May 15, 2002

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

Subject: Duke Energy Corporation
Catawba Nuclear Station Units 1 & 2
Docket Nos. 50 -413, 414
McGuire Nuclear Station Units 1 & 2
Docket Nos. 50 -369, 370
Oconee Nuclear Stations Units 1, 2 & 3
Docket Nos. 50-269, 270, 287

60 Day Response to NRC Bulletin 2002-01:
Reactor Pressure Vessel Head Degradation
Reactor Coolant Pressure Boundary Integrity

Pursuant to 10 CFR 50.54(f), this letter and the associated attached Enclosures provide Duke Energy Corporation's 60 day response to NRC Bulletin 2002-01 for the Catawba, McGuire and Oconee Nuclear Stations. Responses are provided for Bulletin item 3.A in Enclosures I, II and III for Catawba, McGuire and Oconee respectively. These responses provide a basis for reasonable assurance that all applicable regulatory requirements are and will continue to be met and that the facilities will be operated in a safe manner. The responses describe methods and processes currently in place at each plant. This information was collected using reasonably available sources and means available to meet the requested 60 day response. Responses for Bulletin items 1.A through 1.E were provided on April 1, 2002.

Duke Energy has not made any specific regulatory commitments in response to this bulletin.

If you have questions or need additional information, please contact Gregory S. Kent at (704)373-6032.

Very truly yours,

M. S. Tuckman

ENCLOSURES

xc: L.A. Reyes
U.S. Nuclear Regulatory Commission
Regional Administrator,
Region II Atlanta Federal Center
61 Forsyth St., SW, Suite 23T85
Atlanta, GA 30303

C.P. Patel
NRC Project Manager (CNS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

R.E. Martin
NRC Project Manager (MNS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

L.N. Olshan
NRC Project Manager (ONS)
U.S. Nuclear Regulatory Commission
Mail Stop O-8 H12
Washington, DC 20555-0001

S.M. Shaeffer
Senior Resident Inspector (MNS)

D.J. Roberts
Senior Resident Inspector (CNS)

M.C. Shannon
Senior Resident Inspector (ONS)

M. S. Tuckman, affirms that he is the person who subscribed his name to the foregoing statement, and that all the matters and facts set forth herein are true and correct to the best of his knowledge.

____
M. S. Tuckman, Executive Vice President

Subscribed and sworn to me: _____________________________
Date

____
Notary Public

My Commission Expires: _____________________
Date

SEAL

bcc: L.F. Vaughn - PB05E
M.T. Cash - EC05O
C.J. Thomas - MG01RC
G.D. Gilbert - CN01RC
L.E. Nicholson - ON03RC
M.R. Robinson -
G.S. Kent - EC05O
J.M. Shuping - EC09O
D.E. Whitaker - EC09O
K.L. Crane - MG01RC
K.E. Nicholson - CN01RC
J.E. Smith - ON03RC
Catawba Master File - CN01DM
McGuire Master File - MG01DM
Oconee Master File - ON03DM
Saluda River Electric Corporation
NC Municipal Power Agency No. 1
TR Puryear, NC Electric Membership Corporation - CN03G
Piedmont Municipal Power Agency
ELL - EC05O

ENCLOSURE I
Catawba Nuclear Station
Response to NRC Bulletin 2002-01

Requested Information

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:

Catawba Nuclear Station (CNS) has implemented certain programs designed to identify reactor coolant leakage[1] and document corrective actions necessary to prevent adverse effects on plant equipment. Some of these requirements were implemented in response to Generic Letter 88-05[2] (GL 88-05). These programs include:

- Administrative procedures governing the conduct of all plant personnel with respect to system leakage
- Inspections of the Reactor Coolant System (RCS) by means of plant walkdowns
- Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage
- Operational Leakage Program
- Inservice Inspection Program (ISI)

---

[1] Reactor Coolant Leakage and boric acid leakage are used interchangeably to refer to primary water which contains some concentration of boric acid.
[2] Generic Letter 88-05 Boric Acid Corrosion of Carbon Steel

Administrative procedures governing the conduct of all plant personnel with respect to system leakage

The Fluid Leak Management Program was developed to ensure aggressive identification of leaks followed by timely investigation and repair. When boric acid leakage is involved, this program requires activities to identify the source of leakage and evaluate subsequent corrosion degradation of associated piping, structures and components. The RCS is included within the scope of the program.

The Fluid Leak Management Program defines roles and responsibilities for all site personnel. Under this program, boric acid leaks are reported to a program coordinator and are recorded and tracked within a fluid leak management database. Corrective actions are developed commensurate with the evaluation of the leakage.

The Materiel Condition/Housekeeping, Cleanliness/Foreign Material program requires all leaks to be contained, and that boric acid corrosion concerns be identified promptly. As part of this program, leaks and corrosion concerns are entered into the corrective action program.

Inspections of the RCS by means of plant walkdowns

"Shutdown / Startup Walkdowns" are performed each refueling outage. A purpose of these walkdowns is the identification of system leakage and boric acid deposits.

In parallel with unit shutdown, a containment walkdown is performed. The purpose is to systematically inspect inside containment for identification of boric acid leaks. The procedure controlling the walkdown identifies specific primary system piping locations that are considered highly susceptible to leakage. Any leak identified is assessed by the station corrective action program.

In parallel with unit startup, a walkdown of ASME Section III Class 1 piping and inspection for any leakage inside containment is performed. This VT 2 examination verifies the leak tightness of the reactor coolant system at normal operating pressure after it has been closed following a refueling outage and/or maintenance that involved the opening of the primary system. Any leak identified is assessed by the station corrective action program.

