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May 17, 2002
L-02-055

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555-0001

Subject: Beaver Valley Power Station, Unit No. 1 and No. 2
BV-1 Docket No. 50-334, License No. DPR-66
BV-2 Docket No. 50-412, License No. NPF-73
60-Day Response to Bulletin 2002-01, Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity

This letter provides the FirstEnergy Nuclear Operating Company (FENOC) 60-day response for Beaver Valley Power Station (BVPS) Units 1 and 2 to NRC Bulletin 2002-01 dated March 18, 2002. The Bulletin was issued to obtain plant-specific information related 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.

The FENOC 15-day response for BVPS Units 1 and 2 to address reactor pressure vessel head integrity was submitted via letter L-02-032 on April 1, 2002. Supplemental information was subsequently provided on April 19, 2002 (L-02-040) and on May 10, 2002 (L-02-054). The required information to address reactor pressure vessel inspection results within 30 days following restart was provided for BVPS Unit 1 on October 31, 2001 (L-01-136) and for Unit 2 on March 28, 2002 (L-02-021). As requested by the Bulletin, the 60-day response for BVPS Units 1 and 2, to address the integrity of the remainder of the reactor coolant pressure boundary, is provided in Enclosure 1 to this letter.

This BVPS response was developed using the guidance provided by the EPRI Materials Reliability Project (MRP) for assessing our programs. Based on our assessment, we have concluded that the boric acid inspection program at BVPS provides reasonable assurance of compliance with the applicable regulatory requirements discussed in Generic Letter 88-05 and Bulletin 2002-01.

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If there are any questions concerning this matter, please contact Mr. Larry R. Freeland, Manager, Regulatory Affairs/Corrective Action at 724-682-5284.

I declare under penalty of perjury that the following is true and correct. Executed on May 17, 2002.

Sincerely,

R. E. Donnellon

R. E. Donnellon

Enclosure

c: Mr. D. S. Collins, Project Manager
Mr. D. M. Kern, Sr. Resident Inspector
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Enclosure 1

60-Day Response to NRC Bulletin 2002-01 "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity" for Beaver Valley Power Station (BVPS) Units 1 and 2

Note that these responses apply for both BVPS Units 1 and 2 because the inspections and maintenance programs are common for both units. Plant specific information for each unit is provided where necessary.

The Bulletin required that PWR licensees provide the following information within 60 days of the date of the Bulletin:

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 the bulletin. If a documented basis does not exist, provide your plans, if any, for a review of your program.

Response:

The following is a summary of the BVPS inspection program for the structural integrity of the reactor coolant system pressure boundary. This response is provided in the outline form suggested by the EPRI Materials Reliability Project (MRP) for assessing our program.

1. Program Definition and Responsibility

a. Is the Generic Letter (GL) 88-05 program defined by a separate procedure, or included in other procedures?

The Generic Letter 88-05 inspections are performed under several examination programs.

Boric Acid Corrosion Control Program:

The Boric Acid Corrosion Control Program is implemented through NDE Procedure VT-510, "*Visual Examination for Boric Acid.*" The program specifically covers examination requirements to identify evidence of leakage from valve packing, mechanical joints and other similar areas of potential leakage.

The Boric Acid Corrosion Control Program was developed based on the guidance provided in NRC Generic Letter 88-05 "Boric Acid Corrosion of Carbon Steel Reactor Pressure Boundary Components in PWR Plants". The program requirements include the following:

- The determination of principal locations where coolant leaks smaller than allowable specification limits could cause degradation of the pressure boundary by boric acid corrosion,
- Methods for conducting examinations that are integrated into VT-2 exams conducted during system pressure tests, and
- Corrective actions to prevent recurrences of this type of leakage.

Additionally, two other leakage-related programs exist to implement the requirements of ASME Section XI, 1989 Edition, Article IWA-5000, "System Pressure Tests." These are the System Leakage Program and the Bolted Connection Program.

<u>ASME Section XI System Leakage Program:</u>

The System Leakage Program implements the system leakage examination requirements set forth by the American Society of Mechanical Engineers (ASME) Section XI Code, "*Rules for Inservice Inspection of Nuclear Power Plant Components*". The program verifies that Class 1, 2 & 3 systems maintain pressure boundary integrity through periodic systematic visual inspections. The System Leakage Program is implemented through Procedure VT-502, "*Leakage Examination Requirements*".

<u>ASME Section XI Bolted Connection Program:</u>

The Bolted Connection Program implements the bolted connection visual examination requirements set forth by the ASME Section XI Code, "*Rules for Inservice Inspection of Nuclear Power Plant Components*". The goal of the program is to verify through systematic visual inspections, that closures (bolted connections) are assembled and maintained to have a low risk of leakage. The Bolted Connection Program is implemented though Procedure VT-502, "*Leakage Examination Requirements*", which branches to Procedure VT-501, "*Visual Examination of Threaded Fasteners*" for bolting acceptance criteria.

In addition, Operating Surveillance Procedures (1-OST-48.2 and 2-OST-48.2 respectively) are performed quarterly at each Unit to examine accessible high-energy lines and Emergency Core Cooling Systems (ECCS) outside of containment. These visual examinations are performed by VT-2 qualified personnel to address boric acid leakage using NDE Procedure VT-510, "*Visual Examination for Boric Acid.*" Additionally, the examination encompasses high-energy systems (Feedwater and Main Steam Systems).

General requirements are identified in Procedure VT-500 "General Requirements for Visual Examinations" which defines qualification requirements for the inspection personnel. NDE personnel who perform examinations for leakage or evidence of boric acid are VT-2 Level II certified as a minimum.

These programs overlap to some degree with respect to actual physical activities, resolution of observed leakage, corrective measure and qualifications of personnel performing the examinations. Due to the similarities, a process improvement is currently being evaluated to consider a merger of the three programs.

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

Identification and tracking of chronic leaking components has been and continues to be a part of the Boric Acid Corrosion Control Program, and has been successful in planning and implementing effective corrective maintenance. Plant Engineering implementation procedure for boric acid leakage monitoring identifies recurring trends and provides a tracking mechanism for chronic leaking components. A Plant Engineering Boric Acid Monitoring Report is tabulated each cycle per unit and identifies recurring work orders for boric acid leakage issues. Work Orders are generated to plan and schedule follow-up resolution during the next outage or scheduled opportunity. Increased management awareness and lowering of the threshold for boric acid leakage issues have been reflected in the latest Boric Acid Report (dated 4/9/2002).

The Valve Packing Program at BVPS was enhanced in 2001 and has a Program Owner and management support. The program is in accordance with the guidance provided in Section 7 of the BAC Guidebook and is continually evaluated to incorporate improvements towards preventing boric acid leakage from occurring. Positive aspects of the program include the use of hardened washers, proper consolidation techniques, and follow-up re-torques after repacks, if necessary. The Valve Packing Engineer evaluates the proper packing type, configuration and torque requirement for each valve that is repacked. The BVPS Corrective Action Program provides for tracking and follow-up as to the cause of valve stem leakage for valves repacked in accordance with the program.

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

The program manuals and site expectations for Program Owners clearly state the responsibilities of the Boric Acid Corrosion Control Program owner. The owner is responsible for all aspects of the program, including procedures, near and long term improvement plans, and periodic effectiveness reviews of the Program.

Specific responsibilities of the Boric Acid Corrosion Control Program owner include, but are not limited to:

- Implementation of the BVPS Boric Acid Corrosion Control Program, which governs the identification, cleaning and trending of boric acid leakage,
- Maintaining the Boric Acid Corrosion Control Program to effectively manage and trend boric acid leakage,
- Ensuring the examinations are performed, documented and entered into the leakage tracking database, and
- Identification of leakage and initiation of Work Requests and Condition Reports for leakage observed during the examinations.

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.?

The inspection scope does provide for a multifaceted approach to leakage as suggested in the BAC Guidebook.

The Reactor Coolant System (RCS) Engineers at each unit monitor both identified and unidentified RCS leakage on both short and long-term bases. Nuclear Shift Managers are also keenly aware of the shift-to-shift changes and trends. These attributes are also published and discussed at the daily manager's communication meeting.

The plant system engineers perform periodic walkdowns of their assigned systems to document system performance, material condition, key system parameter trends, and potential problems that might affect system performance. The following key system parameters are routinely monitored by the RCS System Engineer to determine the health of the RCS pressure boundary: reactor containment building sump pumpout rate, RCS leakage rate, and reactor containment building dewpoint temperature. A review of these key system parameters over the past two years has shown no adverse trends.

As part of routine preventive maintenance, the Control Rod Drive Mechanism (CRDM) Shroud Fan Coils and the Containment Air Recirculation (CAR) Fan Coils are inspected for debris and dirt accumulation that would reduce the efficiency of the coils. Evidence of boric acid on the cooling coils would be an indicator of an RCS pressure boundary leak.

The Reactor Building Radiation Monitoring Leakage Detection System is comprised of both airborne particulate radioactivity and airborne gaseous radioactivity monitors. These monitors are capable of detecting RCS pressure boundary leakage in accordance with plant technical specifications. The data from this system is monitored, recorded and trended by Health Physics personnel and anomalies reported to the Control Room. Due to the sealed nature of the BVPS containment buildings, the reactor building radiation monitoring system is extremely sensitive to leakage from the RCS pressure boundary.

Beaver Valley Site Senior Management personnel regularly tour containment during refueling outages, providing another source of management oversight with respect to plant materiel condition and reinforcement of management expectations. Although not VT-2 qualified, these Senior Management personnel also perform containment closeout walkdown examinations prior to plant heat-up following refueling outages. Containment Coordinators also provide continuous coverage of containment activities during refueling outages, and have proven adept at identifying evidence of leakage or component damage.

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

Inspection schedules are typically based on refueling outages – both at shutdown and startup. In addition, it has been the practice to perform inspections whenever components are readily accessible, as in the case of forced outages, or if leakage is suspected as identified through other monitoring parameters.

Following each operating cycle, a scheduled boric acid walkdown inspection is performed by Visual Testing (VT) qualified personnel to identify boric acid accumulations or other indications of leakage from borated systems. In addition, an inspection of the RCS pressure boundary inside the Reactor Containment Building is conducted during plant startup following refueling outages, when the system is initially pressurized to approximately 300 psi, to observe for leaks. Leakage accumulations identified during the inspections are tracked through the site corrective action program and resolved through the site maintenance and design change processes.

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?

All accessible locations are inspected for evidence of leakage. Bolted connections, including valve-to-bonnet bolting, are examined following removal of insulation, if required, to perform examinations. There has also been an increased focus since the issuance of Information Notice 2000-17, to specifically examine components containing Alloy 600 series base materials or Alloy 82/182 welds.

During refueling outages, ASME Class 1 bolted connections are visually examined by VT-2 qualified personnel for evidence of leakage. Additionally, the bolted connections for borated ASME Class 2 systems are visually examined at least once per 40-month period for evidence of boric acid leakage.

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

Acceptance criteria are provided for all leak detection and visual inspections as specified within the implementing procedures governing each leakage examination activity or corrective action follow-up activities. Procedure VT-502, "*Leakage Examination Requirements*" provides acceptance criteria and specifies the following leakage-related conditions as *unacceptable*:

- Buried components with leakage losses in excess of limits established by Engineering,
- Leakage at a bolted connection, (reference VT-501 for acceptance criteria),
- Components with local areas of general corrosion that reduce the wall thickness by more than 10%,
- Any leakage whose source is from a pressure-retaining weld,
- Any leakage whose source is through base-metal material,
- Leakage from insulated or inaccessible components that will require location of leakage source,
- Discoloration or accumulated residues on surfaces of components, insulation or floor areas that may be evidence of borated water leakage, or

- Excessive leakage from expected areas with or without a leakage collection system that cannot contain the leakage.

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

Operating Experience (OE) is an integral part of the Boric Acid Corrosion Control Program that is reviewed periodically for process improvements and enhancements to the program. BVPS has a strong OE program with applicable OE postings being evaluated through the site corrective action program in order to implement enhancements to the program or procedure revisions or additional examinations, if warranted. For example, the reactor vessel inlet and outlet nozzles were visually examined for evidence of leakage at both units during the 1R14 and 2R09 outages, based on Information Notice 2000-17 experience. Safety Injection accumulator tanks and tank nozzles were closely examined for leakage following the posting of OE12133 (Safety Injection Accumulator Tank Nozzles Replaced due to Intergranular Stress Corrosion Cracking) in March 2001.

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.)?**

Boric acid walkdown inspections are performed during refueling outages to identify evidence of leakage following a cycle of power operation. The inspections identify the need for corrective maintenance at the onset of an outage. Additionally, ASME Code required system leakage examinations at nominal RCS operating temperature and pressure are performed at the end of refueling outages prior to power operation.

The boric acid walkdown inspections conducted by VT-2 qualified personnel are performed in containment at the beginning of each refueling outage on all elevations and accessible locations to specifically identify, photograph and report leakage or deposits of boric acid. During refueling outage activities as initially inaccessible components become accessible, additional examinations are performed in conjunction with ISI NDE and visual examinations, walkdowns, and bolted connection examinations.

Following each refueling outage, VT-2 qualified personnel perform a system leakage examination on the RCS pressure boundary and other pressurized containment systems when the RCS reaches nominal operating temperature and pressure. This examination activity also serves as the post-maintenance system leakage examination on items that were repaired, replaced, or disassembled during the refueling outage.

Test conditions are specified within the governing procedures, based on the purpose of the examination. These procedures are based on the ASME Section XI requirements applicable to the activity being performed.

The boric acid leakage inspection practices at BVPS currently include the following attributes:

- Inspections include the locations that contain carbon steel bolting associated with borated systems when performing walkdowns.
- The low point of any insulated borated piping system is carefully examined for evidence of leakage, since leakage would accumulate at this point.
- The underside, insulation joints, and low points of insulated vessels and tanks containing borated water are also examined for evidence of leakage.
- Evidence of leakage is identified and evaluated.
- Boric acid leaks identified during the boric acid walkdown inspection are entered into the site corrective action program and are resolved prior to plant startup.

Bolted connection examinations are performed per ASME Section XI. ASME Section XI requires systems borated for the purposes of controlling reactivity to have installed insulation removed from the pressure retaining bolted connections for VT-2 visual examinations.

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

Examination criteria and accessibility requirements are specified within the procedure governing the examination. Scaffolding is provided (when necessary) and insulation is removed to examine Class 1 and 2 bolted connections. Other insulated pressure boundary components are examined at the horizontal or vertical insulation seams or at the lowest point to detect pressure boundary leakage in accordance with ASME Section XI requirements. Areas adjacent to and below components are examined for evidence of leakage.

The criteria established for the visual inspection of the reactor vessel head and penetrations at both units were identified previously in our 15 day response to the Bulletin (Reference submittal L-02-032 dated April 1, 2002).

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

Alternative inspection methods have not been necessary to meet the applicable examination procedure access requirements except for the reactor vessel head penetration examinations performed at both units in accordance with Bulletin 2001-01. In those cases, visual examinations were performed, using both robotic and remote video probe equipment. Examination results were recorded using narrated videotape to allow for subsequent review and to document as-left conditions for comparison with future examinations.

Additionally, binoculars, telephoto lenses and high intensity lighting have been used when specific component examinations are required or desired. A recent example of such an application is the remote visual examinations of reactor vessel conoseals recently performed at Unit 2 during a forced outage in April of 2002 (Reference submittal L-02-054 dated May 10, 2002).

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?**

Procedure QSP 2.3, "*Written Practice for Qualification and Certification of Nondestructive Examination and Testing Personnel*," specifies how Nondestructive Examination (NDE) and Testing Personnel are to be qualified. It also specifies the minimum education, experience and training requirements for each level of certification. This procedure meets the intent of ASME Section XI 1989 Edition (excluding Appendix VII) and SNT-TC-1A 1984 Edition.

All of the NDE personnel who perform examinations for leakage or evidence of boric acid are certified to at least VT-2 Level II. Formal NDE Training is performed to qualify individuals for VT-2 Certification. NDE personnel, usually Level III NDE Instructors, provide this training. The VT-2 Leakage Examination training covers ASME Codes, safety, plant drawings, NDE (VT) procedures, insulation, inaccessible components, areas of potential leakage, corrosion, acceptable standards and recording requirements. Following training, general, specific and practical examinations are administered to complete certification. NDE personnel are also required to have annual eye examinations.

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

Training is periodically updated when NDE procedures are revised, examination plans are updated, or on an as-needed basis. The VT-2 Training was recently revised in preparation for re-certification of several individuals whose certifications are expiring. Visual Certification requires re-certification by examination every three years for Level II and every five years for Level III personnel.

Industry Operating Experience (OE) in the form of INPO OE or INPO Newsgroup items is typically forwarded to NDE personnel for their review and actions. Additionally, NDE personnel review industry enforcement actions and Licensee Event Reports (LERs), and participate in applicable INPO newsgroups to capture industry lessons learned for program enhancements.

5. Response to Leakage

a. Is there a formal leakage acceptance criteria?

The BVPS Unit 1 and Unit 2 Technical Specifications provide a formal leakage acceptance criteria for Reactor Coolant System (RCS) Identified Leakage and RCS Unidentified Leakage. The RCS leakage rate is calculated by the performance of Operations Surveillance Test (OST) 1OST-6.2 "*Reactor Coolant System Water Inventory Balance*" at Unit 1 and 2OST-6.2 "*Reactor Coolant System Water Inventory Balance*" at Unit 2. The following acceptance criteria have been established for these procedures:

- Identified Leakage greater than 10 gpm or Unidentified Leakage greater than 1.0 gpm (refer to Technical Specification 3.4.6.2).
- Unidentified Leakage between 0.5 gpm and 1.0 gpm; however leakage has not been increasing since the last performance of the procedure, then re-perform test every 72 hours as scheduled.
- Unidentified Leakage between 0.5 gpm and 1.0 gpm and leakage has been increasing since the last performance of the procedure, then consult Station Management for a possible Containment entry for leak identification.
- Unidentified Leakage less than 0.5 gpm, then re-perform test every 72 hours, as scheduled.

Based on recent industry information, enhancements have been identified for the program to include additional monitoring considerations in the event of increasing RCS unidentified leak rates.

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

Unidentified Leakage has been negligible (average leakage, less than or equal to 0.05 gpm) over the last two fuel cycles of operations at both BVPS Units 1 & 2. Since the last head inspection at Unit 1 (during the 1R14 September 2001 refueling outage) and the last head inspection at Unit 2 (during the 2R09 February 2002 refueling outage), the average unidentified leakage rate has remained negligible at less than 0.03 gpm. By maintaining unidentified leakage at these extremely low levels, RCS leakage can be identified at its early stages, particularly by the containment radiation monitoring system. Due to the sealed nature of the containment building at BVPS (closed ventilation systems), the containment radiation monitoring system is extremely sensitive to leakage from the RCS pressure boundary. The current Identified RCS Leak Rate, Unidentified RCS Leak Rate, and Average Containment Pumpout Rate are reported daily on the individual plant's Operating Status Report for management review of station performance.

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

BVPS procedures provide for the identification of leakage sources, consideration of potential consequential damage, repair, and cleanup of deposits.

Any individual that discovers a problem can identify and report boric acid leakage through the Corrective Action Program, but qualified NDE examiners typically report such conditions. The NDE organization uses procedures VT-501 "*Visual Examination of Threaded Fasteners*," VT-502 "*Leakage Examination Requirements*," and VT-510 "*Visual Examination for Boric Acid*" to perform the examinations.

