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Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Attention: Ms. K. R. Cotton

Ladies and Gentlemen:

Subject: VIRGIL C. SUMMER NUCLEAR STATION (VCSNS)
DOCKET NO. 50/395
OPERATING LICENSE NO. NPF-12
REQUEST FOR ADDITIONAL INFORMATION REGARDING
60 DAY RESPONSE TO NRC BULLETIN 2002-01
REACTOR PRESSURE VESSEL HEAD DEGRADATION AND
REACTOR COOLANT PRESSURE BOUNDARY INTEGRITY

Reference:

1. SCE&G Letter to NRC (Document Control Desk), RC-02-0091, May 17, 2002; 60 Day Response to NRC Bulletin 2002-01
2. Westinghouse and Combustion Engineering Owners Group Project Manager letter to Westinghouse Owners Group Primary Representatives, WOG-02-223/CEOG-02-259, December 13, 2002, Vendor Recommendations for Visual Inspections of Alloy 600/82/182 Component Locations (MUHP-5035, CEOG 2046)
3. Karen Cotton (NRC) letter to Stephen A. Byrne (SCE&G), dated November 21,2002

The NRC letter of November 21, 2002 (Reference 3) issued a request for additional information (RAI) regarding the Virgil C. Summer Nuclear Station (VCSNS) response to NRC Bulletin 2002-01 submitted May 17, 2002 (Reference 1) and requested that the additional information be provided within 60 days of receipt of letter by VCSNS. Effective due date is January 27, 2003. The RAI consists of questions developed by the NRC during review of industry responses to the Bulletin in regards to the detail of specificity in the responses and lack of clarity. The NRC staff's review of these 60-day responses provided the basis for development of the questions in this RAI.

South Carolina Electric & Gas Company (SCE&G) acting for itself and as agent for South Carolina Public Service Authority, hereby submits the attached in response to the bulletin.

A095

Should you have questions, please call Mr. Mel Browne at (803) 345-4141.

I certify under penalty of perjury that the foregoing is true and correct.

1/24/03
Executed on

Stephen A. Byrne

JWT/SAB
Attachments

c: N. O. Lorick
N. S. Carns
T. G. Eppink (w/o Attachment)
R. J. White
L. A. Reyes
K. R. Cotton
NRC Resident Inspector
K. M. Sutton
K. O. Cozens (NEI)
NSRC
RTS (0-C-02-0703)
File (815.02)
DMS (RC-03-0016)

60-Day Response to NRC Request for Additional Information Regarding 60-Day Response to Bulletin 2002-01 "Reactor Pressure Vessel Head Degradation and Reactor Coolant Pressure Boundary Integrity" for V. C. Summer Nuclear Station

1. Provide detailed information on, and the technical basis for, the inspection techniques, scope, extent of coverage, and the frequency of inspections, personnel qualifications, and degree of insulation removal for examination of Alloy 600 pressure boundary material and dissimilar metal Alloy 82/182 welds and connections in the reactor coolant pressure boundary (RCPB). Include specific discussion of inspection of locations where reactor coolant leaks have the potential to come in contact with and degrade the subject material (e.g., reactor pressure vessel (RPV) bottom head).

Response:

Inspection Techniques

Examination techniques at VCSNS are developed to conform to ASME Code, Section XI visual examination requirements for Code Class 1, 2, and 3 structures, systems, and components. These techniques are employed in the visual examinations performed for other codes, standards, and regulatory requirements. These examination techniques are defined at VCSNS within General Test Procedure – 304, Inservice Inspection System Pressure Testing, and are presented as follows:

VT-2 Visual Examination

The VT-2 Visual Examination is conducted to locate evidence of leakage from pressure retaining components with or without leakage collection systems as required during the conduct of System Pressure Tests.

The VT-2 Visual Examination is conducted by examining the accessible external exposed surfaces of pressure retaining components for evidence of leakage.

For those components whose external surfaces are not accessible for direct VT-2 Visual Examination, only the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage is required.

For those systems borated for the purposes of controlling reactivity:

1. For those applicable components listed in Attachment VII, the VT-2 visual examination is conducted per the Alternate Testing requirements described in relief request RR-PT-03, Rev. 2.

2. For all other systems borated for the purposes of controlling reactivity, insulation is removed from pressure retaining bolted connections for VT-2 Visual Examination.

For other components, VT-2 Visual examination may be conducted without the removal of insulation by examining the accessible and exposed surfaces and joints of the insulation. Essentially vertical surfaces of insulation need only be examined at the lowest elevation where leakage may be detected. Essentially horizontal surfaces of insulation shall be examined at each insulation joint.

When examining insulated components, the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage, or other areas to which leakage may be channeled, is required.

Discoloration or residue on surfaces examined is given particular attention to detect evidence of boric acid accumulation.

Where leakage from components is normally expected and collected, such as valve stems, pump seals, or vessel flange gaskets, the VT-2 Visual Examination is conducted by verifying that the leakage collection system is functioning properly.

For piping passing through Reactor Building Penetrations, the VT-2 Visual Examination is performed with the penetration drain plug removed. The open drain is monitored for signs of leakage from the process piping located inside the penetration.

The VT-2 Visual Examination conducted following a code repair or replacement of a component, or the alteration of a system, may be limited to the repaired or replaced components, or the altered portion of the system, and shall include any connection made to the existing system.

Scope

Inspection scope includes applicable ASME Code, Section XI Code Class 1, 2, and 3 structures, systems, and components and other components that may be identified through the VCSNS programs that control boric acid corrosion.

Preventive Test Procedure (PTP) 151.001A outlines components to be examined to identify possible boric acid induced corrosion during each refueling outage prior to the Reactor Coolant System (RCS) being cooled down and depressurized. Surveillance Test Procedure (STP) 250.001A is used to examine for boric acid induced corrosion after RCS cooldown and depressurization, and after insulation or other obstructions which previously prevented complete viewing of the components to be examined have been removed but prior to decontamination of the piping/components to be examined. This STP is also used to perform a system leakage test on all ASME Class 1 piping and components associated with the reactor coolant system each refueling outage prior to plant startup after attaining normal operating pressure associated with 100% reactor power.

The scope of the examinations is explicit. While the RCS is hot and pressurized, a walkdown is performed to visually examine for evidence of boric acid leakage on specific components. Specific components identified in the procedures include major equipment bolted connections (e.g., steam generator and pressurizer manways, reactor vessel head and ductwork, RCS pumps, pressurizer spray and safety valves) and all accessible reactor coolant piping. In addition, general area examinations on all elevations are performed to identify evidence of boric acid leakage.

When the RCS is cooled below 200°F and depressurized below 350 psig, insulation is removed and a visual examination of all bolted connections listed on Attachment VII is conducted. The examination also includes examination of the studs, nuts, washers and cap screws for the reactor vessel head vent and isolation valves, the reactor vessel head closure studs, nut and washers, and the vessel head above the insulation.

VCSNS surveillance test procedure STP 250.001A requires the performance of a VT-2 visual examination of the bottom of the Reactor vessel each refueling outage prior to plant startup after attaining normal operating pressure associated with 100% reactor power. After a minimum hold time of four hours, a VT-2 visual examination is performed.

Extent of Coverage

The following components and their adjacent areas are examined for boric acid residue:

Reactor Vessel head area (including head ventilation ductwork)
Reactor Vessel bottom area
Reactor Coolant Pumps
Steam Generator Primary Side Manways
Pressurizer Spray Valves
Pressurizer Safety Valves
Pressurizer Manways
All accessible Reactor Coolant Piping
All Elevations - General Area

Attachments II through VI contain descriptions of the piping/components boundaries that are examined for system leakage.

Attachment VII lists insulated components with pressure retaining bolted connections.

Attachment VIII provides a list of components to be examined with the reactor coolant system (RCS) depressurized and less than 200 degrees Fahrenheit.

Attachment IX lists those ASME Category B-F welds that are within the examination boundaries.