Major components of the reactor coolant system receive an inspection during each refueling outage as part of the routine maintenance activities. Any evidence of boric acid leakage would be identified in the station corrective action process and evaluated by engineering.

Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage

The inspection, evaluation, and clean up of boric acid spills identified on alloy, carbon steel, and stainless steel components is controlled by a maintenance procedure. The purpose of this procedure is to verify the structural integrity of alloy, carbon and stainless steel components (i.e. piping, valves, equipment, hangers, fasteners, etc.) that have come in contact with boric acid solution as a result of a leaking system. This procedure is activated whenever boron is found on a component and identified through the corrective action program. This procedure requires the affected area to be inspected and photographed, if required,to maintain documentation of the targeted area. The area is then cleaned and re-inspected/evaluated for corrosion and/or degradation. Any identified corrosion and/or degradation is entered in the corrective action program and evaluated by engineering.

Operational Leakage Program

"Operational Leakage" monitoring provides a means for detecting and, to the extent practical, identifying the source of reactor coolant system leakage. Technical specifications and procedures require verifying reactor coolant operational leakage is within limits by performing a water inventory balance at least once every 72 hours. Low thresholds have been established for initiating corrective action ensuring TS limits are not approached during normal plant operation. Once identified, any leak source will be assessed using the corrective action program.

ISI

CNS periodically inspects the RCS system pressure boundary as part of the inservice inspection program in accordance with the requirements of 1989 ASME Section XI. These inspections are scheduled and conducted consistent with the CNS ISI plan for the particular refueling outage. Any significant obstruction inhibiting inspection requires a request for relief in accordance with 10CFR50.55a. Findings not meeting the acceptance criteria are entered in the corrective action program.

Summary

The inspection and maintenance programs at CNS are designed to prevent degradation of the RCS by proactively detecting leakage or evidence of leakage. These programs are based on a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

When boric acid deposits or evidence of boric acid leakage are detected, corrective actions are taken to resolve the problem. These corrective actions may include removal of boric acid, repair of components, or engineering evaluations. The Fluid Leak Management Program requires investigation and appropriate corrective action for the area affected by the leak. This investigation should identify thinning, pitting or other forms of degradation. Taking action when boron deposits are identified rather than waiting for visible signs of degradation of the carbon steel protects the structural integrity of the pressure boundary.

DESCRIPTION OF REGULATORY REQUIREMENTS

10 CFR 50, Appendix A
Criterion 14 - Reactor Coolant Pressure Boundary
The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Compliance

Existing leakage identification programs ensure that reactor coolant leakage is identified and corrected. These programs ensure early detection of small leakage prior to abnormal leakage, rapidly propagating failure or gross rupture. The inspection and maintenance programs described in this response provide a means of preventing thinning, pitting, or other forms of degradation of the RCS. By preventing degradation of the RCS there is a low probability of abnormal leakage, rapidly propagating failure or gross rupture. By maintaining these or other equivalent programs there is a reasonable assurance of continued compliance with this general design criterion.

Criterion 31 - Fracture Prevention of Reactor Coolant Pressure Boundary
The reactor coolant pressure boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a nonbrittle manner and (2) the probability of rapidly propagating fracture is minimized. The design shall reflect consideration of service temperatures and other conditions of the boundary material under operating, maintenance, testing, and postulated accident conditions and the uncertainties in determining (1) material properties, (2) the effects of irradiation on material properties, (3) residual, steady state and transient stresses, and (4) size of flaws.

Compliance

The RCS was designed and constructed of materials that will have sufficient margin to behave in a non-brittle manner under operating conditions. The programs described in this response provide a means of preventing thinning, pitting, or other forms of degradation of the RCS. Maintaining the RCS in this manner provides reasonable assurance that the system will continue to behave in a non-brittle manner. By maintaining these or other equivalent programs there is a reasonable assurance of continued compliance with this general design criterion.

Criterion 32 - Inspection of Reactor Coolant Pressure Boundary
Components which are part of the reactor coolant pressure boundary shall be designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the RPV.

Compliance

Catawba's Reactor Coolant Pressure Boundary met the requirements of GDC 32 through the incorporation of the following inspections:

- Post-shutdown inspection to identify leakage or evidence of leakage in the form of boric acid crystals on top or outside the support structure of the RCS.
- Inspection of RCS during refueling outages to look for evidence of borated water leakage.
- Startup "normal operating temperature / pressure" inspection to meet ASME XI system pressure test requirements and detect leakage that would be apparent with the insulation installed.

These activities coupled with the ability to remove insulation and conduct bare metal inspections provide Catawba the ability to prevent boric acid corrosion from affecting the structural and leaktight integrity of the RCS.

10 CFR 50.55a Codes and Standards - ASME Class 1 components (which include VHP nozzles) must meet the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. Table IWB-2500-l of Section XI of the ASME Code provides examination requirements for VHP nozzles and references IWB-3522 for acceptance standards

Compliance

Catawba is in compliance with 10 CFR 50.55a and code compliance criteria in IWB-3522. Table IWB-2500-l of Section XI examination category B-P requires a VT-2 examination of the RCS during the system leakage test. This is currently accomplished in mode 3 during startup. Periodic inspections are also required and conducted in accordance with the ISI plan.

10 CFR 50 Appendix B Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants
Criterion IX- Control of Special Processes

Measures shall be established to assure that special processes including welding, heat treating, and nondestructive testing are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

Compliance

Duke maintains full responsibility for assuring that its nuclear power plants are designed constructed, tested and operated in conformance with good engineering practices, regulatory requirements and specified design bases and in a manner to protect the public health and safety. To this end, Duke has established and implemented a quality assurance program, described in the QA Topical Report, which conforms to the criteria established in Appendix B to 10 CFR, Part 50.

Repairs, replacements, and inspections are conducted as per ASME Section XI Code. Where ASME Section XI Code is not applicable, repairs, replacements, and inspections are performed by personnel qualified in the process and knowledgeable of the equipment.

Criterion V - Instructions, Procedures, and Drawings

Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished

Compliance

Activities associated with the RCS are performed in accordance with the Duke QA program. Procedures which address activities associated with QA Condition 1 structures, systems, and components are subjected to an established preparation, review, and approval process as defined in the Duke QA Program. This QA Program meets and will continue to meet Criterion V - Instructions, Procedures, and Drawings.

Criterion XVI - Corrective Action
Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Compliance

Activities associated with the RCS are performed in accordance with the Duke QA program. Pursuant to this program, station personnel are responsible for the implementation of the quality assurance program as it pertains to the performance of their activities. Specific to this responsibility is the requirement for informing the responsible supervisory personnel and/or for taking appropriate corrective action whenever any deficiency in the implementation of the requirements of the program is determined. Procedures require that conditions adverse to quality be corrected. In the case of significant conditions adverse to quality, the procedures assure that the cause of the condition is determined and action is taken to preclude re-occurrence.

Performance and verification personnel are to:

a) Identify conditions that are adverse to quality.
b) Suggest, recommend or provide solutions to the problems as appropriate.
c) Verify resolution of the issue.

Additionally, performance and verification personnel are to ensure that reworked, repaired, and replacement items are inspected and tested in accordance with the original inspection and test requirements or specified alternatives.

In the event of a failure of QA Condition 1 components (such as degradation of the RCS) the cause of the failure is evaluated and appropriate corrective action taken. Items of the same type are evaluated to determine whether or not they can be expected to continue to function in an appropriate manner. This evaluation is documented in accordance with applicable procedures.

This corrective action program meets and will continue to meet the requirements of Criterion XVI - Corrective Action.

Technical Specifications
At Catawba, 3.4.13 RCS Operational LEAKAGE is limited to:

a. No pressure boundary LEAKAGE;
b. 1 gpm unidentified LEAKAGE;
c. 10 gpm identified LEAKAGE;
d. 576 gallons per day total primary to secondary LEAKAGE through all steam generators (SGs); and
e. 150 gallons per day primary to secondary LEAKAGE through any one SG.

These limits are applicable in operational modes 1 through 4.

Compliance

The inspection, maintenance and operational leakage programs outlined in this response provide reasonable assurance of reactor pressure boundary integrity and compliance with Technical Specification 3.4.13 limits.

GENERIC LETTER 88-05 BORIC ACID CORROSION OF CARBON STEEL REACTOR PRESSURE BOUNDARY COMPONENTS IN PWR PLANTS

The GL 88-05 program should contain the following
(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.

Compliance

The primary method used to locate boric acid leaks is through a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

These activities are performed as a minimum when the unit is in refueling outages. The procedures are reviewed and revised as necessary to incorporate plant and industry operating experience to ensure that potential leak locations have been identified.

The GL 88-05 program should contain the following

(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.

Compliance

Physical inspections, as described in this response, of the reactor coolant system during each refueling shutdown are performed that will identify boric acid crystalline deposits from leakage during operation. The leakage path is identified and evaluated for potential degradation of the RCS boundary as part of the corrective action program.

The GL 88-05 program should contain the following

(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.

Compliance

When RCS leakage is identified, corrective actions are initiated to evaluate and repair the leak or any damage. Specific procedures exist to perform a detailed evaluation of the leak, including gathering the information necessary to perform an engineering evaluation before removal of evidence of leakage. This evaluation ensures that a thorough inspection of the leakage path and any surrounding component is conducted.

The GL 88-05 program should contain the following

(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.

Compliance

The corrective action program is entered upon the detection of RCS leakage. In the event of a failure of QA Condition 1 components (such as the degradation of the RCS) the cause of the failure is evaluated and appropriate actions taken.

The Operating Experience program initiates a documented review of significant operating events including significant boric acid leakage. This review includes an engineering evaluation and trending of similar events. As a result of this program and lessons learned from industry, corrective actions may be implemented. These actions may include repairs, replacements and/or enhanced inspections to reduce the probability of boric acid leaks.

ENCLOSURE II
McGuire Nuclear Station
Response to NRC Bulletin 2002-01

Requested Information

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:

McGuire Nuclear Station (MNS) has implemented certain programs designed to identify reactor coolant leakage[1] and document corrective actions necessary to prevent adverse effects on plant equipment. Some of these requirements were implemented in response to Generic Letter 88-05[2] (GL 88-05). These programs include:

- Administrative procedures governing the conduct of all plant personnel with respect to system leakage
- Inspections of the Reactor Coolant System (RCS) by means of plant walkdowns
- Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage
- Operational Leakage Program
- Inservice Inspection Program (ISI)

---

[1] Reactor Coolant Leakage and boric acid leakage are used interchangeably to refer to primary water which contains some concentration of boric acid.
[2] Generic Letter 88-05 Boric Acid Corrosion of Carbon Steel

Administrative procedures governing the conduct of all plant personnel with respect to system leakage

The Fluid Leak Management Program was developed to ensure aggressive identification of leaks followed by timely investigation and repair. When boric acid leakage is involved, this program requires activities to identify the source of leakage and evaluate subsequent corrosion degradation of associated piping, structures and components. The RCS is included within the scope of the program.

The Fluid Leak Management Program defines roles and responsibilities for all site personnel. Under this program boric acid leaks are reported to a program coordinator and are recorded and tracked within a fluid leak management database. Corrective actions are developed commensurate with the evaluation of the leakage.

The Materiel Condition/Housekeeping, Cleanliness/Foreign Material program requires all leaks to be contained, and that boric acid corrosion concerns be identified promptly. As part of this program, leaks and corrosion concerns are entered into the corrective action program.

Inspections of the RCS by means of plant walkdowns

"Shutdown / Startup Walkdowns" are performed each refueling outage. A purpose of these walkdowns is the identification of system leakage and boric acid deposits.

In parallel with unit shutdown, a containment walkdown is performed. The purpose is to systematically inspect inside containment for identification of boric acid leaks. The walkdown preparation identifies specific primary system piping locations that are considered highly susceptible to leakage.

In parallel with unit startup, a walkdown of ASME Section III Class 1 piping and inspection for any leakage inside containment is performed. This VT 2 examination verifies the leak tightness of the reactor coolant system at normal operating pressure after it has been closed following a refueling outage and/or maintenance that involved the opening of the primary system. Any leak identified is assessed by the station corrective action program.

A walkdown of major reactor coolant system components is performed during each refueling outage as part of the routine maintenance activities. Additionally, other housekeeping inspections are performed prior to Mode 4. Any evidence of boric acid leakage would be identified in the station corrective action process and evaluated by engineering.

Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage

The inspection, evaluation, and clean up of boric acid spills identified on alloy, carbon steel, and stainless steel components is controlled by a maintenance procedure. The purpose of this procedure is to verify the structural integrity of alloy, carbon and stainless steel components (i.e. piping, valves, equipment, hangers, fasteners, etc.) that have come in contact with boric acid solution as a result of a leaking system. This procedure is activated whenever boron is found on a component and identified through the corrective action program. This procedure requires the affected area to be inspected and photographed, if required, to maintain documentation of the targeted area. The area is then cleaned and re-inspected/evaluated for corrosion and/or degradation. Any identified corrosion and/or degradation is entered in the corrective action program and evaluated by engineering.

Operational Leakage Program

"Operational Leakage" monitoring provides a means for detecting and, to the extent practical, identifying the source of reactor coolant system leakage. Technical specifications and procedures require verifying reactor coolant operational leakage is within limits by performing a water inventory balance at least once every 72 hours. Low thresholds have been established for initiating corrective action ensuring TS limits are not approached during normal plant operation. Once identified, any leak source will be assessed using the corrective action program.

ISI

MNS periodically inspects the RCS system pressure boundary as part of the inservice inspection program in accordance with the requirements of applicable ASME code. These inspections are scheduled consistent with the MNS ISI plan for the particular refueling outage. Any significant obstructions require a request for relief in accordance with 10CFR50.55a. Findings not meeting the acceptance criteria are entered in the corrective action program.

Summary

The inspection and maintenance programs at MNS are designed to prevent degradation of the RCS by proactively detecting leakage or evidence of leakage. These programs are based on a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

When boric acid deposits or evidence of boric acid leakage are detected, corrective actions are taken to resolve the problem. These corrective actions may include removal of boric acid, repair of components, or engineering evaluations. The Fluid Leak Management Program requires investigation and appropriate corrective action for the area affected by the leak. This investigation should identify thinning, pitting or other forms of degradation. Taking action when boron deposits are identified rather than waiting for visible signs of degradation of the carbon steel protects the structural integrity of the pressure boundary.

DESCRIPTION OF REGULATORY REQUIREMENTS

10 CFR 50, Appendix A
Criterion 14 - Reactor Coolant Pressure Boundary
The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Compliance

Existing leakage identification programs ensure that reactor coolant leakage is identified and corrected. These programs ensure early detection of small leakage prior to abnormal leakage, rapidly propagating failure or gross rupture. The inspection and maintenance programs described in this response provide a means of preventing thinning, pitting, or other forms of degradation of the RCS. By preventing degradation of the RCS there is a low probability of abnormal leakage, rapidly propagating failure or gross rupture. By maintaining these or other equivalent programs there is a reasonable assurance of continued compliance with this general design criterion.

Criterion 31 - Fracture Prevention of Reactor Coolant Pressure Boundary
The reactor coolant pressure boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a nonbrittle manner and (2) the probability of rapidly propagating fracture is minimized. The design shall reflect consideration of

service temperatures and other conditions of the boundary material under operating, maintenance, testing, and postulated accident conditions and the uncertainties in determining (1) material properties, (2) the effects of irradiation on material properties, (3) residual, steady state and transient stresses, and (4) size of flaws.

Compliance

The RCS was designed and constructed of materials that will have sufficient margin to behave in a non-brittle manner under operating conditions. The programs described in this response provide a means of preventing thinning, pitting, or other forms of degradation of the RCS. Maintaining the RCS in this manner provides reasonable assurance that the system will continue to behave in a non-brittle manner. By maintaining these or other equivalent programs there is a reasonable assurance of continued compliance with this general design criterion.

Criterion 32 - Inspection of Reactor Coolant Pressure Boundary
Components which are part of the reactor coolant pressure boundary shall be designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the RPV.

Compliance

McGuire's Reactor Coolant Pressure Boundary met the requirements of GDC 32 through the incorporation of the following inspections:

- Post-shutdown inspection to identify leakage or evidence of leakage in the form of boric acid crystals on top or outside the support structure of the RCS.
- Inspection of RCS during refueling outages to look for evidence of borated water leakage.
- Startup "normal operating temperature / pressure" inspection to meet ASME XI system pressure test requirements and detect leakage that would be apparent with the insulation installed.

These activities coupled with the ability to remove insulation and conduct bare metal inspections provide McGuire the ability to prevent boric acid corrosion from affecting the structural and leaktight integrity of the RCS.

10 CFR 50.55a Codes and Standards - ASME Class 1 components (which include VHP nozzles) must meet the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. Table IWB-2500-l of Section XI of the ASME Code provides examination requirements for VHP nozzles and references IWB-3522 for acceptance standards

Compliance

McGuire is in compliance with 10 CFR 50.55a and code compliance criteria in IWB-3522. Table IWB-2500-l of Section XI examination category B-P requires a VT-2 examination of the RCS during the system leakage test. This is currently accomplished in mode 3 during startup. Periodic inspections are also required and conducted in accordance with the ISI plan.

10 CFR 50 Appendix B Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants
Criterion IX- Control of Special Processes

Measures shall be established to assure that special processes including welding, heat treating, and nondestructive testing are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

Compliance

Duke maintains full responsibility for assuring that its nuclear power plants are designed constructed, tested and operated in conformance with good engineering practices, regulatory requirements and specified design bases and in a manner to protect the public health and safety. To this end, Duke has established and implemented a quality assurance program, described in the QA Topical Report, which conforms to the criteria established in Appendix B to 10 CFR, Part 50.

Repairs, replacements, and inspections are conducted as per ASME Section XI Code. Where ASME Section XI Code is not applicable, repairs, replacements, and inspections are performed by personnel qualified in the process and knowledgeable of the equipment.

Criterion V - Instructions, Procedures, and Drawings

Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished

<u>Compliance</u>

Activities associated with the RCS are performed in accordance with the Duke QA program. Procedures which address activities associated with QA Condition 1 structures, systems, and components are subjected to an established preparation, review, and approval process as defined in the Duke QA Program. This QA Program meets and will continue to meet Criterion V - Instructions, Procedures, and Drawings.

Criterion XVI - Corrective Action

Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

<u>Compliance</u>

Activities associated with the RCS are performed in accordance with the Duke QA program. Pursuant to this program, station personnel are responsible for the implementation of the quality assurance program as it pertains to the performance of their activities. Specific to this responsibility is the requirement for informing the responsible supervisory personnel and/or for taking appropriate corrective action whenever any deficiency in the implementation of the requirements of the program is determined. Procedures require that conditions adverse to quality be corrected. In the case of significant conditions adverse to quality, the procedures assure that the cause of the condition is determined and action is taken to preclude re-occurrence.

Performance and verification personnel are to:

a) Identify conditions that are adverse to quality.
b) Suggest, recommend or provide solutions to the problems as appropriate.
c) Verify resolution of the issue.

Additionally, performance and verification personnel are to ensure that reworked, repaired, and replacement items are inspected and tested in accordance with the original inspection and test requirements or specified alternatives.

In the event of a failure of QA Condition 1 components (such as degradation of the RCS) the cause of the failure is evaluated and appropriate corrective action taken. Items of the same type are evaluated to determine whether or not they can be expected to continue to function in an appropriate manner. This evaluation is documented in accordance with applicable procedures.

This corrective action program meets and will continue to meet the requirements of Criterion XVI - Corrective Action.

Technical Specifications

At McGuire, 3.4.13 RCS Operational LEAKAGE is limited to:

a. No pressure boundary LEAKAGE;
b. 1 gpm unidentified LEAKAGE;
c. 10 gpm identified LEAKAGE;
d. 576 gallons per day total primary to secondary LEAKAGE through all steam generators (SGs); and
e. 150 gallons per day primary to secondary LEAKAGE through any one SG.

These limits are applicable in operational modes 1 through 4.

Compliance

The inspection and maintenance programs outlined in this response in combination with the corrective action program provides reasonable assurance of reactor pressure boundary integrity and compliance with Technical Specification 3.4.13 limits.

GENERIC LETTER 88-05 BORIC ACID CORROSION OF CARBON STEEL REACTOR PRESSURE BOUNDARY COMPONENTS IN PWR PLANTS

The GL 88-05 program should contain the following

(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.

Compliance

The primary method used to locate boric acid leaks is through a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

These activities are performed as a minimum when the unit is in refueling outages. The procedures are reviewed and revised as necessary to incorporate plant and industry operating experience to ensure that potential leak locations have been identified.

The GL 88-05 program should contain the following

(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.

Compliance

Physical inspections, as described in this response, of the reactor coolant system during each refueling shutdown are performed that will identify boric acid crystalline deposits from leakage during operation. The leakage path is identified and evaluated for potential degradation of the RCS boundary as part of the corrective action program.

The GL 88-05 program should contain the following

(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.

Compliance

When RCS leakage is identified, corrective actions are initiated to evaluate and repair the leak or any damage. Specific procedures exist to perform a detailed evaluation of the leak, including gathering the information necessary to perform an engineering evaluation before removal of evidence of leakage. This evaluation ensures that a thorough inspection of the leakage path and any surrounding component is conducted.

