SAI Report No. 186-028-14

TECHNICAL EVALUATION REPORT

PEACH BOTTOM ATOMIC POWER STATION
UNITS 2 and 3

INSERVICE INSPECTION PROGRAM

Submitted to:

U.S. Nuclear Regulatory Commission
Contract No. 03-82-096

Science Applications, Inc.
McLean, Virginia 22102

September 10, 1982

CONTENTS

TECHNICAL EVALUATION REPORT
PEACH BOTTOM ATOMIC POWER STATION - UNITS 2 AND 3
INSERVICE INSPECTION PROGRAM

INTRODUCTION

The revision to 10 CFR 50.55a, published in February 1976, required that Inservice Inspection (ISI) Programs be updated to meet the requirements (to the extent practical) of the Edition and Addenda of Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code* incorporated in the Regulation by reference in paragraph (b). This updating of the programs was required to be done every 40 months to reflect the new requirements of the later editions of Section XI.

As specified in the February 1976 revision, for plants with Operating Licenses issued prior to March 1, 1976, the regulations became effective after September 1, 1976, at the start of the next regular 40-month inspection period. The initial inservice examinations conducted during the first 40-month period were to comply with the requirements in editions of Section XI and addenda in effect no more than six months prior to the date of start of facility commercial operation.

The Regulation recognized that the requirements of the later editions and addenda of the Section XI might not be practical to implement at facilities because of limitations of design, geometry, and materials of construction of components and systems. It therefore permitted determinations of impractical examination or testing requirements to be evaluated. Relief from these requirements could be granted provided health and safety of the public were not endangered giving due consideration to the burden placed on the licensee if the requirements were imposed. This report provides evaluations of the various requests for relief by the licensee, Philadelphia Electric Company (PEC), of Peach Bottom Atomic Power Station, Units 2 and 3. It deals only with inservice examinations of components and with system pressure tests. Inservice tests of pumps and valves (IST programs) are being evaluated separately.

---

* Hereinafter referred to as Section XI or Code.

The revision to 10 CFR 50.55a, effective November 1, 1979, modified the time interval for updating ISI programs and incorporated by reference a later edition and addenda of Section XI. The updating intervals were extended from 40 months to 120 months to be consistent with intervals as defined in Section XI.

For plants with Operating Licenses issued prior to March 1, 1976, the provisions of the November 1, 1979, revision are effective after September 1, 1976, at the start of the next one-third of the 120-month interval. During the one-third of an interval and throughout the remainder of the interval, inservice examinations shall comply with the latest edition and addenda of Section XI, incorporated by reference in the Regulation, on the date 12 months prior to the start of that one-third of an interval. For Peach Bottom Atomic Power Station, Units No. 2 and 3, the ISI program and the relief requests evaluated in this report cover the last 80 months of the current 120-month inspection interval, i.e., from November 5, 1977, to July 5, 1984, for Unit 2 and from April 23, 1978, to December 12, 1984, for Unit 3. This program was based upon the 1974 Edition of Section XI of the ASME Boiler and Pressure Vessel Code with Addenda through the Summer of 1975.

The November 1979 revision of the Regulation also provides that ISI programs may meet the requirements of subsequent code editions and addenda, incorporated by reference in paragraph (b) and subject to Nuclear Regulatory Commission (NRC) approval. Portions of such editions or addenda may be used provided that all related requirements of the respective editions or addenda are met. These instances are addressed on a case-by-case basis in the body of this report.

Finally, Section XI of the code provides for certain components and systems to be exempted from its requirements. In some instances, these exemptions are not acceptable to NRC or are only acceptable with restrictions. As appropriate, these instances are also discussed in this report.

References (1) to (14) listed at the end of this report pertain to previous information transmittals on ISI between the licensee and the NRC. By letters of April 26 and November 22, 1976,[1,3] the Commission provided general ISI guidance to all licensees. The licensee responded to the initial guidance on June 4, 1976.[2] On May 5, 1977,[4] the licensee submitted a proposed change in the Technical Specifications for both units and on August 4, 1977,[5] submitted the Inservice Inspection Program for Unit 2. The Commission granted

interim relief on August 30, 1977,[6] for Unit 2, based on the ISI Program submittal, pending detailed review. On January 23, 1978,[7] the licensee submitted the Inservice Inspection Program for Unit 3. By letters of August 10, 1978,[8] and March 5, 1982,[12] the Commission requested additional information to complete this review. In response to the August 10, 1978, request, the licensee furnished further information on September 20, 1978,[9] and a revised ISI Program on November 22, 1978.[10] In response to the March 5, 1982, request, the licensee submitted information on April 5, 1982,[13] and June 11, 1982.[14] The licensee made a request for Code interpretation on February 19, 1980.[11]

From these submittals, a total of 10 requests (a) for relief from Code requirements, (b) for updating to a later code, and (c) for exemptions not necessarily acceptable to the Commission were identified. These requests are evaluated in the following sections of this report.

I. CLASS 1 COMPONENTS

A. Reactor Vessel

No relief requests.

B. Pressurizer

Does not apply to BWRs.

C. Heat Exchangers

No relief requests.

D. Piping Pressure Boundary

1. Request for Relief 2.4.1, Hydraulic Shock Suppressors for Class 1 Piping, Pumps, and Valves, Category B-K-2, Items B4.10, B5.5 and B6.5

Code Requirement

The areas shall include the support components that extend from the piping, valve, and pump attachment to and including the attachment to the supporting structure.

The visual examination performed during each inspection interval shall cover all support components.

The support settings of constant and variable spring type hangers, snubbers, and shock absorbers shall be verified.

Code Relief Request

Licensee requests permission to examine the hydraulic shock suppressors on Class 1 systems according to the requirements of the plant Technical Specifications instead of according to the requirements of Table IWB-2500, Category B-K-2, of Section XI.

Proposed Alternative Examination

Hydraulic shock suppressors will be examined and tested in accordance with Technical Specification requirements.

Licensee's Basis for Requesting Relief

The hydraulic shock suppressors on Class 1 systems are currently subjected to an ongoing inspection and testing program detailed in the plant Technical Specifications which exceeds the requirements of the Section XI. This program is designed to demonstrate continued operational readiness and structural integrity of the shock suppressors. This approach provides for unified testing and reporting requirements and eliminates duplication of records.

Evaluation

The requirements of the plant Technical Specifications specify monthly inspections of the hydraulic shock suppressors, whereas the requirements of Table IWB-2500 of Section XI specify only one examination during an inspection interval of ten years. There would be no need to perform an additional visual inspection during an inspection interval just to satisfy Section XI requirements. The intent of the requirements of the plant Technical Specifications is the same as that of the requirements of Section XI; i.e., the assurance of safety based on the adequate functioning of the hydraulic shock suppressors.

The requirements of the plant Technical Specifications meet all the requirements of Section XI for inspection and testing of hydraulic shock suppressors, with the exception of the reporting requirements. The principal basis for the licensee's relief request is to eliminate the duplication of records.

Reporting requirements in accordance with the plant Technical Specifications are discussed in Regulatory Guide 1.16, including an explanation of what constitutes a reportable occurrence. For instance, degradation of hydraulic shock suppressors to the extent that they could not perform their required safety function would be a reportable occurrence. Also, a violation of a technical specification would be a reportable occurrence. The reporting requirements for reportable occurrences are presented in Regulatory Guide 10.1.

The reporting requirements of the plant Technical Specifications are more stringent than those of Section XI, i.e., IWA-6220. Additional reporting requirements to satisfy Inservice Inspection requirements should not be necessary.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the hydraulic shock suppressors discussed above, the Code requirements are impractical. It is further concluded that the alternative examination discussed above will provide necessary added assurance of structural reliability. Therefore, the following is recommended:

Relief from the examination requirements of Table IWB-2500, Category B-K-2, should be granted, provided the licensee examines and tests Class 1 hydraulic shock suppressors in accordance with the plant Technical Specification requirements, including the related reporting requirements.

References

References 5, 7, 8, 9 and 10.

E. Pump Pressure Boundary

1. Hydraulic Shock Suppressors for Class 1 Pumps, Category B-K-2, Item B5.5

The request to examine hydraulic shock suppressors for Class 1 piping, pumps and valves in accordance with the requirements of the plant Technical Specifications (see I.D.1 of this report) applies here. Therefore, the following is recommended:

Relief from the examination requirements of Table IWB-2500, Category B-K-2, should be granted, provided the licensee examines and tests Class 1 hydraulic shock suppressors in accordance with the plant Technical Specification requirements, including the related reporting requirements.

2. Request for Relief 2.4.2; Internal Surfaces of Pumps, