Program." This procedure describes the technical and organizational requirements for management of the BWC program, evaluation of boric acid leaks, evaluation of corrosion damage, identification of components in the leak path, and guidance for initiating Problem Evaluation Reports (PERs) when required. This procedure also provides guidance for trending leakage data and suggests preventive maintenance when indicated. Lower tier site procedures and instructions complement the TVAN procedure to ensure that boric acid leaks and residue are identified and evaluated.

   SQN Preventative Maintenance (PM) Instruction, "Borated Water Systems Leakage Inspection/Evaluation," provides criteria for walkdowns, inspection, and evaluation for degradation of all carbon and low alloy materials affected by boric acid leakage. This instruction is conducted each refueling outage to identify leaks that may cause damage to the primary reactor coolant pressure boundary components and initiates corrective actions. Inspections are performed on ASME Class 1 and 2 components that have a negative trend leakage history or have been indicated as a

problem in industry experience. Inspections required by these PMs include the Reactor Coolant, Chemical Volume and Control, Safety Injection, Residual Heat Removal, Containment Spray, and Flood Mode Boration Systems. Metallurgical engineers are responsible for evaluations involving material degradation due to Boric Acid Corrosion. Plant personnel are instructed by plant procedures to initiate a work order for accumulations of borated water or residue from borated water systems. If boron residue or corrosion is present, Engineering is notified by procedure requirements to perform an inspection/evaluation.

Site Maintenance Instruction, "Removal of Reactor Pressure Head and Attachments," provides for inspection of head penetrations, control rod drive mechanism (CRDM) columns/canopy seal welds, conoseals, RVLIS lines, "O" ring monitoring tubes and head vent lines for leakage or signs of boron deposits, and initiate work orders for repairs as required. Engineering is required to be notified to perform BWC Program inspection in accordance with the applicable PM instructions. These activities are performed in conjunction with removal of RPV head insulation, CRDM ductwork, and CRDM shroud and installation of the RPV head lead shielding.

TVAN Procedure, "Housekeeping/Temporary Equipment Control," requires that accumulations of borated water or borated water residue be reported by a work order. In addition to the procedures and instructions noted above, SQN has identified numerous other instructions and procedures which contain discussion concerning the identification and reporting of leaks.

b. Does the plant have voluntary leakage reduction and leak tracking programs as suggested in Section 7 of the Boric Acid Corrosion Guidebook, Revision 1?

SQN does not have a "Voluntary Leakage Reduction Program" per se that encompasses all of the elements described in

the "Boric Acid Guidebook." However, many of the leakage reduction program characteristics are ingrained in the SQN operating and maintenance culture. SQN management has been and continues to be focused on the detection, correction, and overall reduction of leaks. As such, the Maintenance organization is responsible for tracking any plant leaks, including boric acid leaks. One of the maintenance focus areas is the Maintenance Material Condition Indicator which tracks plant leaks. This performance indicator is routinely presented for site management review each month. The performance indicator categorizes plant leaks by method of identification and Unit, with subgroupings that reflect repair schedule (outage and non-outage). This allows the management team to determine if a negative trend exists, evaluate resource allocation, and determine if additional actions are warranted. Trending of work orders identifies areas that may be specific problems and results in additional attention. Recurring problem areas are placed in the corrective action program for evaluation and development of corrective actions commensurate with the problem's significance. This may result in hardware refurbishment, replacement, or redesign.

c. Is responsibility for the 88-05 and leakage reduction programs specified?

The GL 88-05 program responsibilities are defined in the TVAN BWC Program procedure and site procedures further clarify those responsibilities. While there is no single formal "leakage reduction program" defined in plant procedures, the responsibility for such is well defined and apportioned throughout the plant. Engineering is responsible for evaluating and trending boric acid leaks and component degradation as required by the TVAN BWC Program procedure. System Engineers and Operations personnel are responsible for leakage identification during system engineering walkdowns and performance of operator rounds. Plant personnel are responsible for reporting any leaks identified.

2. Inspection Scope and Frequency

a. ***Does the inspection scope provide for a multifaceted approach to leakage detection as suggested in the BAC Guidebook, including on-line leakage monitoring, containment air cooler thermal performance, visual inspections during containment entries, visual inspections during shutdowns and outages, visual inspections during plant startup, etc.?***

SQN has a multifaceted leakage detection approach which includes on-line radiation and leakage monitoring as required by the TS, visual inspections during containment entries, system walkdown inspections during shutdowns and outages, and system walkdown inspections during plant startup.

Monitoring reactor building compartment cooler discharge temperatures is not specifically defined or formally performed for detecting boric acid leaks; however, Engineering does monitor cooler performance. Currently, an Operating Experience Review item for NRC Information Notice 2002-13, "Possible Indicators of Ongoing Reactor Pressure Vessel Head Degradation," is being evaluated to determine if appropriate PMs for the containment coolers should be revised to include guidance to take action if evidence of boron or ferric oxide is identified on the coolers.

SQN has system Surveillance Instructions (SIs) that comprise the Leakage Reduction Program for Borated Water Systems required by TS 6.8.4 and described in SQN FSAR Chapter 12.4.2. These SIs provide detailed steps that perform visual examination and trending of the results for safety systems during normal system operation. Systems included in this population are Containment Spray, Safety Injection, Residual Heat Removal, Chemical and Volume Control, and Post-Accident Sampling Systems in areas outside the containment structure.