Frequency of Inspections

Frequency of inspections is based on either ASME Code requirements or other regulatory requirements and is coordinated with the plant refueling schedule for each refueling outage. Initially, an examination is performed early in each outage while the RCS is hot and pressurized between 2235 psig and 350 psig. A second examination is performed after the RCS is cooled and depressurized below 350 psig.

A. System Pressure Tests and VT-2 Visual Examinations are performed and completed during each inspection period or inspection interval, as applicable, during the service lifetime of the plant except as otherwise noted in paragraph B.

B. Tests performed in lieu of System Pressure Tests, such as the demonstration of unimpaired flow for open ended portions of discharge lines in non-closed systems, are performed at least once each inspection interval.

C. Each inspection interval may be decreased or extended (but not cumulatively) by as much as one year. If the plant is out of service continuously for six months or more, the inspection interval during which the outage occurred may be extended for a period of time equivalent to the outage.

D. The inspection interval and inspection period is determined from the number of calendar years since placing the plant into commercial service.

E. Inspection intervals for repaired items, component replacements, additions, and alterations coincide with the remaining inspection intervals as originally scheduled prior to such repairs, replacements, additions or alterations.

F. The required System Pressure Tests and concurrent VT-2 Visual Examinations are identified and scheduled in accordance with the requirements of Table IWA-5210-1, Reference Paragraphs For System Pressure Tests And Visual Examination Requirements (VT-2) Requirements, unless specific relief has been granted by the Regulatory Authority.

H. Repaired components, replacements, additions, and alterations will receive a VT-2 Visual Examination in conjunction with a System Pressure Test prior to or immediately upon return to service.

<u>Personnel Qualifications</u>

Personnel from the mechanical maintenance, health physics, quality control and operations organizations perform the examinations for boric acid leakage to comply with GL 88-05. These individuals are formally trained on plant program procedures and procedure compliance.

Examination personnel are qualified as visual examiners in accordance with the VCSNS Quality Services training program.

<u>Degree of Insulation Removal</u>

For examination of bolted connections, listed in Attachment VII, the insulation is removed from the bolted connections prior to the performance of the VT-2 Visual

Examination of the component. The insulation may be removed prior to the start of the examination or just prior to examining each individual bolted connection.

2. **Provide the technical basis for determining whether or not insulation is removed to examine <u>all</u> locations where conditions exist that could cause high concentrations of boric acid on pressure boundary surfaces or locations that are susceptible to primary water stress corrosion cracking (Alloy 600 base metal and dissimilar metal Alloy 82/182 welds). Identify the type of insulation for each component examined, as well as any limitations to removal of insulation. Also include in your response actions involving removal of insulation required by your procedures to identify the source of leakage when relevant conditions (e.g., rust stains, boric acid stains, or boric acid deposits) are found.**

<u>Response:</u>

Mirror insulation is the type insulation used in the reactor building.

Inside the reactor building, the systems under the VCSNS programs that control boric acid corrosion are examined in an environment that is hazardous to personnel. Ambient temperature is between 100 and 120 degrees Fahrenheit. Personnel must manipulate undesirable work platforms such as ladders against components that could be in excess of 500 degrees Fahrenheit. Removing and reinstalling insulation under these conditions is difficult to perform and is not considered to be consistent with prudent industrial safety practices and the ALARA (as low as reasonably achievable) concept when compared to alternative requirements allowed by relief request RR-PT-03, Revision 2.

The inspection process involves visual examinations of low points or horizontal joints in the mirror type insulation used inside containment. The inspection consists of examining the lowest points or horizontal joints for signs of boron residue or active leakage. If no visible leakage is noted and the primary component is not identified within the governing procedures of the plant Programs that control boric acid corrosion, then the insulation is not removed. If leakage or signs of leakage are observed, then a Condition Evaluation Report is generated and work documents initiated to remove insulation. Any corrective action is performed by maintenance after engineering has evaluated and recommended the corrective means to either rework, repair, or accept the condition as is.

The VT-2 Visual Examination is conducted by examining the accessible external exposed surfaces of pressure retaining components for evidence of leakage. For those components whose external surfaces are not accessible for direct VT-2 Visual Examination, only the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage is required.

The 'A' Loop Hotleg leak discovered at VCSNS, which was extremely small at the time of detection, was identified utilizing the method described above.

For those systems borated for the purposes of controlling reactivity:

1. For those applicable components listed in Attachment VII, the visual examination is conducted per the Alternate Testing requirements described in relief request RR-PT-03, Rev. 2.

2. For all other systems borated for the purposes of controlling reactivity, insulation is removed from pressure retaining bolted connections for VT-2 Visual Examination.

For other components, VT-2 Visual examination may be conducted without the removal of insulation by examining the accessible and exposed surfaces and joints of the insulation. Essentially vertical surfaces of insulation need only be examined at the lowest elevation where leakage may be detected. Essentially horizontal surfaces of insulation are examined at each insulation joint.

When examining insulated components, the examination of surrounding area, including floor areas or equipment surfaces located underneath the components, for evidence of leakage, or other areas to which leakage may be channeled, is required.

Discoloration or residue on surfaces examined is given particular attention to detect evidence of boric acid accumulation.

<u>Corrective Actions</u>

When evidence of leakage is detected while performing a VT-2 Visual Examination, the following actions are performed:

1. The source of the leakage is determined. A Condition Evaluation Report is generated and work documents initiated to remove insulation.

2. To the extent practical, the amount of leakage is quantified.

For those leaks involving boric acid residues, the following are performed:

1. Leakage source and areas of general corrosion are located. A Condition Evaluation Report is generated and work documents initiated to remove insulation.

2. QC performs a VT-1 on the areas affected by boric acid residue.

3. A Work Order is generated to QC to perform a VT-1, Visual Examination on components outside the scope of the system pressure test being performed which are affected by boric acid.

4. Concurrence is obtained from the Shift Supervisor/Control Room Supervisor prior to cleaning boric acid residue from any plant component.

5. Utilizing proper HP controls, any boric acid residue is cleaned from the affected areas.

6. A Condition Evaluation Report is initiated for components with local areas of general corrosion to determine one of following:

   a. The component is evaluated acceptable for continued service.

   b. Repair or replacement is required.

3. Describe the technical basis for the extent and frequency of walkdowns and the method for evaluating the potential for leakage in <u>inaccessible areas</u>. In addition, describe the degree of inaccessibility, and identify any leakage detection systems that are being used to detect potential leakage from components in inaccessible areas.

Response:

<u>Extent of Walkdowns</u>

Inspection scope includes applicable ASME Code, Section XI Code Class 1, 2, and 3 structures, systems, and components and other components that may be identified through the programs that control boric acid corrosion.

The scope of the inspections is explicit. While the RCS is hot and pressurized, a walkdown is performed to visually examine for evidence of boric acid leakage on specific components. Specific components identified in the procedures include major equipment bolted connections (e.g., steam generator and pressurizer manways, reactor vessel head and ductwork, RCS pumps, pressurizer spray and safety valves) and all accessible reactor coolant piping. In addition, general area examinations on all elevations are performed to identify evidence of boric acid leakage.

Frequency of Walkdowns

VT-2 Visual Examinations are performed and completed during each refueling outage, as applicable, during the service lifetime of the plant.

Evaluation of Inaccessible Areas

Areas found to be inaccessible, due to plant conditions or physical impediments, are evaluated by engineering. Discrepancies are noted on a Condition Evaluation Report. Engineering evaluates the condition for acceptance or gives directions for corrective actions under the Work Order program.

Leakage Detection Systems

The existing design of leak detection systems at V. C. Summer fully satisfies the performance requirements of Regulatory Guide 1.45 (May 1973). The leak detection hardware is supported by visual examinations, and engineering oversight of plant operation, including the data from leak detection systems and visual examinations.