Examination procedure NDE-VT-502 "*Leakage Examination Requirements*" states that the source of leakage detected during the conduct of a system pressure test shall be located. An acceptance criterion in the procedure specifies that leakage from insulated or inaccessible components requires the location of the leakage source to be identified. The procedure stipulates that the examiner determine if further evaluation is needed when there is residue or seepage accumulation on equipment directly under the leaking component which may jeopardize the operability of the equipment.

NDE-VT-510 "*Visual Examination for Boric Acid*" provides acceptance criteria for boric acid examinations. A light coating of dry boric acid residue is acceptable provided it does not preclude the inspector from determining that significant material degradation has not occurred. Conditions exceeding the acceptance criteria are reported and corrected.

When boric acid leakage is identified, it is reported on a Condition Report and the resolution of the issue can be done in one of three ways. If the leakage residue is minor, cleanup is done per the instructions provided in maintenance work procedure, 1/2-CMP-M-75.034. If the condition identified is beyond the scope of the procedure, customized work packages are generated that address the specific conditions identified. If the condition could not be remedied by maintenance, a Corrective Action in support of the Condition Report would be initiated for resolution and evaluation by Engineering.

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?

Engineering Standard ES-M-031 "*Leakage and Corrosion Evaluations*" was revised in August of 1997 and provides general guidance for evaluating the effects of leakage and corrosion on components at BVPS. The Standard addresses responsibility for performing the evaluation and provides details on how to do an evaluation. It lists the following types of information to gather to perform the evaluation:

- The source of the observed leakage.
- A complete listing of all components or parts touched by the corrosive agent.
- The chemical make-up of the leaking fluid.
- The types of materials involved.
- The temperature of the components, corrosive agent, and general area.
- The leak rate of the corrosive agent.
- The length of time the leak or corrosive agent has been present.
- The system/component/part operating parameters and requirements.
- A description of any material degradation.
- The results of any NDE performed on the area of evaluation.
- The drawings or technical manuals.

- Technical Specification, Operating Manual, and UFSAR requirements.
- Results of any direct assessments done.
- Results of the engineering evaluations.

The Standard identifies references to use, including the EPRI Boric Acid Corrosion Guidebook, and describes how to determine if the component is acceptable and how to project the remaining life of the component. The BVPS Corrective Action Program would document the evaluation and ultimate disposition.

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

At BVPS, the sources of leakage are required to be identified. As described in the response to question 5.c, site procedures require that the source of leakage be determined and provide for evaluation of potential consequential damage. The procedures preclude the site from needing "procedures and approvals for circumstances when the source of the leak and potential consequential damage cannot be identified."

6. Review of Program Effectiveness

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

Both internal and external periodic reviews have been conducted to determine program effectiveness. As a result of a recent corrective action, program ownership for the Boric Acid Corrosion Control Program was assigned within the NDE group and a Program Manual was assembled to compile key programmatic elements in a single location. Key elements for this Program Manual include; Vision Statement, Program description, References, List of Procedures, FENOC Common Process, Industry Operating Experience, 1 & 5 Year Plans for Improvement, Corrective Actions, Self-Assessments and Effectiveness Reviews, Training, Performance Indicators, and Quarterly Health Reports. The Program Manual is a "living document", and is currently being revised to include recent (since November 2001) trending data and boric acid-related condition reports, Industry Operating Experience, and Program enhancements to incorporate process improvements.

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

There are no known ongoing leaks presently associated with borated water systems that involve degradation of carbon steel components. Effectiveness reviews conducted to date have been more focused on the programmatic, implementation and ownership aspects of the program. Any cases involving degradation or operation with ongoing leakage are evaluated in accordance with Engineering Standard ES-M-031, "*Leakage and Corrosion Evaluations*."

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

As part of the Boric Acid Corrosion Control Program 1-year improvement plan dated December 1, 2001, the Boric Acid Corrosion Control Handbook (EPRI TR 100975, Revision 1) will be utilized as a key source for establishing a leakage reduction program. The Valve Packing Program has been benchmarked against other plants, and enhancements that are being made to the Program will have a positive effect in reducing boric acid leakage.