The GL 88-05 program should contain the following

(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.

Compliance

The corrective action program is entered upon the detection of RCS leakage. In the event of a failure of QA Condition 1 components (such as the degradation of the RCS) the cause of the failure is evaluated and appropriate actions taken.

The Operating Experience program initiates a documented review of significant operating events including significant boric acid leakage. This review includes an engineering evaluation and trending of similar events. As a result of this program and lessons learned from industry, corrective actions may be implemented. These actions may include repairs, replacements and/or enhanced inspections to reduce the probability of boric acid leaks.

ENCLOSURE III
Oconee Nuclear Station
Response to NRC Bulletin 2002-01

Requested Information

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:

Oconee Nuclear Station (ONS) has implemented certain programs designed to identify reactor coolant leakage[1] and document corrective actions necessary to prevent adverse effects on plant equipment. Some of these requirements were implemented in response to Generic Letter 88-05[2] (GL 88-05). These programs include:

- Administrative procedures governing the conduct of all plant personnel with respect to system leakage
- Inspections of the Reactor Coolant System (RCS) by means of plant walkdowns
- Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage
- Operational Leakage Program
- Inservice Inspection Program (ISI)

---

[1] Reactor Coolant Leakage and boric acid leakage are used interchangeably to refer to primary water which contains some concentration of boric acid.
[2] Generic Letter 88-05 Boric Acid Corrosion of Carbon Steel

Administrative procedures governing the conduct of all plant personnel with respect to system leakage

The Fluid Leak Management Program was developed to ensure aggressive identification of leaks followed by timely investigation and repair. When boric acid leakage is involved, this program requires activities to identify the source of leakage and evaluate subsequent corrosion degradation of associated piping, structures and components. The RCS is included within the scope of the program.

The Fluid Leak Management Program defines roles and responsibilities for all site personnel. Under this program boric acid leaks are reported to a program coordinator and are recorded and tracked within a fluid leak management database. Corrective actions are developed commensurate with the evaluation of the leakage.

The Materiel Condition/Housekeeping, Cleanliness/Foreign Material program requires all leaks to be contained, and that boric acid corrosion concerns be identified promptly. As part of this program, leaks and corrosion concerns are entered into the corrective action program.

Inspections of the RCS by means of plant walkdowns.

Several walkdowns are conducted every refueling outage by Operations. These walkdowns occur during shutdown, startup and periodically during the refueling outage. A purpose of these walkdowns is the identification of system leakage and boric acid deposits. The procedure controlling the walkdown identifies specific primary system locations that are considered highly susceptible to leakage. The procedure directs entry of all identified leaks into the corrective action program.

In parallel with unit startup, a walkdown of Class 1 piping and inspection for any leakage inside containment is performed. This VT 2 examination verifies the leak tightness of the reactor coolant system at normal operating pressure after it has been closed following a refueling outage and/or maintenance that involved the opening of the primary system for repair purposes. Any leak source identified is assessed by the station corrective action program.

Major components of the reactor coolant system receive an inspection during each refueling outage as part of the routine maintenance activities. Any evidence of boric acid leakage would be identified in the station corrective action process and evaluated by engineering.

Procedure for controlling the inspection, evaluation and cleanup of boric acid leakage

The inspection, evaluation, and clean up of boric acid spills identified on alloy, carbon steel, and stainless steel components is controlled by a maintenance procedure. The purpose of this procedure is to verify the structural integrity of alloy, carbon and stainless steel components (i.e. piping, valves, equipment, hangers, fasteners, etc.) that have come in contact with boric acid solution as a result of a leaking system. This procedure is activated whenever boron is found on a component and identified through the corrective action program. This procedure requires the affected area to be inspected and photographed, if required, to maintain documentation of the targeted area. The area is then cleaned and re-inspected/evaluated for corrosion and/or degradation. Any identified corrosion and/or degradation is entered in the corrective action program and evaluated by engineering.

Operational Leakage Program

"Operational Leakage" monitoring provides a means for detecting and, to the extent practical, identifying the source of reactor coolant system leakage. Technical specifications and procedures require verifying reactor coolant operational leakage is within limits by performing a water inventory balance at least once every 72 hours. Low thresholds have been established for initiating corrective action ensuring TS limits are not approached during normal plant operation. Once identified, any leak source will be assessed using the corrective action program.

ISI

ONS periodically inspects the RCS system pressure boundary as part of the inservice inspection program in accordance with the requirements of 1989 ASME Section XI. These inspections are scheduled and conducted consistent with the ONS ISI plan for the particular refueling outage. Any significant obstruction inhibiting inspection requires a request for relief in accordance with 10CFR50.55a. Findings not meeting the acceptance criteria are entered in the corrective action program.

Summary

The inspection and maintenance programs at ONS are designed to prevent degradation of the RCS by proactively detecting leakage or evidence of leakage. These programs are based on a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

When boric acid deposits or evidence of boric acid leakage are detected, corrective actions are taken to resolve the problem. These corrective actions may include removal of boric acid, repair of components, or engineering evaluations. The Fluid Leak Management Program requires investigation and appropriate corrective action for the area affected by the leak. This investigation should identify thinning, pitting or other forms of degradation. Taking action when boron deposits are identified rather than waiting for visible signs of degradation of the carbon steel protects the structural integrity of the pressure boundary.