Plant procedures and programs have been developed to provide testing requirements of the installed equipment and provide guidance on responding to abnormal indications of leakage. The Surveillance Test Procedures (STP) include procedures to check for leakage (STP 114.002 and STP 114.003) and are performed at a frequency to ensure that leakage approaching the Technical Specification limit of 1.0 gpm will be discovered. STP 114.002 uses the plant computer to calculate leak rates based on water inventory balances with an action level of 0.8 gpm. This surveillance is performed once a day with the TS requirement of once per 72 hours. Should the surveillance results indicate leakage of 0.8 gpm, direction is provided to perform a more detailed calculation (PTP 175.001) to quantify the identified and unidentified leakage.

Annunciator Response Procedures (ARP) are used by the operations staff to provide guidance whenever a Main Control Board indication alarms. Direction is provided to verify the alarm condition and perform predetermined corrective actions.

Operators are trained on the use of the ARPs and required responses. When an annunciator alarm is received, the procedure is reviewed to determine probable causes and course of action. These procedures are kept within reach at the main control board and are used during simulator training.

The capability of the leakage detection system has been repeatedly demonstrated over the plant's operating history. The following examples are used as illustration:

a. On December 8, 1982, operators noted frequent automatic makeup to the RCS. An inventory balance was performed and unidentified leakage was found to be 1.56 gpm. Operators promptly investigated and discovered that a drain valve on a reactor coolant pump seal injection filter (outside containment, non-RCS) was leaking approximately 0.7 gpm.

b. On October 7, 1986, the reactor was shut down because the operators could not accurately verify the amount of unidentified leakage. Over a period of three weeks, identified leakage had increased slowly to 3.91 gpm. During performance of the required inventory balance, the reactor coolant drain tank (RCDT) relief valve opened and released an unknown volume of water to the Reactor Building Leak Detection Sump. Since the RCDT level is an input to the leak rate calculation, the actual leak rate could not be determined. Upon repair of the relief valve, unidentified leakage was 0.0 gpm

c. On December 5, 1994, RCS unidentified leakage was assessed to be 0.8 gpm. Operators initiated an investigation and concluded that 0.2 gpm was attributed to an unidentified source inside the reactor building. A visual examination was conducted inside the reactor building and a leaking pressure boundary weld on a reactor coolant pump seal injection line was located. The plant was placed in cold shutdown to repair the weld.

Despite the success of the existing programs and systems, the following enhancements have been instituted:

a. The (particulate) radioactivity monitoring channel of Radiation Monitor (RM)-A2 continuously monitors the Reactor Building atmosphere. The Final Safety Analysis Report states that the sensitivity of this component is based in part on the activity in the Reactor Coolant System (RCS). Since the industry has been developing new fuel designs that are less prone to leaking, activity levels in the RCS have decreased without a corresponding increase in sensitivity of this method of detecting leaks. This method will continue to be utilized in the leakage detection system but may not be effective in detecting small leaks given the present activity levels in the RCS. With the capability of the airborne radiation monitors diminished, other methods were investigated.

   SCE&G performs noble gas sampling and analysis to provide additional verification of RCS integrity. Noble gas sampling and analysis can potentially detect very small changes in the reactor coolant system and reactor building atmosphere and provide early warning of reactor coolant leaks of less than the Technical Specifications limit. A comparison is made between the concentrations of Xenon-133 and Xenon-135 in the RCS and the concentrations of these isotopes in the reactor building atmosphere. This information cannot by itself identify or quantify a leak, however it will provide additional information to detect changes inside the Reactor Building which may require investigation.

b. The plant Technical Specifications require that a RCS water inventory balance be performed at least once per 72 hours. This calculation is performed daily while the plant is stable. Currently the plant computer performs this requirement of our Technical Specifications. This calculation uses 1 minute averages to calculate a leak rate and is capable of detecting approximately 0.25 gpm change in unidentified leakage. VCSNS performs this calculation once per day and retains the information for trending. Investigation will begin at or before 0.8 gpm.

c. VCSNS has always depended on reactor building sump level and rate of change as part of the leakage detection system. A 15-minute average is computed which provides input into a leak rate calculation. Although the data from the level instruments are trended on the computer, there is no alarm function until the TS limit is reached. An alarm function has been developed to provide an early warning of sump in-leakage. This alarm is through the plant annunciator system and comes in at 0.75 gpm. Guidance is provided in the ARPs for verification and actions when this alarm is received.

d. VCSNS Chemistry tracks Tritium in the reactor coolant system as an early warning of loss of inventory. Tritium is monitored in the reactor coolant system and the reactor building sump.

e. VCSNS has initiated radio-chemical sampling of the Reactor Building Sump on a quarterly basis to assist in the early detection of primary nuclides in containment.

Additionally, the procedures for boric acid examinations, both to satisfy Generic Letter 88-05 and ASME Code, Section XI, were enhanced to provide additional detail for the examination and evaluation of RCS leakage. Specific components and locations to be examined are listed in Attachments II through IX.

4. **Describe the evaluations that would be conducted upon discovery of leakage from mechanical joints (e.g., bolted connections) to demonstrate that continued operation with the observed leakage is acceptable. Also describe the acceptance criteria that was established to make such a determination. Provide the technical basis used to establish the acceptance criteria. In addition,**

    a. **if the observed leakage is determined to be acceptable for continued operation, describe what inspection/monitoring actions are taken to trend/evaluate changes in leakage, or**

    b. **if observed leakage is not determined to be acceptable, describe what corrective actions are taken to address the leakage.**

Response:

Class 1 mechanical joints and components are examined every outage per ASME code requirements. For mechanical joints, once a leak is discovered a Condition Evaluation Report is written and based on the findings it is determined which one of three actions is taken. These three actions are to 1) perform an evaluation to determine the susceptibility of the bolting to corrosion and potential failure, 2) perform a VT-1 visual examination after removing the bolt closest to the leakage location, or 3) restore the joint integrity and perform a VT-1 visual examination on any reused bolts.

When an evaluation is used in lieu of repair or bolting examination, the evaluation to determine the susceptibility of the bolting to corrosion considers the following minimum variables:

1) Location of leak

2) History of leak

3) Fastener materials

4) Evidence of corrosion, with the connection assembled

5) Corrosiveness of the process fluid

6) Other components in the vicinity that may be degraded due to leakage

7) History and studies of similar fastener material in a similar environment.

A reference used for evaluation is the *NMAC Boric Acid Corrosion Guidebook*. The guidebook contains field experience as well as results from testing of boric acid environments. The information from the guidebook helps provide basis on acceptance of leakage from industry standards, and testing. Another resource used to evaluate is the ASM (formerly American Society of Metals) "*Engineering Properties of Steel*", 1982 and component drawings, which provide characteristics and properties of the material in the systems where leaks are found. The history of work orders and leaks of the component or mechanical joint is also used in the evaluation.

If the evaluation indicates that the fasteners are not degraded no further action is taken. However, an attempt will be made to stop the leakage. If the initial evaluation indicates the need for a more detailed evaluation, or no evaluation is performed, a VT-1 visual examination is performed.

The VT-1 visual examination follows the guidance of an interim relief request from IWA-5250 (a)(2) corrective actions for bolted connections. This relief request allows the removal of the bolt closest to the source of the leak. The bolt will receive a VT-1 and be evaluated in accordance with IWA-3100 (a) and dispositioned in accordance with IWB-3140. If the removed bolt shows evidence of rejectable degradation, all the remaining bolts shall be removed. If a leak is identified when in service and is acceptable, it is monitored until it can be repaired.

If boric acid residue is found on components the corrective actions follow the guidelines of IWA-5250 (b) for the 1990 addendum. In A90 IWA-5250 (b) the corrective actions require the source of the leakage and areas of general corrosion to be located. A VT-1 shall be performed on the affected area and any affected area outside the scope of the system pressure test being performed. The affected area is cleaned using proper HP control. If the area general corrosion reduces the wall thickness by more than 10%, it shall be evaluated to determine whether to accept, repair or replace the component.