SQN TS limits unidentified leakage to one gallon per minute (gpm) and allows no pressure boundary leakage. This leakage is detected by radiation monitoring and/or the changing level of the containment pocket sump. The associated annunciator response instruction for the radiation detectors provides indication of increased radiation. The instruction requires that Plant Chemistry and RADCON be notified to investigate the cause of the alarm and initiate corrective action. This procedure provides guidance to identify a pressure boundary leak and would indirectly implement the BWC program. In addition, although not credited for TS compliance, SQN has a containment humidity alarm that would indicate an increase water vapor in containment and could be an indicator of potential reactor coolant system (RCS) leakage.

ASME Section XI inspections and system pressure test programs provide requirements for RCS leakage test and ASME Section XI system pressure test/RCS bolted connection inspections. These procedures require that identified leaks be evaluated and that corrective actions be consistent with the engineering evaluation conducted in accordance with the TVAN BWC Program procedure.

Operations procedures address investigations of unidentified leakage and its source. Abnormal Operating Procedure, "RCS Leak and Leak Source Identification," provides guidance required to identify and isolate a small RCS leak. Indications for leakage are based on deviations in plant operating parameters (e.g., pressurizer level drop, Volume Control Tank level drop with Auxiliary Building, or containment radiation level increase, etc.). General Operating Instruction, "Operator Round and Tour Performance," provides inspection criteria which includes equipment performance and the identification of leakage as part of general housekeeping requirements. Shift walkdowns and plant tours include any abnormal conditions noted such as identification and containment of leakage from components.

b. Are inspection schedules based on potential leak rates and criticality (10 year ISI, each refuel outage, each startup/shutdown, other)?

Inspection schedules are based on the nature of the concern and the potential for compromising pressure boundary integrity. The frequency of some inspections and walkdowns inside the containment vessel is affected while the reactor is in operation due to the high radiation fields. Specific instructions are performed each refueling outage to look at areas that are susceptible to boric acid leakage, areas that show a negative trend in leakage history, or areas where industry experience indicates a potential problem. The required frequency of performance is identified in each instruction and major activities are scheduled in either the plant or outage schedules.

Inspections for leakage detection are required to be performed at least once every refueling outage. Operations rounds are performed once each shift or in certain cases when warranted by plant operating conditions (e.g., TS Limiting Condition for Operation, etc.). Inspections that are included in the ISI Augmented Inspection Program are based on frequencies established by engineering guidance similar to the ASME Section XI sampling plan (e.g., stress corrosion cracking, thermal stratification, primary water stress corrosion cracking (PWSCC), etc.). For emergent activities that identify corrosion damage, the evaluation is performed as needed to ensure pressure boundary integrity.

c. Does the visual inspection scope include all sources of leaks including, flanges, valve packing, Alloy 600 PWSCC, or is it limited to certain leakage sources or locations?

The scope of visual inspections on leak sources includes accessible flanges, valve packing, and Alloy 600 PWSCC locations. For inaccessible and/or high radiation areas, TVA uses methods other than visual (e.g., radiation

monitors, pocket sump levels). Walkdowns of the borated water systems are performed during each refueling outage and require visual inspections of susceptible areas listed in procedures to include sources of leaks from pumps and valves, valve packing, bolted connections, flanges, manways, flow elements, pump seals, instrument ports, welded areas, and vessel head penetrations. TVA is revising the ASME Section XI ISI/NDE Program to include the augmented inspections of the Alloy 600 reactor vessel head penetrations at the head interface as stated in TVA's 15-day response to this bulletin on April 2, 2002.

d. Are acceptance criteria provided for all leak detection and visual inspections?

Leak detection acceptance criteria are contained within site procedures. These acceptance criteria are based on TS limits.

The TVAN BWC Program procedure establishes acceptance criteria to be used in evaluating material wastage due to BWC. Corrosion allowances or minimum wall thickness are established by the design bases and used to evaluate the degree of wastage allowed. General wastage tolerances for plate and structural shapes are based on manufacturing tolerances. Corrosion allowances do not apply to bolting, seals, valve seats, springs, bearings, bushings and stems, or shafts in the seal area. If localized material loss due to BWC exceeds the established minimum wall thickness or if corrosion allowances are not known, Engineering performs an evaluation to determine the acceptability of the component or develops corrective actions.

e. Is the inspection scope reviewed periodically to reflect industry experience?

While the inspection scope is not specifically reviewed periodically to reflect industry experience, TVAN's Operating Experience Program, "Managing the Operating Experience Program," provides for the review of industry

experiences by potentially impacted organizations in order to ensure these experiences are factored into their programs when applicable. Site instructions incorporate industry experiences when determined applicable to plant conditions. This may be identified under Work Orders, newly established procedures, or augmented examinations added to the ASME Section XI Program.

3. Obstructions to Visual Inspections

a. ***Does the 88-05 program specify the plant condition when visual inspections are to be performed (pressurized/unpressurized, temperature, insulation removed, etc.)?***

Where specific examinations of components are identified and specific conditions are required by ASME Section XI or regulatory requirements, these parameters are identified in the instruction. An example where minimum pressure and temperature limits are required is in the instruction for RCS leakage test. Procedures for inspection of CRDM canopy seal welds for leakage are normally performed during unit shutdown during Modes 5 and 6. Inspections are normally performed prior to the removal of the RPV head, but may be performed after the head has been removed and installed in the storage stand.