DESCRIPTION OF REGULATORY REQUIREMENTS

10 CFR 50, Appendix A
Criterion 14 - Reactor Coolant Pressure Boundary
The reactor coolant pressure boundary shall be designed, fabricated, erected, and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Corresponding Oconee Criterion 9 - Reactor Coolant Pressure Boundary (Category A)
The reactor coolant pressure boundary shall be designed and constructed so as to have an exceedingly low probability of gross rupture or significant leakage throughout its design lifetime.

Compliance
As described in the Oconee UFSAR, the Reactor Coolant System pressure boundary at ONS meets the criterion through the following:

1. Material selection, design, fabrication, inspection, testing, and certification in accordance with ASME codes for all components excluding piping. Piping is maintained in accordance with the USAS B31.1 and B31.7 codes.

2. Manufacture and erection is in accordance with approved procedures.

3. Inspection is in accordance with code requirements plus additional requirements imposed by the manufacturer.

4. System analysis accounts for cyclic effects of thermal transients, mechanical shock, seismic loadings, and vibratory loadings.

5. Selection of RV material properties gives due consideration to neutron flux effects and the resultant increase of the nil ductility transition temperature. The materials, codes, cyclic loadings, and non-destructive testing are discussed further in Chapter 5 of the Oconee UFSAR.

The original materials and methods of construction have not been materially changed or altered. The inspections and maintenance programs outlined in this response serve to provide reasonable assurance of continued compliance with this GDC through thorough inspection, boron removal and appropriate examination therefore, Duke concludes that the GDC is presently met and shall continue to be met in the future.

Criterion 31 - Fracture Prevention of Reactor Coolant Pressure Boundary

The reactor coolant pressure boundary shall be designed with sufficient margin to assure that when stressed under operating, maintenance, testing, and postulated accident conditions (1) the boundary behaves in a nonbrittle manner and (2) the probability of rapidly propagating fracture is minimized. The design shall reflect consideration of service temperatures and other conditions of the boundary material under operating, maintenance, testing, and postulated accident conditions and the uncertainties in determining (1) material properties, (2) the effects of irradiation on material properties, (3) residual, steady state and transient stresses, and (4) size of flaws.

Corresponding ONS Criterion 34 - Reactor Coolant Pressure Boundary Rapid Propagation Failure Prevention (Category A)

The reactor coolant pressure boundary shall be designed to minimize the probability of rapidly propagating type failures. Consideration shall be given a) to the notch-toughness properties of materials extending to the upper shelf of the Charpy transition curve, b) to the state of stress of materials under static and transient loadings, c) to the quality control specified for materials and component fabrication to limit flaw sizes, and d) to the provisions for control over service temperature and irradiation effects which may require operation restrictions.

<u>Compliance</u>
Reactor coolant pressure boundary leakage is detectable by visual inspections during planned refueling outages. As a result of this detection, degradation is successfully identified and subsequently repaired in accordance with ASME Section XI.

As described in the Oconee UFSAR, the reactor coolant pressure boundary design at ONS meets this criterion by the following:

1. Development of RV plate material properties opposite the core to a specified Charpy-V- notch test result of 30 ft-lb or greater at a nominal low NDTT.

2. Determination of the fatigue usage factor resulting from expected static and transient loading during detailed design and stress analysis.

3. Quality control procedures including permanent identification of materials and non-destructive testing.

4. Operating restrictions to prevent failure towards the end of design vessel life resulting from increase in the nil-ductility transition temperature (NDTT) due to neutron irradiation, as predicted by a material irradiation surveillance program.

Further, all leakage that is discovered will be repaired in accordance with ASME Section XI, NRC approved ASME Code Cases or alternatives. In all cases, ASME safety margins are maintained during the specified period of operation; thereby giving reasonable assurance of present and continued compliance with the intent of the GDC.

Criterion 32 - Inspection of Reactor Coolant Pressure Boundary
Components which are part of the reactor coolant pressure boundary shall be designed to permit (1) periodic inspection and testing of important areas and features to assess their structural and leaktight integrity, and (2) an appropriate material surveillance program for the reactor pressure vessel.

Corresponding Oconee Criterion 36 - Reactor Coolant Pressure Boundary Surveillance (Category A)
Reactor coolant pressure boundary components shall have provisions for inspection, testing, and surveillance by appropriate means to assess the structural and leak-tight integrity of the boundary components during their service lifetime. For the RV, a material surveillance program conforming to ASTM-E-185-66 shall be provided.

Compliance
The reactor coolant pressure boundary components at Oconee meet this criterion. The inspections outlined in this response coupled with the ability to remove insulation and conduct bare metal inspections serve to provide reasonable assurance of continued compliance with this GDC.

Oconee has facilitated RV head inspection by cleaning the heads, implementing service structure modifications that improve access under the RV head insulation, and the elevated design of the existing head insulation. A RPV material surveillance program conforming to ASTM-E-185-66 has been established.

Oconee has been involved with supplemental proactive inspection and testing of the RPV penetrations since the early 1990's, modifying the program as appropriate.

10 CFR 50.55a Codes and Standards - ASME Class 1 components (which include VHP nozzles) must meet the requirements of Section XI of the ASME Boiler and Pressure Vessel Code. Table IWB-2500-l of Section XI of the ASME Code provides examination requirements for VHP nozzles and references IWB-3522 for acceptance standards.

Compliance
Oconee is in compliance with 10 CFR 50.55a and code compliance criteria in IWB-3522. Table IWB-2500-l of Section XI examination category B-P requires a VT-2 examination of the RCS during the system leakage test. This is currently accomplished in mode 3 during startup. Periodic inspections are also required and conducted in accordance with the ISI plan.