For other components not included in Code Class 1, when a leakage or evidence of boric acid is noted during a GL 88-05 examination, a Condition Evaluation Report is initiated. An evaluation is completed based on leakage, leak rate, component, and history. Work orders are written to replace or repair the component as needed.

5. **Explain the capabilities of your program to detect the low levels of RCPB leakage that may result from through-wall cracking in the bottom RPV head incore instrumentation nozzles. Low levels of leakage may call into question reliance on visual detection techniques or installed leakage detection instrumentation, but has the potential for causing boric acid corrosion. The NRC has had a concern with the bottom RPV head incore instrumentation nozzles because of the high consequences associated with loss of integrity of the bottom head nozzles. Describe how your program would evaluate evidence of possible leakage in this instance. In addition, explain how your program addresses leakage that may impact components that are in the leak path.**

Response:

The existing design of leak detection systems at V. C. Summer fully satisfies the performance requirements of Regulatory Guide 1.45 (May 1973). The leak detection hardware is supported by visual examinations, and engineering oversight of plant operation, including the data from leak detection systems and visual examinations.

Plant procedures and programs have been developed to provide testing requirements of the installed equipment and provide guidance on responding to abnormal indications of leakage. The Surveillance Test Procedures (STP) include procedures to check for leakage (STP 114.002 and STP 114.003) and are performed at a frequency to ensure that leakage approaching the Technical Specification limit of 1.0 gpm will be discovered. STP 114.002 uses the plant computer to calculate leak rates based on water inventory balances with an action level of 0.8 gpm. This surveillance is performed once a day with the TS requirement of once per 72 hours. Should the surveillance results indicate leakage of 0.8 gpm, direction is provided to perform a more detailed calculation (PTP 175.001) to quantify the identified and unidentified leakage.

Leakage in this area is subject to the same detection systems as previously described such as:

Annunciator Response Procedures (ARP) are used by the operations staff to provide guidance whenever a Main Control Board indication alarms. Direction is provided to verify the alarm condition and perform predetermined corrective actions.

Operators are trained on the use of the ARPs and required responses. When an annunciator alarm is received, the procedure is reviewed to determine probable causes and course of action. These procedures are kept within reach at the main control board and are used during simulator training.

The capability of the leakage detection system has been repeatedly demonstrated over the plant's operating history. For additional discussion, refer to response to RAI Question 3.

Vessel Bottom Examinations

VCSNS boric acid corrosion control program surveillance procedures require the performance of a VT-2 visual examination of the bottom of the Reactor vessel each refueling outage prior to plant startup after attaining normal operating pressure associated with 100% reactor power. After a minimum hold time of four hours, a VT-2 visual examination is performed.

Leakage Evaluation

If boric acid residue is found, the source of the leakage and areas of general corrosion are located. A VT-1 shall be performed on the affected area and any affected area outside the scope of the system pressure test being performed. The affected area is cleaned using proper HP control. If the area general corrosion reduces the wall thickness by more than 10%, it will be evaluated to determine whether to accept, repair or replace the component.

Other Impacted Components

For other components, when leakage or evidence of boric acid is noted during an examination, a Condition Evaluation Report is initiated. An evaluation is completed based on leakage, leak rate, component, and history. Work orders are written and every effort is made to replace or repair the component as needed.

6. **Explain the capabilities of your program to detect the low levels of RCPB leakage that may result from through-wall cracking in certain components and configurations for other small diameter nozzles. Low levels of leakage may call into question reliance on visual detection techniques or installed leakage detection instrumentation, but has the potential for causing boric acid corrosion. Describe how your program would evaluate evidence of possible leakage in this instance. In addition, explain how your program addresses leakage that may impact components that are in the leak path.**

Response:

The existing design of leak detection systems at V. C. Summer fully satisfies the performance requirements of Regulatory Guide 1.45 (May 1973). The leak detection hardware is supported by visual examinations, and engineering oversight of plant operation, including the data from leak detection systems and visual examinations.

Plant procedures and programs have been developed to provide testing requirements of the installed equipment and provide guidance on responding to abnormal indications of leakage. The Surveillance Test Procedures (STP) include procedures to check for leakage (STP 114.002 and STP 114.003) and are performed at a frequency to ensure that leakage approaching the Technical Specification limit of 1.0 gpm will be discovered. STP 114.002 uses the plant computer to calculate leak rates based on water inventory balances with an action level of 0.8 gpm. This surveillance is performed once a day with the TS requirement of once per 72 hours. Should the surveillance results indicate leakage of 0.8 gpm, direction is provided to perform a more detailed calculation (PTP 175.001) to quantify the identified and unidentified leakage.

Annunciator Response Procedures (ARP) are used by the operations staff to provide guidance whenever a Main Control Board indication alarms. Direction is provided to verify the alarm condition and perform predetermined corrective actions.

Operators are trained on the use of the ARPs and required responses. When an annunciator alarm is received, the procedure is reviewed to determine probable causes and course of action. These procedures are kept within reach at the main control board and are used during simulator training.

This capability was demonstrated on October 7, 2000, during visual examinations following shutdown for RF-12, when plant examination personnel identified an accumulation of boric acid residue under the reactor coolant loop 'A' hot leg. Further investigation resulted in the identification of pressure boundary leakage on October 12, 2000.

Further examples of the success of the capability of the leakage detection system have been demonstrated over the plant's operating history. For additional discussion, refer to response to RAI Question 3.

Leakage Evaluation

If boric acid residue is found, the source of the leakage and areas of general corrosion are located. A VT-1 will be performed on the affected area and any affected area outside the scope of the system pressure test being performed. The affected area is cleaned using proper HP control. If the area general corrosion reduces the wall thickness by more than 10%, it will be evaluated to determine whether to accept, repair or replace the component.

<u>Other Impacted Components</u>

For other components, when leakage or evidence of boric acid is noted during a boric acid control program examination, a Condition Evaluation Report is initiated. An evaluation is completed based on leakage, leak rate, component, and history. Work orders are written to replace or repair the component as needed.

7. Explain how any aspects of your program (e.g., insulation removal, inaccessible areas, low levels of leakage, evaluation of relevant conditions) make use of susceptibility models or consequence models.

Response:

Currently VCSNS has not made use of susceptibility models or consequence models.

8. Provide a summary of recommendations made by your reactor vendor on visual inspections of nozzles with Alloy 600/82/182 material, actions you have taken or plan to take regarding vendor recommendations, and the basis for any recommendations that are not followed.

Response:

Provided by Westinghouse Owners Group Project Office through letter WOG-02-223, December 13, 2002.

> "As a result of a request from the Westinghouse Owners Group/CE Owners Group Materials Subcommittee, Westinghouse reviewed applicable databases and communications to determine what recommendations Westinghouse had made to its owners on visual examinations of Alloy 600/82/182 materials in the reactor coolant pressure boundary. The detailed review of communications that may have contained such recommendations did not identify any Westinghouse recommendations on visual examinations of Alloy 600/82/182."

There are no vendor recommendations for SCE&G to initiate action on at this time.

9. **Provide the basis for concluding that the inspections and evaluations described in your responses to the above questions comply with your plant Technical Specifications and Title 10 of the *Code of Federal Regulations*, Section 50.55(a), which incorporates Section XI of the American Society of Mechanical Engineers (ASME) Code by reference. Specifically, address how your boric acid corrosion control program complies with ASME Section XI, paragraph IWA-5250 (b) on corrective actions. Include a description of the procedures used to implement the corrective actions.**

Response:

VCSNS complies with 10 CFR 50.55(a) through a 10 year Interval Inservice Inspection Program which has been approved by the NRC and subscribes to the requirements of ASME Code, Section XI. Inservice Inspections are performed as required by Technical Specification 4.0.5, in accordance with ASME Code Section XI.