Site instructions are performed prior to plant shutdown and/or during each refueling outage. In conducting inspections on components listed in the instructions, insulation is removed where there is evidence of leakage, except for inaccessible components.

b. ***Does the GL 88-05 program provide criteria for locations with obstructions to visibility such as insulated reactor vessel heads, reactor coolant piping, and valves/flanges?***

Where obstructions exist, provisions are made in procedures or PM packages for inspecting for evidence of leakage in the general vicinity of the component of

concern. PMs provide for inspection in the following locations for evidence of leakage:

1. The lowest elevation of insulation on vertical surfaces.

2. At joints of insulation on horizontal surfaces.

3. The top of equipment surfaces beneath the component.

4. All regions above and beside the equipment.

5. The floor underneath the component.

Site procedures for CRDM canopy seal weld leakage require inspection for any evidence of boron staining on the CRDM column that may indicate leakage from seal welds contained within the inaccessible areas covered by the CRDM duct work shroud (intermediate canopy seal weld).

Obstructions encountered during inspection on specific components (e.g., reactor head penetrations) would use a best effort examination and an engineering evaluation in determining whether there was a potential compromise to the reactor coolant pressure boundary based on the inspection results.

c. Are alternative inspection methods specified for locations with obstructed visibility (e.g., remote video, inspections of adjacent visible locations, etc.)?

Alternate inspections are used at SQN for areas which are not readily accessible for direct visual examination. Remote video has been specified and used to inspect the penetrations on the Unit 2 reactor vessel head during the recent Unit 2 Cycle 11 refueling outage. One example is the VT-2 examination performed in operational Mode 3 before startup. This examination is performed with insulation on the system components and will detect gross leakage. Service-sensitive components have periodic

direct or remote visual examinations which will detect boric acid residue leading to investigation and evaluation of the source. Remote video has been used in the past to inspect canopy seal welds.

4. Training

a. Are personnel who perform 88-05 inspections formally trained in program requirements, inspection methods, important design features, industry experience, and acceptance criteria?

The materials engineers who perform the evaluation and inspection tasks associated with the BWC Program are required to be formally trained and qualified on the BWC Program requirements. Other personnel who support these activities (e.g., structural analysts and inspection technicians) are trained and qualified in their area of expertise. TVA's Operating Experience Program provides relevant information to these personnel in accordance with program requirements.

In addition to the training provided for personnel who evaluate BWC, General Employee Training for unescorted plant access covers housekeeping expectations and the reporting of steam leaks. Radiation Worker Training required for workers who have unescorted access to the radiological-controlled area contains numerous references on leaks as related to sources and indications of contamination and contamination control. RADCON is to be notified in these situations. Assistant unit operators receive periodic training to look for leaks and to initiate a work request for undocumented borated water leaks.

b. Is the training updated periodically to reflect industry lessons learned?

In general, training is updated periodically to reflect industry lessons learned. The Curriculum Review Committee

selects industry events which are factored into continuing training for personnel at SQN. The following topics are contained in continuing training:

1. Revisions to engineering standards and processes.

2. Lessons learned from review of internal and external operating experience.

3. Results of external evaluations or inspections.

4. Changes in regulatory requirements and environment.

TVA will be evaluating the recent operating experience with BWC for impacts on the training program.

5. Response to Leakage

a. Is there a formal leakage acceptance criteria?

Formal acceptance criteria are defined in the instructions where pertinent. For example, some instructions define that zero pressure boundary leakage is the acceptance criterion. For the primary coolant pressure boundary, the TS require zero pressure boundary leakage and one gallon per minute unidentified leakage.

b. Is Unidentified Leakage maintained sufficiently low to permit identification of new leaks at an early stage?

Unidentified leakage is reviewed by site management each weekday in the plan-of-the-day meeting. To ensure the unidentified leakage is maintained sufficiently low for identification of new leaks, the system engineer for the RCS monitors the results of SI performance data for the RCS water inventory balance. This SI is performed as required by the TS at least every 72 hours. The system engineer trends this data and investigates indications of increasing unidentified leakage. Most actions taken to eliminate unidentified leakage have involved valve seat

leakage which is detectable by increasing pipe temperature down stream of the valve. Minor packing leaks, compression fitting leaks, and canopy seal leaks have not been of sufficient magnitude to result in detection by trending as required by this instruction or by radiation and pocket sump instrumentation monitoring. These conditions are typically identified during walkdowns in accordance with plant instructions.

c. ***Does the corrective action program require confirmation of the leak source, potential consequential damage, repair, and cleanup of any remaining boric acid deposits?***

The TVAN Corrective Action Program is an administrative control procedure that establishes the process, requirements, and responsibilities for documenting and resolving problems. The TVAN BWC Program procedure contains requirements for corrective actions and provides reference to the TVAN "Corrective Action Program." The TVAN BWC Program procedure includes an evaluation form that addresses leak location, leak path, potential damage under insulation, contact with the primary coolant pressure boundary, damage assessment, acceptance criteria, initiation of a corrective action document, PER, and corrective actions. TVAN BWC procedure does not specifically require the removal of any remaining boric acid deposits.

d. ***Is an engineering evaluation performed if accumulated boric acid is not removed from components and surfaces susceptible to corrosion? Is the responsibility for evaluating possible degradation specified?***

TVA does not currently have procedural requirements to perform an engineering evaluation of accumulated boric acid that is not removed from components and surfaces susceptible to corrosion. This letter includes a commitment to address this situation. An engineering evaluation is required by the TVAN BWC Program procedure for any material which has surface evidence of more than

superficial rust. The TVAN BWC Program procedure specifies that site Engineering perform this evaluation.

e. ***What procedures and approvals are required when the source of the leak and potential consequential damage cannot be identified?***

When the source of the leakage can not be determined, the condition (source of the leak and any potential consequential damage) is addressed through the Corrective Action Program by initiation of a PER. When the PER is initiated, it is presented to the site Management Review Committee (MRC) that is comprised of managers from various site organizations. The PER is then assigned to the appropriate line organization for development of apparent or root cause and a corrective action plan. For selected PERs, the condition cause and corrective action plan are presented to MRC for review.