10 CFR 50 Appendix B Quality Assurance Criteria for Nuclear Power Plants and Fuel Processing Plants
Criterion IX- Control of Special Processes
Measures shall be established to assure that special processes including welding, heat treating, and nondestructive testing are controlled and accomplished by qualified personnel using qualified procedures in accordance with applicable codes, standards, specifications, criteria, and other special requirements.

Compliance
Duke maintains full responsibility for assuring that its nuclear power plants are designed constructed, tested and operated in conformance with good engineering practices, regulatory requirements and specified design bases and in a manner to protect the public health and safety. To this end, Duke has established and implemented a quality assurance program, described in the QA Topical Report, which conforms to the criteria established in Appendix B to 10 CFR, Part 50.

Repairs, replacements, and inspections are conducted as per ASME Section XI Code. Where ASME Section XI Code is not applicable, repairs, replacements and inspections are performed by personnel qualified in the process and knowledgeable of the equipment.

Criterion V - Instructions, Procedures, and Drawings
Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

Compliance
Activities associated with the RCS are performed in accordance with the Duke QA program. Procedures that address activities associated with QA Condition 1 structures, systems, and components are subjected to a well-defined and established preparation, review, and approval process as defined in the Duke QA Program. This QA Program meets Criterion V - Instructions, Procedures, and Drawings.

Criterion XVI - Corrective Action
Measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and that corrective actions are taken to preclude repetition. The identification of the significant condition adverse to quality, the cause of the condition, and the corrective action taken shall be documented and reported to appropriate levels of management.

Compliance
Activities associated with the RCS are performed in accordance with the Duke QA program. Pursuant to this program, station personnel are responsible for the implementation of the quality assurance program as it pertains to the performance of their activities. Specific to this responsibility is the requirement for informing responsible supervisory personnel and/or for taking appropriate corrective action whenever any deficiency in the implementation of the requirements of the program is determined. Procedures require that conditions adverse to quality be corrected. In the case of significant conditions adverse to quality, the procedures assure that the cause of the condition is determined and action taken to preclude repetition.

Performance and verification personnel are to:

a) Identify conditions that are adverse to quality.
b) Suggest, recommend, or provide solutions to the problems as appropriate.
c) Verify resolution of the issue.

Additionally, performance and verification personnel are to ensure that reworked, repaired, and replacement items be inspected and tested in accordance with the original inspection and test requirements or specified alternatives.

In the event of the failure of QA Condition 1 components (such as degradation of the RCS) the cause of the failure is evaluated and appropriate corrective action taken. Items of the same type are evaluated to determine whether or not they can be expected to continue to function in an appropriate manner. This evaluation is documented in accordance with applicable procedures.

This corrective action program meets the requirements of Criterion XVI - Corrective Action.

Technical Specifications - The current limiting condition of operation (LCO) for ONS, TS 3.4.13, requires that RCS operational LEAKAGE be limited to no pressure boundary LEAKAGE;

- 1 gpm unidentified LEAKAGE;
- 10 gpm identified LEAKAGE;
- 300 gallon per day total primary to secondary LEAKAGE through all steam generators (SGs)
- and 150 gallon per day primary to secondary leakage through any one SG. These limits are applicable in operational modes 1 through 4.

Compliance

The inspection and maintenance programs outlined in this response in combination with the corrective action program provides reasonable assurance of reactor pressure boundary integrity and compliance with Technical Specification 3.4.13 limits.

GENERIC LETTER 88-05 BORIC ACID CORROSION OF CARBON STEEL REACTOR PRESSURE BOUNDARY COMPONENTS IN PWR PLANTS

The GL 88-05 program should contain the following

(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.

Compliance

The primary method used to locate boric acid leaks is through a hierarchy of administrative and technical procedures whose purpose is to detect boric acid leakage and implement appropriate corrective actions. Specific plant activities (walk downs and inspections) are periodically conducted to determine if boric acid deposits are present on the reactor coolant boundary equipment or borated water leakage is occurring.

These activities are performed as a minimum when the unit is in refueling outages. The procedures are reviewed and revised as necessary to incorporate plant and industry operating experience to ensure that potential leak locations have been identified.

The GL 88-05 program should contain the following

(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.

Compliance

Physical inspections, as described in this response, of the RCS during each refueling shutdown are performed that will identify boric acid crystalline deposits from leakage during operation. The leakage path is identified and evaluated for potential degradation of the RCS boundary as part of the corrective action program.

The GL 88-05 program should contain the following

(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.

Compliance

When RCS leakage is identified, corrective actions are initiated to evaluate and repair the leak or any damage. Specific procedures exist to perform a detailed evaluation of the leak, including gathering the information necessary to perform an engineering evaluation before removal of evidence of leakage. This evaluation ensures that a thorough inspection of the leakage path and any surrounding component is conducted.

The GL 88-05 program should contain the following

(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.

Compliance

The corrective action program is entered upon the detection of RCS leakage. In the event of a failure of QA Condition 1 components (such as the degradation of the RCS) the cause of the failure is evaluated and appropriate actions taken.

The Operating Experience program initiates a documented review of significant operating events including significant boric acid leakage. This review includes an engineering evaluation and trending of similar events. As a result of this program and lessons learned from industry, corrective actions may be implemented. These actions may include repairs, replacements and/or enhanced inspections to reduce the probability of boric acid leaks.