The VT visual examinations follow the guidance of IWA-5250. If boric acid residue is found on components the corrective actions follow the guidelines of IWA-5250 (b) for the 1990 addendum. In A90 IWA-5250 (b) the corrective actions require the source of the leakage and areas of general corrosion to be located. A VT-1 would be performed on the affected area and any affected area outside the scope of the system pressure test being performed. The affected area is cleaned using proper HP control. If the area general corrosion reduces the wall thickness by more than 10%, it shall be evaluated in accordance with IWB-3140 to determine whether to accept, repair or replace the component [IWA-5250 A90].

For other components not included in the code Class 1, when a leakage or evidence of boric acid is noted during a GL 88-05 examination, a Condition Evaluation Report is initiated. An evaluation is completed based on leakage, leak rate, component, and history. Work orders are written to replace or repair the component as needed.

Corrective actions are implemented through VCSNS maintenance procedures applicable to the component.

A Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT00075-SI 302-691 A-4	ECCS TEST VALVE FOR XVC08993A-SI	RB-412-260-20
XVT00006A-SI 302-691 A-7	TEST CONNECTION FOR XVC08993A-SI	RB-412-275-56
XVC08992A-SI 302-691 B-6	LOOP A HIGH HEAD HOT LEG CHECK VALVE	RB-412-275-56
XVC08990A-SI 302-691 B-8	LOOP A LOW HEAD HOT LEG CHECK VALVE	RB-412-275-56
XVC08988A-SI 302-691 A-9	RHR SUPPLY HEADER CHECK VALVE	RB-412-275-48
XVT00004A-RH 302-641 H-16	RH HEADER A BYPASS DRAIN VALVE	RB-412-270-24
XVT00016A-RH 302-641 G-15	RH HEADER A VENT VALVE	RB-424-270-51
XVG08701A-RH 302-641 H-15	RH HEADER A ISOLATION VALVE (IRC)	RB-412-265-48
IPX00405-HI-RC 302-601 C-12	HIGH SIDE ISOL TO IPX0405	RB-412-240-32
IPT00403A-HI-RC 302-601 C-12	HIGH SIDE ISOL TO IPT0403A	RB-412-240-32
XVT18033-RC 302-601 D-14	HOT LEG TRAIN A CAP TUBE ISOL VALVE	RB-412-300-28
XTK0024 302-602 G-12	PRESSURIZER SURGE LINE TO HOT LEG	RB-434, BOTTOM OF PRESSURIZER
IFT00414-HI-RC 302-601 C-16	HIGH SIDE ISOL TO IFT0414	RB-412-280-49
IFT00414-LI-RC 302-601 C-16	LOW SIDE ISOL TO IFT0414	RB-412-280-49
IFT00415-HI-RC 302-601 C-16	HIGH SIDE ISOL TO IFT0415	RB-412-277-49
IFT00415-LI-RC 302-601 C-16	LOW SIDE ISOL TO IFT0415	RB-412-277-49
IFT00416-HI-RC 302-601 B-16	HIGH SIDE ISOL TO IFT0416	RB-412-255-49
IFT00416-LI-RC 302-601 B-16	LOW SIDE ISOL TO IFT0416	RB-412-255-49
XVT08058A-RC 302-601 A-15	RC DRAIN PUMP RC LOOP A SUCTION VALVE	RB-412-268-35

A Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
LCV00459-CS 302-673 A-13	RC LETDOWN LINE ISOLATION VALVE	RB-412-285-44
XVT00050A-CV 302-671 F-14	RC PUMP A SEAL BYPASS HEADER DRAIN VLV	RB-436-255-30
XVT08363A-CS 302-671 E-17	RC PUMP A SEAL BYPASS HEADER VENT VALVE	RB-436-245-36
XPS0024A 302-671 E-17	REACTOR COOLANT PUMP A SEAL BYPASS ORF	RB-436-245-36
IPT00156-HI-CS 302-671 F-16	HIGH SIDE ISOL FOR IPT0156	RB-412-252-47
XVT08364A-CS 302-671 G-14	RC PUMP A SEAL SUPPLY DRAIN VALVE	RB-412-265-40
XVC08367A-CS 302-671 G-15	RC PUMP A SEAL SUPPLY HEADER CHECK VLV	RB-429-265-40
XVN08050-RC 302-602 G-09	RC LOOP A PZR SPRAY VALVE BYPASS VALVE	RB-436-302-49
PCV00444D-RC 302-602 G-09	LOOP A PRESSURIZER SPRAY VALVE	RB-463-302-49
XVT00078-SI 302-691 A-15	ECCS TEST VALVE FOR XVC08998A-SI	RB-412-265-50
XVC08973A-SI 302-693 E-16	RCS LOOP A COLD LEG INLET HDR CHK VALVE	RB-412-255-48
XVT00004A-SI 302-691 B-13	TEST CONNECTION FOR XVC08995A-SI	RB-412-250-48
XVC08995A-SI 302-691 B-13	LOOP A HIGH HEAD COLD LEG CHECK VALVE	RB-412-250-48
XVT00002A-SI 302-691 B-16	TEST CONNECTION FOR XVC08997A-SI	RB-412-345-56
XVC08997A-SI 302-691 B-15	LOOP A LOW HEAD COLD LEG CHECK VALVE	RB-412-345-56
XVC08956A-SI 302-692 B-13	SI ACCUM A DISCH HEADER CHECK VALVE	RB-412-227-48

A Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT00061A-SI 302-692 C-15	ACCUMULATOR A TEST ISOLATION VALVE	RB-412-250-28
XVT08879A-SI 302-692 C-13	XVC08948A-SI TEST LINE ISOLATION VALVE	RB-412-227-48
XVC08346-CS 302-673 A-14	ALTERNATE CHARGING HEADER CHECK VALVE	RB-433-280-18
XVT08212-CS 302-673 A-14	UPSTRM TEST ISOL VLV FOR XVC08379-CS	RB-422-255-17

B Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT00076-SI 302-691 A-4	ECCS TEST VALVE FOR XVC08993B-SI	RB-412-190-30
XVT00006B-SI 302-691 B-8	TEST CONNECTION FOR XVC08990B-SI	RB-412-225-44
XVC08990B-SI 302-691 B-8	LOOP B LOW HEAD HOT LEG CHECK VALVE	RB-412-225-40
XVC08992B-SI 302-691 B-6	LOOP B HIGH HEAD HOT LEG CHECK VALVE	RB-412-235-36
XVC08988B-SI 302-691 B-9	RHR SUPPLY HEADER CHECK VALVE	RB-412-230-50
XVM09307B-SS 302-771 D-10	RCS LOOP B SAMPLE HEADER TEST CONN VLV	RB-412-220-57
XRP0314 302-771 D-10	SAMPLING LINE FROM RC LOOP B PENETR	RB-425-219-62
XVT18032-RC 302-601 F-14	HOT LEG TRAIN B CAP TUBE ISOL VALVE	RB-412-180-27
IFT00424-HI-RC 302-601 E-16	HIGH SIDE ISOL TO IFT0424	RB-412-180-51
IFT00424-LI-RC 302-601 E-16	LOW SIDE ISOL TO IFT0424	RB-412-180-51
IFT00425-HI-RC 302-601 E-16	HIGH SIDE ISOL TO IFT0425	RB-412-180-51
IFT00425-LI-RC 302-601 E-16	LOW SIDE ISOL TO IFT0425	RB-412-180-51
IFT00426-HI-RC 302-601 E-16	HIGH SIDE ISOL TO IFT0426	RB-412-170-51
IFT00426-LI-RC 302-601 E-16	LOW SIDE ISOL TO IFT0426	RB-412-170-51
XVT08083-RC 302-601 J-15	RC LOOP B STANDPIPE ISOLATION VALVE	RB-412-175-36
XVT8058B-RC 302-601 H-15	RC DRAIN PUMP RC LOOP B SUCTION VALVE	RB-412-175-36
XVT00050B-CV 302-672 F-16	RC PUMP B SEAL BYPASS HEADER DRAIN VLV	RB-436-140-45

B Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT08363B-CS 302-672 E-16	RC PUMP B SEAL BYPASS HEADER VENT VALVE	RB-436-140-45
XPS0024B 302-672 E-16	REACTOR COOLANT PUMP B SEAL BYPASS ORF	RB-436-140-45
IPT00155-HI-CS 302-672 F-15	HIGH SIDE ISOL TO IPT0155	RB-412-135-45
XVT08364B-CS 302-672 G-13	RC PUMP B SEAL SUPPLY DRAIN VALVE	RB-412-140-45
XVC08367B-CS 302-672 G-15	RC PUMP B SEAL SUPPLY HEADER CHECK VALVE	RB-429-140-45
XVC08956B-SI 302-692 E-13	SI ACCUM B DISCH HEADER CHECK VALVE	RB-412-130-40
XVT00061B-SI 302-692 D-15	ACCUMULATOR B TEST ISOLATION VALVE	RB-436-130-38
XVT08879B-SI 302-692 E-13	XVC08948B-SI TEST LINE ISOLATION VALVE	RB-412-130-40
XVT00079-SI 302-691 A-15	ECCS TEST VALVE FOR XVC08998B-SI	RB-412-235-45
XVC08973B-SI 302-693 F-15	RCS LOOP B COLD LEG INLET HDR CHK VALVE	RB-424- 160-52
XVT00004B-SI 302-691 B-12	TEST CONNECTION FOR XVC08995B-SI	RB-412-150-56
XVC08995B-SI 302-691 B-12	LOOP B HIGH HEAD COLD LEG CHECK VALVE	RB-412-150-56
XVT00002B-SI 302-691 B-15	TEST CONNECTION FOR XVC08997B-SI	RB-412-260-60
XVC08997B-SI 302-691 B-15	LOOP B LOW HEAD COLD LEG CHECK VALVE	RB-412-225-37

B Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVC08347-CS 302-673 B-14	RCS NORMAL CHARGING HEADER CHECK VALVE	RB-412-155-28
XVT00066-CV 302-673 B-14	RCS NORMAL CHARGING HEADER DRAIN VALVE	RB-412-155-28
XRP0314 302-771 D-10	SAMPLING LINE FROM RC LOOP B PENETR	AB-412-K-07
XVX09365B-SS 302-771 D-10	RC LOOP B HOT LEG SAMPLE HDR ISOL VALVE	AB-412-K-07

C Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT00077-SI 302-691 B-4	ECCS TEST VALVE FOR XVC08993C-SI	RB-412-050-20
XVT00006C-SI 302-691 B-5	TEST CONNECTION FOR XVC08990C-SI	RB-412-275-62
XVC08992C-SI 302-691 B-5	LOOP C HIGH HEAD HOT LEG CHECK VALVE	RB-412-275-60
XVC08990C-SI 302-691 B-7	LOOP C LOW HEAD HOT LEG CHECK VALVE	RB-412-275-60
IPX00404-HI-RC 302-601 C-07	HIGH SIDE ISOL TO IPX0404	RB-412-090-30
IPT00402A-HI-RC 302-601 C-07	HIGH SIDE ISOL TO IPT00402A	RB-412-090-30
XVT00004B-RH 302-641 F-15	RH HEADER B BYPASS DRAIN VALVE	RB-412-080-30
XVT00016B-RH 302-641 E-15	RH HEADER B VENT VALVE	RB-412-080-30
XVG08701B-RH 302-641 F-15	RH HEADER B ISOLATION VALVE (IRC)	RB-412-110-44
XVM09307C-SS 302-771 E-11	RCS LOOP C SAMPLE HEADER TEST CONN VLV	RB-412-150-57
XRP0223 302-771 E-10	SAMPLING LINE/RC LOOP C PENETR	RB-425-154-62
IFT00434-HI-RC 302-601 C-03	HIGH SIDE ISOL TO IFT0434	RB-412-080-45
IFT00434-LI-RC 302-601 C-03	LOW SIDE ISOL TO IFT0434	RB-412-080-45
IFT00435-HI-RC 302-601 C-03	HIGH SIDE ISOL TO IFT0435	RB-412-060-55
IFT00435-LI-RC 302-601 C-03	LOW SIDE ISOL TO IFT0435	RB-412-060-55
IFT00436-HI-RC 302-601 B-03	HIGH SIDE ISOL TO IFT0436	RB-412-060-55
IFT00436-LI-RC 302-601 B-03	LOW SIDE ISOL TO IFT0436	RB-412-060-55
XVT08058C-RC 302-601 B-04	RC DRAIN PUMP RC LOOP C SUCTION VALVE	RB-412-045-24
XVT08153-CS 302-673 B-09	EXCESS LETDOWN HEAT EXCH INLET VALVE	RB-412-070-34

C Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVT00050C-CV 302-673 F-16	RC PUMP C SEAL BYPASS HEADER DRAIN VLV	RB-436-045-39
XVT08363C-CS 302-673 E-16	RC PUMP C SEAL BYPASS HEADER VENT VALVE	RB-436-050-45
IPT00154-HI-CS 302-673 F-15	HIGH SIDE ISOL FOR IPT0154	RB-412-030-54
XPS0024C 302-673 E-16	REACTOR COOLANT PUMP C SEAL BYPASS ORF	RB-436-050-45
XVT08364C-CS 302-673 G-13	RC PUMP C SEAL SUPPLY DRAIN VALVE	RB -412-050-40
XVC08367C-CS 302-673 G-15	RC PUMP C SEAL SUPPLY HEADER CHECK VLV	RB-429-050-45
XVT08145-CS 302-673 B-14	RCS PRESSURIZER SPRAY HEADER ISOL VLV	RB-425-030-52
XVN08050-RC 302-602 G-09	RC LOOP A PZR SPRAY VALVE BYPASS VALVE	RB-463-302-49
PCV00444D-RC 302-602 G-09	LOOP A PRESSURIZER SPRAY VALVE	RB-463-302-49
XTK0024 302-602 G-12	PRESSURIZER SPRAY LINE FROM LOOP C COLD LEG	RB-480, TOP OF PRESSURIZER
XVC08956C-SI 302-692 G-13	SI ACCUM C DISCH HEADER CHECK VALVE	RB-436-032-60
XVT00061C-SI 302-692 F-15	ACCUMULATOR C TEST ISOLATION VALVE	RB-436-025-54
XVT08879C-SI 302-692 G-13	XVC08948C-SI TEST LINE ISOLATION VALVE	RB-436-015-58
XVT00080-SI 302-691 B-15	ECCS TEST VALVE FOR XVC08998C-SI	RB-412-055-25
XVC08973C-SI 302-693 G-15	RCS LOOP C COLD LEG INLET HDR CHK VALVE	RB-412-095-30
XVT00004C-SI 302-691 B-11	TEST CONNECTION FOR XVC08995C-SI	RB-412-095-30
XVC08995C-SI 302-691 B-11	LOOP C HIGH HEAD COLD LEG CHECK VALVE	RB-412-095-28
XVT00002C-SI 302-691 B-14	TEST CONNECTION FOR XVC08997C-SI	RB-412-345-56
XVC08997C-SI 302-691 B-14	LOOP C LOW HEAD COLD LEG CHECK VALVE	RB-412-345-56

C Loop Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XRP0223 302-771 E-11	SAMPLING LINE/RC LOOP C PENETR	IB-412-J-04
XVX09365C-SS 302-771 E-9	RC LOOP C HOT LEG SAMPLE HDR ISOL VALVE	IB-412-J-04