6. **Review of Program Effectiveness**

a. ***Is there a periodic management review of program effectiveness?***

Periodic management reviews have not been performed on the BWC elements of the SQN Corrosion Control Program. TVA has a proceduralized self-assessment program which conducts reviews of program effectiveness. A review of the program documents conducted by corporate Engineering in 1993 concluded that the program fulfills the requirements of GL 88-05. An assessment was performed on the SQN GL 88-05 Program in 1994 which concluded that the program had some weaknesses regarding the attributes of 88-05, and corrections were made to the program at that time. TVA plans to perform an assessment of the BWC Program by the fall of 2003.

b. ***Does the review include evaluation of any cases involving degradation, or operation with ongoing leaks from borated water systems?***

As stated in Topic 6.a above, SQN has not performed a periodic management review of the program effectiveness. However, the assessment to be conducted as discussed above will include an evaluation of appropriate elements.

c. ***Is the leakage reduction program effectiveness benchmarked against other plants?***

SQN has participated in the EPRI "Sealing Technology and Plant Leakage Reduction Working Group Meeting" in 1998. SQN has not benchmarked the leakage reduction approach being applied at SQN.

CONCLUSION SUMMARY STATEMENTS

Based on evaluation of TVA's boric acid inspection program described above, TVA considers there is reasonable assurance of compliance with the applicable regulatory requirements discussed in GL 88-05 and this bulletin. TVA plans to perform an assessment of the BWC Program by the fall of 2003. This assessment will be used to evaluate the effectiveness of enhancements and corrective actions made to the BWC Program in response to recent industry events.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

This enclosure contains WBN's sixty-day response to Required Information, Item 3.0, of the subject bulletin dated March 18, 2002.

NRC REQUEST

3. ***Within 60 days of the date of this bulletin, all PWR addressees are required to submit to the NRC the following information related to the remainder of the reactor coolant pressure boundary:***

   (A) the basis for concluding that your boric acid inspection program is providing reasonable assurance of compliance with the applicable regulatory requirements discussed in Generic Letter 88-05 and this bulletin. If a documented basis does not exist, provide your plans, if any, for a review of your programs.

RESPONSE

The response to this item is divided into two sections. Section I demonstrates implementation of Generic Letter (GL) 88-05, "*Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants.*" Section II provides a response to the six topics that were developed by the Electric Power Research Institute (EPRI), Materials Reliability Project (MRP), Alloy 600 Issue Task Group for responding to this item of the bulletin.

In summary, TVA's responses to the four GL 88-05 criteria contained in Section I and to the six MRP topics contained in Section II form the basis for concluding that WBN's Boric Acid Inspection Program provides reasonable assurance of compliance with the applicable regulatory requirements discussed in GL 88-05 and the subject bulletin. TVA plans to perform an assessment of WBN's Borated Water Corrosion (BWC) program by the fall 2003. This assessment will be used to evaluate the effectiveness of enhancements and corrective actions made to the BWC Program in response to recent industry events.

ENCLOSURE 2

TENNESSEE VALLEY AUTHORITY
WATTS BAR NUCLEAR PLANT (WBN)
UNIT 1

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

SECTION I - RESPONSE TO GENERIC LETTER 88-05 CRITERIA

GL 88-05 identified four criteria recommended for an effective Boric Acid Corrosion Program. Each criterion is provided below followed by a TVA response describing how WBN has incorporated the criterion into its BWC Program. Section II of this enclosure, which contains WBN's responses to the aforementioned EPRI-MRP topics, is referenced when applicable.

CRITERION 1

A determination of the principal locations where leaks that are smaller than the allowable technical specification limit can cause degradation of the primary pressure boundary by boric acid corrosion. Particular consideration should be given to identifying those locations where conditions exist that could cause high concentrations of boric acid on pressure boundary surfaces.

Response

The principal locations where leaks that are smaller than the allowable Technical Specification (TS) limit or locations where conditions exist where boric acid might accumulate on pressure boundary surfaces and result in degradation have been identified in plant procedures and instructions. These procedures and instructions address (or will address as committed in the Bulletin 2002-01, 15-day response dated April 2, 2002) principal locations where leakage could initiate (e.g., flanges, welds, packing, etc.) and also identify service-sensitive components (i.e., carbon and low alloy steel) in the primary coolant pressure boundary requiring direct visual examination.

WBN evaluates and tracks leaks in systems (safety, quality, and nonsafety-related process lines) containing borated water in the BWC Program. This activity is addressed in plant procedures and instructions and is tracked in the BWC Program database maintained by Engineering. Monitoring is accomplished by separate procedures and by the Inservice Inspection (ISI) Augmented Inspection Program (refer to previous commitment noted above) where there are specific requirements or actions regarding degradation of reactor pressure vessel boundary components (e.g. canopy seal weld leakage, etc.).

ENCLOSURE 2

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CRITERION 2

Procedures for locating small coolant leaks (i.e., leakage rates at less than technical specification limits). It is important to establish the potential path of the leaking coolant and the reactor pressure boundary components it is likely to contact. This information is important in determining the interaction between the leaking coolant and reactor coolant pressure boundary materials.