Pressurizer Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
XVS08010A-RC 302-602 D-11	PRESSURIZER SAFETY VALVE A	RB-480-313-37
XVS08010B-RC 302-602 D-11	PRESSURIZER SAFETY VALVE B	RB-480-308-48
XVS08010C-RC 302-602 D-14	PRESSURIZER SAFETY VALVE C	RB-480-325-48
PCV00445A-RC 302-602 D-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-315-34
PCV00445B-RC 302-602 E-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-323-35
PCV00444B-RC 302-602 E-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-326-56
XVT08052-RC 302-602 E-12	PRESSURIZER STEAM SAMPLE HDR VENT VALVE	RB-463-326-56
XVT19308-SS 302-771 C-12	PZR GAS SAMPLE HDR TEST VALVE (IRC)	RB-436-275-58
XVM09303-SS 302-771 C-11	PZR SAMPLE HEADER TEST CONNECTION VALVE	RB-436-275-58
XRP0405 302-771 C-10	SAMPLING LINE FROM PRESSURIZER PENETR	RB-445-274-62
XVT18007-RC 302-602 F-14	CONDENSATE POT VENT VALVE	RB-463-307-53
IPT00455-HI-RC 302-602 G-14	HIGH ISOL TO IPT0455	RB-436-320-45
IPT00455A-HI-RC 302-602 G-14	HIGH SIDE ISOL TO IPT0455A	RB-436-320-45
ILT00459-HI-RC 302-602 G-14	HIGH SIDE ISOL TO ILT0459	RB-436-307-53
ILT00459-LI-RC 302-602 G-14	LOW SIDE ISOL TO ILT0459	RB-436-307-53
ILT00459A-HI-RC 302-602 H-14	HIGH SIDE ISOL TO ILT0459A	RB-436-320-45
ILT00459A-LI-RC 302-602 H-14	LOW SIDE ISOL TO ILT0459A	RB-436-320-45
XVT18011-RC 302-602 F-13	CONDENSATE POT VENT VALVE	RB-463-315-55
IPT00456-HI-RC 302-602 G-13	HIGH ISOL TO IPT0456	RB-436-313-56

Pressurizer Test Boundary

Component ID Drawing Location	Component Description	Approximate Location
ILT00460-HI-RC 302-602 G-13	HIGH SIDE ISOL TO ILT0460	RB-436-315-55
ILT00460-LI-RC 302-602 G-13	LOW SIDE ISOL TO ILT0460	RB-436-315-55
XVT18009-RC 302-602 G-12	CONDENSATE POT VENT VALVE	RB-463-325-44
IPT00445-HI-RC 302-602 G-10	HIGH SIDE ISOL TO IPT0445	RB-436-312-56
IPT00444-HI-RC 302-602 G-10	HIGH SIDE ISOL TO IPT0444	RB-436-335-55
ILT00462-HI-RC 302-602 G-10	HIGH SIDE ISOL TO ILT0462	RB-436-335-55
ILT00462-LI-RC 302-602 G-10	LOW SIDE ISOL TO ILT0462	RB-436-335-55
IPT00457-HI-RC 302-602 G-11	HIGH SIDE ISOL TO IPT0457	RB-436-312-56
ILT00461-HI-RC 302-602 G-11	HIGH SIDE ISOL TO ILT0461	RB-436-325-56
ILT00461-LI-RC 302-602 G-11	LOW SIDE ISOL TO ILT0461	RB-436-325-56
XVT19309-SS 302-771 C-12	PZR LIQUID SAMPLE HDR TEST VALVE (IRC)	RB-436-275-58
XTK0024 302-602 G-12	PRESSURIZER ASSY	RB-437-320-42
XRP0405 302-771 C-10	SAMPLING LINE FROM PRESSURIZER PENETR	AB-436-M-07
XVT09700-SS 302-771 C-12	PRESSURIZER SAMPLING TEST VALVE	AB-436-M-07
XVX09357-SS 302-771 C-10	PRESSURIZER SAMPLE HEADER ISOLATION VLV	AB-436-M-07

Reactor Vessel Test Boundary

Component ID Drawing Location	Description	Approximate Location
XVT08096A-RC 302-601 F-06	REACTOR VESSEL HEAD VENT VALVE	RB-476-270-23
XVT08096B-RC 302-601 F-08	REACTOR VESSEL HEAD VENT VALVE	RB-476-270-17
XVT18023-RC 302-601 E-11	REACTOR HEAD CAPILLARY TUBE ISOL VALVE	RB-436-000-00
ILE01312 302-601 F-08	REACTOR COOLANT LEVEL SENSOR (LOWER RX)	RB-436-210-36
ILE01322 302-601 F-08	RC LEVEL SENSOR (LOWER RX)	RB-436-210-36
XVM08076-RC 302-601 B-10	REAC VESSEL LEAKOFF TELL TALE DRN VLV	RB-412-045-16
XVN08032-RC 302-601 B-10	RCDT INLET FROM REACTOR FLANGE LEAKOFF	RB-412-045-16
XRE0001 302-601 E-10	BOTTOM OF REACTOR VESSEL	RB-374-000-00

Insulated Components with Pressure Retaining Bolted Connections

	Component Drawing Location	Component Description	Approximate Location
	PCV0444B-RC 302-602 E-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-326-56 (Inside PZR Cubicle)
◆	PCV0444C-RC 302-602 F-09	LOOP C PRESSURIZER SPRAY VALVE	RB-463-313-54 (Inside PZR Cubicle)
◆	PCV00444D-RC 302-602 G-09	LOOP A PRESSURIZER SPRAY VALVE	RB-463-302-49 (Inside PZR Cubicle)
	PCV00445A-RC 302-602 D-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-315-34 (Inside PZR Cubicle)
	PCV00445B-RC 302-602 E-15	PRESSURIZER POWER OPERATED RELIEF VALVE	RB-477-323-35 (Inside PZR Cubicle)
	XVG08000A-RC 302-602 D-15	PZR PWR OPER RELIEF VLV INLET ISOL VLV	RB-463-316-34 (Inside PZR Cubicle)
	XVG08000B-RC 302-602 E-15	PZR PWR OPER RELIEF VLV INLET ISOL VLV	RB-463-316-56 (Inside PZR Cubicle)
	XVG08000C-RC 302-602 D-15	PZR PWR OPER RELIEF VLV INLET ISOL VLV	RB-463-325-38 (Inside PZR Cubicle)
◆	XVS08010A-RC 302-602 D-11	PRESSURIZER SAFETY VALVE A	RB-480-313-37 (Inside PZR Cubicle)
◆	XVS08010B-RC 302-602 D-11	PRESSURIZER SAFETY VALVE B	RB-480-308-48 (Inside PZR Cubicle)
◆	XVS08010C-RC 302-602 D-14	PRESSURIZER SAFETY VALVE C	RB-480-325-48 (Inside PZR Cubicle)
	XVG08080-RC 302-602 J-12	PZR SFTY VLV LOOP SL DRN LINE PZR ISOL	RB-436-315-40 (Inside PZR Cubicle)
◆	XTK0024 302-602 G-12	PRESSURIZER ASSY (Manway Covers)	RB-437-320-42 (Inside PZR Cubicle)

Note - Diamond (◆) denotes component associated with the Boron Induced Corrosion Inspection Program.