Response

WBN has procedures and instructions in place which address the detection of leaks including leaks in the primary coolant pressure boundary or in components of other systems that could impact the primary coolant pressure boundary. Identification of the leakage path and the potential for degradation of other non-leaking components is part of the BWC Program evaluation process. WBN's response in Section II, Topics 1, 2, and 3, provide the details of the procedures and instructions which define and implement the program.

CRITERION 3

Methods for conducting examinations and performing engineering evaluations to establish the impact on the reactor coolant pressure boundary when leakage is located. This should include procedures to promptly gather the necessary information for an engineering evaluation before the removal of evidence of leakage, such as boric acid crystal buildup.

Response

WBN procedures and instructions for the identification of leaks reference one procedure for the evaluation of borated water leaks. This procedure includes a form that provides step by step guidance in the collection of relevant data and the evaluation of the leak. WBN's response in Section II, Topics 1, 2, 3, and 5, provide the details of the procedure which defines the methodology for the collection of data and evaluation of leaks.

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CRITERION 4

Corrective actions to prevent recurrences of this type of corrosion. This should include any modifications to be introduced in the present design or operating procedures of the plant that (a) reduce the probability of primary coolant leaks at the locations where they may cause corrosion damage and (b) entail the use of suitable corrosion resistant materials or the application of protective coatings/claddings.

Response

WBN addressed industry issues regarding BWC before the plant was licensed. Modifications to install corrosion resistant materials were implemented as a corrective action to prevent occurrences of BWC. Most components in the primary coolant pressure boundary are stainless steel. These components were either procured with stainless steel bolting material or were changed to stainless steel bolting material prior to fuel loading. Components where this change was not feasible are included in the list of service-sensitive components discussed in Criterion 1. The use of graphite packing products recommended by EPRI has significantly reduced the incidences of BWC. WBN's response in Section II, Topic 1, provides the details of the procedure which includes methods for prevention of BWC and identifies actions which have been taken to prevent leaks. WBN's response in Section II, Topic 5, provides the details of the procedures which define the Corrective Action Program for BWC.

SECTION II - EPRI - MRP TOPIC OUTLINE

The basis for concluding that WBN's BWC Program complies with GL 88-05 and the subject bulletin is provided below in the form of six topics which cover the elements of the BWC Program. The six topics were developed by the EPRI-MRP Alloy 600 Issue Task Group for responding to this item of the subject bulletin. Compliance with those topics is addressed in the form of questions under each topic. Below are the responses to the questions which support each topic:

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1. Program Definition and Responsibility

   a. ***Is the 88-05 program defined by a separate procedure, or included in other procedures?***

   The BWC Program is defined in TVA Nuclear (TVAN) procedure "Corrosion Control Program," Appendix D, "Technical Requirements for the Borated Water Corrosion Program." This procedure describes the technical and organizational requirements for management of the BWC Program, evaluation of boric acid leaks, evaluation of corrosion damage, identification of components in the leak path, and guidance for initiating Problem Evaluation Reports (PERs) when required. This procedure also provides guidance for trending leakage data and suggests preventive maintenance when indicated. Lower tier site procedures and instructions complement the TVAN procedure to ensure that boric acid leaks and residue are identified and evaluated.

   The primary lower tier document that implements the BWC Program is Preventive Maintenance (PM) instruction, "Walkdown Inspection of Borated Water Systems and Reactor Coolant System." Engineering is responsible for the implementation of this instruction which is performed during refueling outages. This instruction requires a system inspection of the ASME Code Class 1 primary reactor coolant pressure boundary. This instruction includes visual examinations of control rod drive mechanism (CRDM) canopy seals (50 percent), conoseals (100 percent), reactor vessel head flange, steam generator primary manway flanges, reactor coolant pump main flange, upper head injection line stub welds, and reactor head vent welds and flanges. These are the areas where a leak of borated water might concentrate and result in significant damage to the primary reactor coolant pressure boundary. The walkdowns required by this instruction include the reactor coolant system (RCS), chemical and volume control system (CVCS), safety injection (SI), residual heat removal (RHR) system, containment spray (CS) system, and flood mode boration. These walkdowns are intended to identify

borated water leaks and residue beyond that which might be identified by other visual inspections and which might result in damage to the primary reactor coolant pressure boundary or other components. Identified leaks are evaluated in accordance with the TVAN BWC Program procedure.

The maintenance instruction for disassembly and reassembly of the reactor pressure vessel and attachments provides for inspections including the CRDM eyebolts on the CRDM seismic support platform, the reactor pressure vessel head and flange area (where insulation is removed), canopy seals, and instrument ports for boric acid crystals during each performance. If crystals are identified, the evidence is reported in accordance with the TVAN BWC Program procedure for evaluation.

TVAN Procedure, "Housekeeping/Temporary Equipment Control," requires that accumulations of borated water or borated water residue be reported by a work order. In addition to the procedures and instructions noted above, WBN has identified numerous other instructions and procedures which contain discussion concerning the identification and reporting of leaks.

b. Does the plant have voluntary leakage reduction and leak tracking programs as suggested in Section 7 of the Boric Acid Corrosion Guidebook, Revision 1?

WBN does not have a "Voluntary Leakage Reduction Program" per se that encompasses each of the elements described in the "Boric Acid Corrosion Guidebook." However, many of the leakage reduction program characteristics are ingrained in the WBN operating and maintenance culture. WBN management has been and continues to be focused on the detection, correction, and overall reduction of leaks. As such, the Maintenance organization is responsible for tracking any plant leaks, including boric acid leaks. One of the Maintenance focus areas is plant "backlog" items, which includes contaminated and noncontaminated leaks. This backlog indicator is routinely presented for site

management review. Plant leaks are categorized with subgroupings that reflect repair schedule (outage and non-outage). This allows the management team to determine if a negative trend exists, evaluate resource allocation, and determine if additional actions are warranted. Trending of work orders identifies areas that may be specific problems and results in additional attention. Recurring problem areas are placed in the Corrective Action Program for evaluation and development of corrective actions commensurate with the problem's significance. This may result in hardware refurbishment, replacement, or redesign.

c. ***Is responsibility for the 88-05 and leakage reduction programs specified?***

The GL 88-05 Program responsibilities are defined in the TVAN BWC Program procedure and site procedures further clarify those responsibilities. While there is no single, formal leakage reduction program defined in plant procedures, the responsibility for such is well defined and apportioned throughout the plant. Engineering is responsible for evaluating and trending boric acid leaks and component degradation as required by the TVAN BWC Program procedure. System Engineers and Operations personnel are responsible for leakage identification during system engineering walkdowns and performance of operator rounds. Plant personnel are responsible for reporting any leaks identified.

2. <u>Inspection Scope and Frequency</u>

a. ***Does the inspection scope provide for a multifaceted approach to leakage detection as suggested in the BAC Guidebook, including on-line leakage monitoring, containment air cooler thermal performance, visual inspections during containment entries, visual inspections during shutdowns and outages, visual inspections during plant startup, etc.?***

WBN has a multifaceted leakage detection approach which includes on-line radiation and leakage monitoring as

required by the TS, visual inspections during containment entries, system walkdown inspections during shutdowns and outages, and system walkdown inspections during plant startup.

Monitoring Reactor Building compartment cooler discharge temperatures is not specifically defined or formally performed for detecting boric acid leaks; however, Engineering performs quarterly trends as an indication of cooler performance. A corrective action document is initiated if there is any indication of degrading cooler performance to investigate the cause and initiate appropriate corrective action. Currently, an Operating Experience Review item for NRC Information Notice 2002-13, "Possible Indicators of Ongoing Reactor Pressure Vessel Head Degradation," is being evaluated to determine if the appropriate PM instructions for the containment coolers should be revised to include guidance to take appropriate action if evidence of boron or ferric oxide is identified on the coolers.

In addition, a corrective action document issued in 2001 resulted in an action to assess the need for periodic monitoring and evaluation of cooler performance. This assessment subsequently resulted in an action to issue instructions for periodic monitoring of the lower compartment coolers performance. These instructions, which are scheduled to be issued later this year, should detect degraded performance.

Instructions are also in place for identifying leaks in primary coolant sources outside of containment which also contain boric acid. This program provides controls to minimize leakage from those portions of the systems outside of containment that contain highly radioactive fluids during a serious transient or accident. The systems included in this program are RHR, CVCS, SI, RCS sampling, and CS. These instructions were developed in

response to NUREG-0737, Item III.D.1.1, and are performed at least each refueling cycle or more frequently if required, in accordance with TS 5.7.2.4, Primary Coolant Sources Outside Containment.

WBN TS limits unidentified leakage to one gallon per minute (gpm) and allows no pressure boundary leakage. This leakage is detected by radiation monitoring and/or the changing level of the containment pocket sump. The associated annunciator response instruction for the radiation detectors provides indication of increased radiation. The instruction requires that Plant Chemistry and RADCON be notified to investigate the cause of the alarm and initiate corrective action. This procedure provides guidance to identify a pressure boundary leak and would indirectly implement the BWC program. In addition, although not credited for TS compliance, WBN has a containment humidity alarm that would indicate an increase water vapor in containment and could be an indicator of potential RCS leakage.

ASME Section XI inspections and system pressure test programs, provide requirements for RCS leakage test and ASME Section XI system pressure test/RCS bolted connection inspections. These procedures require that identified leaks be evaluated and that corrective actions be consistent with the engineering evaluation conducted in accordance with the TVAN BWC Program procedure. The implementing technical instructions require that evidence of borated water leaks be evaluated in accordance with the TVAN BWC Program procedure.

A Surveillance Instruction (SI) for RCS water inventory balance has a frequency of performance of at least every 72 hours and is usually performed three times per week. It may be performed more frequently when required by TS. This SI does not reference the BWC Program procedure; however, the data from the performance is trended by Engineering and indication of unidentified leakage is investigated to determine the source.

b. ***Are inspection schedules based on potential leak rates and criticality (10 year ISI, each refuel outage, each startup/shutdown, other)?***

Inspections schedules are based on the nature of the concern and the potential for compromising pressure boundary integrity. The frequency of some inspections and walkdowns inside the containment vessel are limited while the reactor is in operation due to the high radiation fields. Specific instructions are performed each refueling outage to look at areas that are susceptible to boric acid leakage, areas that show a negative trend in leakage history, or areas where industry experience indicates the potential for a problem. The required frequency of performance is identified in each instruction and major activities are scheduled in either the plant or outage schedules.

Inspections for leakage detection are required to be performed at least once every refueling outage. Operator rounds are performed once each shift or in certain cases when warranted by plant operating conditions (e.g., TS Limiting Condition for Operation, etc.). Inspections that are included in the ISI Augmented Inspection Program are based on frequencies established by engineering guidance similar to the ASME Section XI sampling plan. For emergent activities that identify corrosion damage, the evaluation is performed as needed to ensure pressure boundary integrity.

c. ***Does the visual inspection scope include all sources of leaks including, flanges, valve packing, Alloy 600 PWSCC, or is it limited to certain leakage sources or locations?***

The scope of visual inspections of leak sources includes accessible flanges, valve packing, and Alloy 600 PWSCC locations. For inaccessible and/or high radiation areas, TVA uses methods other than visual (e.g., radiation monitors, pocket sump levels). Walkdowns of the borated

water systems are performed during each refueling outage and require visual inspections of susceptible areas listed in procedures to include sources of leaks from pumps and valves, valve packing, bolted connections, flanges, manways, flow elements, pump seals, instrument ports, welded areas and vessel head penetrations. TVA is revising the ASME Section XI ISI/NDE Program to include the augmented inspections of the Alloy 600 reactor vessel head penetrations at the head interface as stated in TVA's 15-day response to this bulletin on April 2, 2002.

d. ***Are acceptance criteria provided for all leak detection and visual inspections?***

Leak detection has established acceptance criteria within site procedures. These acceptance criteria are based on TS limits.

For visual inspections, the TVAN BWC Program procedure establishes acceptance criteria to be used in evaluating material wastage due to BWC. Corrosion allowances or minimum wall thickness are established by the design bases and used to evaluate the degree of wastage allowed. General wastage tolerances for plate and structural shapes are based on manufacturing tolerances. Corrosion allowances do not apply to bolting, seals, valve seats, springs, bearings, bushings and stems, or shafts in the seal area. If localized material loss due to BWC exceeds the established minimum wall thickness or if corrosion allowances are not known, Engineering performs an evaluation to determine the acceptability of the component or develops corrective actions to be performed.

e. ***Is the inspection scope reviewed periodically to reflect industry experience?***

While the inspection scope per se may not be specifically reviewed to reflect industry experience, TVAN's Operating Experience Program provides for the review of industry experiences by potentially impacted organizations

in order to ensure these experiences are factored into their programs when applicable. Site instructions incorporate industry experiences when they are determined to be applicable to plant conditions. These industry experiences may be reflected in Work Orders, newly established procedures, or augmented examinations added to the ASME Section XI Program.

3. Obstructions to Visual Inspections

a. ***Does the 88-05 program specify the plant condition when visual inspections are to be performed (pressurized/unpressurized, temperature, insulation removed, etc.)?***

Where specific examinations of components are identified and specific conditions are required by ASME Section XI or regulatory requirements, these parameters are identified in the instruction. An example where minimum pressure and temperature limits are required is in the instruction for RCS leakage test. Procedures for inspection of CRDM canopy seal welds for leakage are normally performed during unit shutdown during Modes 5 and 6. Inspections are normally performed prior to the removal of the reactor pressure vessel head, but may be performed after the head has been removed and installed in the storage stand.

Site instructions are performed prior to plant shutdown and/or during each refueling outage. In conducting inspections on components listed in the instructions, Engineering evaluates whether insulation is removed where there is evidence of leakage.

b. ***Does the GL 88-05 program provide criteria for locations with obstructions to visibility such as insulated* reactor vessel heads, reactor coolant piping, and valves/flanges?**

Where obstructions exist, provisions are made in plant instructions for inspecting for evidence of leakage in the general vicinity of the component of concern. Plant instructions provide for inspection in the following locations for evidence of leakage:

1. The lowest elevation of insulation on vertical surfaces.
2. At joints of insulation on horizontal surfaces.
3. The top of equipment surfaces beneath the component.
4. Regions above and beside the equipment.
5. The floor underneath the component.

Obstructions encountered during inspection on specific components (e.g., reactor head penetrations) would use a best effort examination and an engineering evaluation in determining whether there was a potential compromise to the reactor coolant pressure boundary based on the inspection results.

c. ***Are alternative inspection methods specified for locations with obstructed visibility (e.g., remote video, inspections of adjacent visible locations, etc.)?***

Alternate inspections are used at WBN for locations with obstructed visibility. Remote video is specified and will be used to perform at least part of the penetration to reactor vessel head interface inspections as committed in TVA's 15-day response to this bulletin dated April 2, 2002. One example is the VT-2 examination performed in operational Mode 3 before startup. This examination is performed with insulation on the system components and will detect gross leakage. Service-sensitive components have periodic direct or remote visual examinations which will detect boric acid residue leading to investigation and evaluation of the source. Remote video has been used in the past to inspect canopy seal welds.

4. Training

a. ***Are personnel who perform 88-05 inspections formally trained in program requirements, inspection methods, important design features, industry experience, and acceptance criteria?***

The materials engineers who perform the evaluation and inspection tasks associated with the BWC Program are required to be formally trained and qualified on the BWC program requirements. Other personnel who support these activities (e.g., structural analysts and inspection technicians) are trained and qualified in their area of expertise. TVA's Operating Experience Program provides relevant information to these personnel in accordance with program requirements.