Insulated Components with Pressure Retaining Bolted Connections

Component Drawing Location	Component Description	Approximate Location
XVG08085-RC 302-601 A-15	RC LOOP A NORM LETDOWN OUTLET ISOL VLV	RB-412-268-35
XVT08145-CS 302-673 B-14	RCS PRESSURIZER SPRAY HEADER ISOL VLV	RB-425-030-52
XVT08153-CS 302-673 B-09	EXCESS LETDOWN HEAT EXCH INLET VALVE	RB-412-070-34
XVT08154-CS 302-673 B-09	EXCESS LETDOWN HEAT EXCH INLET VALVE	RB-412-070-34
XVC08346-CS 302-673 A-14	ALTERNATE CHARGING HEADER CHECK VALVE	RB-433-280-18
XVC08347-CS 302-673 B-14	RCS NORMAL CHARGING HEADER CHECK VALVE	RB-412-155-28
XVC08377-CS 302-673 B-15	RCS PZR SPRAY SUPPLY HEADER CHECK VALVE	RB-463-305-46
XVC08378-CS 302-673 B-15	RCS NORMAL CHARGING HEADER CHECK VALVE	RB-412-155-28
XVC08379-CS 302-673 A-15	ALTERNATE CHARGING HEADER CHECK VALVE	RB-412-280-18
LCV00459-CS 302-673 A-13	RC LETDOWN ISOLATION VALVE	RB-412-285-44
LCV00460-CS 302-673 A-14	RC LETDOWN ISOLATION VALVE	RB-412-285-44
SPOOL PIECES 302-671 E-17	REACTOR COOLANT PUMP A SEAL SUPPLY AND BYPASS SPOOL PIECES AND FLANGES	RB-436-245-36
SPOOL PIECES 302-672 E-16	REACTOR COOLANT PUMP B SEAL SUPPLY AND BYPASS SPOOL PIECES AND FLANGES	RB-436-140-45
SPOOL PIECES 302-673 E-16	REACTOR COOLANT PUMP C SEAL SUPPLY AND BYPASS SPOOL PIECES AND FLANGES	RB-436-050-45

Insulated Components with Pressure Retaining Bolted Connections

Component Drawing Location	Component Description	Approximate Location
XVG08701A-RH 302-641 H-15	RH HEADER A ISOLATION VALVE (IRC)	RB-412-265-48
XVG08701B-RH 302-641 F-15	RH HEADER B ISOLATION VALVE (IRC)	RB-412-110-44
XVG08702A-RH 302-641 H-15	RH INLET HEADER A ISOLATION VALVE	RB-412-275-24
XVG08702B-RH 302-641 F-15	RH INLET HEADER B ISOLATION VALVE	RB-412-080-30
XVC08948A-SI 302-692 C-16	SI LOOP A OUTLET HEADER CHECK VALVE	RB-433-250-28
XVC08948B-SI 302-692 E-16	SI LOOP B OUTLET HEADER CHECK VALVE	RB-433-145-44
XVC08948C-SI 302-692 G-16	SI LOOP C OUTLET HEADER CHECK VALVE	RB-433-035-28
XVC08993A-SI 302-691 A-04	LOOP A HIGH HEAD HOT LEG HDR CHECK VLV	RB-433-260-20
XVC08993B-SI 302-691 A-04	LOOP B HIGH HEAD HOT LEG HDR CHECK VLV	RB-433-150-56
XVC08993C-SI 302-691 A-05	LOOP C HIGH HEAD HOT LEG HDR CHECK VLV	RB-433-050-21
XVC08998A-SI 302-691 A-15	LOOP A LOW HEAD COLD LEG CHECK VALVE	RB-433-275-18
XVC08998B-SI 302-691 A-15	LOOP B LOW HEAD COLD LEG CHECK VALVE	RB-433-135-45
XVC08998C-SI 302-691 B-15	LOOP C LOW HEAD COLD LEG CHECK VALVE	RB-433-055-22
XVC08973A-SI 302-693 E-15	RCS LOOP A COLD LEG INLET HDR CHK VALVE	RB-412-255-48
XVC08973B-SI 302-693 F-15	RCS LOOP B COLD LEG INLET HDR CHK VALVE	RB-424-160-52
XVC08973C-SI 302-693 G-15	RCS LOOP C COLD LEG INLET HDR CHK VALVE	RB-412-095-30

Insulated Components with Pressure Retaining Bolted Connections

	Component Drawing Location	Component Description	Approximate Location
	XVC08988A-SI 302-691 A-09	RHR SUPPLY HEADER CHECK VALVE	RB-412-275-48
	XVC08988B-SI 302-691 A-09	RHR SUPPLY HEADER CHECK VALVE	RB-412-230-50
◆	XSG0002A 302-601 C-14	STEAM GENERATOR A (Primary Manway Covers)	RB-412-290-32
◆	XSG0002B 302-601 E-14	STEAM GENERATOR B (Primary Manway Covers)	RB-412-165-32
◆	XSG0002C 302-601 C-04	STEAM GENERATOR C (Primary Manway Covers)	RB-412-075-32

Note - Diamond (◆) denotes component associated with the Boron Induced Corrosion Inspection Program.

Boron Induced Corrosion Inspection Boundary

Component ID	Component Description	Approximate Location
XPP0030A	REACTOR COOLANT PUMP A - Main Flange Bolts, Housing Bolts, and Seal Housing Ring Clamp Bolts	RB-412-245-35
XPP0030B	REACTOR COOLANT PUMP B - Main Flange Bolts, Housing Bolts, and Seal Housing Ring Clamp Bolts	RB-412-125-35
XPP0030C	REACTOR COOLANT PUMP C - Main Flange Bolts, Housing Bolts, and Seal Housing Ring Clamp Bolts	RB-412-030-35
XRE0001	REACTOR VESSEL - Closure Stud Bolts, Closure Nuts and Washers, Reactor Vessel Head	RB-463-000-00
XVT08095A-RC	REACTOR VESSEL HEAD VENT ISOL VALVE - Body Studs, Body Nuts, Hold Down Clamp, and Socket Head Cap Screws	RB-463-000-00
XVT08095B-RC	REACTOR VESSEL HEAD VENT ISOL VALVE - Body Studs, Body Nuts, Hold Down Clamp, and Socket Head Cap Screws	RB-463-000-00
XVT08096A-RC	REACTOR VESSEL HEAD VENT VALVE - Body Studs, Body Nuts, Hold Down Clamp, and Socket Head Cap Screws	RB-463-000-00
XVT08096B-RC	REACTOR VESSEL HEAD VENT VALVE - Body Studs, Body Nuts, Hold Down Clamp, and Socket Head Cap Screws	RB-463-000-00

ASME CODE CATEGORY B-F WELDS

The review of the Inservice Examination Plan, ISE-3 provides the following pertaining to the total number of ASME Code Category B-F welds at the V. C. Summer Nuclear Station. These dissimilar metal welds are within the examination boundaries of Attachments II, III, IV, V and VI of this response.

Isometric Drawing/Weld #	COMMENTS
CGE-1-4100-33DM	"A" Hot Leg weld to Reactor Vessel Nozzle
CGE-1-4100-16DM	"A" Cold Leg weld to Reactor Vessel Nozzle
CGE-1-4200-1DM	"B" Hot Leg weld to Reactor Vessel Nozzle
CGE-1-4200-16DM	"B" Cold Leg weld to Reactor Vessel Nozzle
CGE-1-4300-1DM	"C" Hot Leg weld to Reactor Vessel Nozzle
CGE-1-4300-16DM	"C" Cold Leg weld to Reactor Vessel Nozzle
CGE-1-4500-1DM	Pressurizer Surge Line Weld to Pressurizer Nozzle
CGE-1-4501-1DM	Pressurizer Nozzle weld to "A" Pressurizer Safety Valve
CGE-1-4501-12DM	Pressurizer Nozzle weld to "B" Pressurizer Safety Valve
CGE-1-4501-23DM	Pressurizer Nozzle weld to "C" Pressurizer Safety Valve
CGE-1-4502-1DM	Pressurizer Nozzle weld to PORVs
CGE-1-4503-46DM	Pressurizer Nozzle weld to Spray piping
CGE-1-4100-31DM	"A" Hot Leg weld to Steam Generator Nozzle
CGE-1-4100-32DM	"A" Crossover weld to Steam Generator Nozzle
CGE-1-4200-28DM	"B" Hot Leg weld to Steam Generator Nozzle
CGE-1-4200-29DM	"B" Crossover weld to Steam Generator Nozzle
CGE-1-4300-29DM	"C" Hot Leg weld to Steam Generator Nozzle
CGE-1-4300-30DM	"C" Crossover weld to Steam Generator Nozzle