In addition to the training provided for personnel who evaluate BWC, General Employee Training for unescorted plant access covers housekeeping expectations and the reporting of steam leaks. Radiation Worker Training required for workers who have unescorted access to the radiological controlled area, contains numerous references on leaks as related to sources and indications of contamination and contamination control. RADCON is to be notified in these situations. Assistant unit operators receive periodic training to look for leaks and to initiate a work request for undocumented borated water leaks.

b. ***Is the training updated periodically to reflect industry lessons learned?***

In general, training is updated periodically to reflect industry lessons learned. The Curriculum Review Committee selects industry events which are factored into continuing training for personnel at WBN. The following topics are contained in continuing training:

1. Revisions to engineering standards and processes.

2. Lessons learned from review of internal and external operating experience.

3. Results of external evaluations or inspections.

4. Changes in regulatory requirements and environment.

TVA will be evaluating the recent operating experience with BWC for impacts on the training program.

5. Response to Leakage

a. Is there a formal leakage acceptance criteria?

Formal acceptance criteria are defined in the instructions where pertinent. For example, some instructions define that zero pressure boundary leakage is the acceptance criterion. For the primary coolant pressure boundary, the TS require zero pressure boundary leakage and one gpm unidentified leakage.

b. Is Unidentified Leakage maintained sufficiently low to permit identification of new leaks at an early stage?

Unidentified leakage is reviewed by site management each weekday in the plan of the day meeting. To ensure unidentified leakage is maintained sufficiently low for identification of new leaks, the system engineer for the RCS monitors the results of surveillance instruction performance data for the RCS water inventory balance which is performed as required by the TS at least every 72 hours. The system engineer follows the trend of this data and investigates indications of increasing unidentified leakage. Most actions taken to eliminate unidentified leakage have involved valve seat leakage which is detectable by increasing pipe temperature down stream of the valve. Minor packing leaks, compression fitting leaks, and canopy seal leaks may not be of sufficient magnitude to result in detection by trending as required by this instruction or by radiation and pocket sump

instrumentation monitoring. These conditions are typically identified during walkdowns in accordance with plant instructions.

c. Does the corrective action program require confirmation of the leak source, potential consequential damage, repair, and cleanup of any remaining boric acid deposits?

The TVAN Corrective Action Program is an administrative control procedure that establishes the process, requirements, and responsibilities for documenting and resolving problems. The TVAN BWC Program procedure contain requirements for corrective actions and provides reference to the TVAN "Corrective Action Program." The TVAN BWC Program procedure includes an evaluation form that addresses leak location, leak path, potential damage under insulation, contact with the primary coolant pressure boundary, damage assessment, acceptance criteria, initiation of a corrective action document, PER, and corrective actions. TVAN BWC procedure does not specifically require the removal of any remaining boric acid deposits.

d. Is an engineering evaluation performed if accumulated boric acid is not removed from components and surfaces susceptible to corrosion? Is the responsibility for evaluating possible degradation specified?

TVA does not currently procedurally require an evaluation if accumulated boric acid is not removed from component surfaces susceptible to corrosion. This letter includes a commitment to address this situation. An engineering evaluation is required by the TVAN BWC Program procedure for any material which has surface evidence of more than superficial rust. This TVAN BWC Program procedure specifies that site Engineering perform the evaluation.

e. ***What procedures and approvals are required when the source of the leak and potential consequential damage cannot be identified?***

When the source of the leakage can not be determined, the condition (source of the leak and any potential consequential damage) is addressed through the Corrective Action Program by initiation of a PER. When the PER is initiated, it is presented to the site Management Review Committee (MRC) that is comprised of managers from various site organizations. The PER is assigned to the appropriate line organization for development of apparent or root cause and a corrective action plan. For selected PERs, the condition cause and corrective action plan are presented to MRC for review.

6. **Review of Program Effectiveness**

a. ***Is there a periodic management review of program effectiveness?***

Periodic management reviews have not been performed on the BWC elements of WBN's Corrosion Control Program. TVA has a proceduralized self-assessment program which conducts reviews of program effectiveness. A review of the program documents conducted by corporate Engineering in 1993 concluded that the program fulfills the requirements of GL 88-05. TVA plans to perform an assessment of the BWC Program by the fall of 2003.

b. ***Does the review include evaluation of any cases involving degradation, or operation with ongoing leaks from borated water systems?***

As stated in Topic 6.a above, WBN has not performed a review of the program effectiveness. However, the assessment to be conducted as discussed above will include an evaluation of the appropriate elements.

c. ***Is the leakage reduction program effectiveness benchmarked against other plants?***

WBN has not formally benchmarked against other plants; however, maintenance management has observed leakage reduction aspects at another facility. Information from such visits is typically evaluated for effects on the WBN program and enhancements identified if warranted. There were no changes identified as a result of these observations.

WBN has participated in the EPRI Plant Leak Reduction Workshop Series training in conjunction with mockup training for a hands-on learning experience.

CONCLUSION SUMMARY STATEMENT

Based on the evaluation of TVA's boric acid inspection program above, TVA considers there is reasonable assurance of compliance with the applicable regulatory requirements discussed in GL 88-05 and this bulletin. TVA plans to perform an assessment of the BWC program by the fall 2003. This assessment will be used to evaluate the effectiveness of enhancements and corrective actions made to the BWC program in response to recent industry events.

ENCLOSURE 3

TENNESSEE VALLEY AUTHORITY

SIXTY-DAY RESPONSE TO NRC BULLETIN 2002-01, "REACTOR PRESSURE VESSEL HEAD DEGRADATION AND REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY"

LIST OF COMMITMENTS

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1. TVA will perform an assessment of the Borated Water Corrosion (BWC) Program. The assessment will be completed by the fall of 2003.

2. TVA will revise the BWC Program to require a specific evaluation if accumulated boric acid is not removed from component surfaces susceptible to corrosion. This revision will be completed by December 31, 2002.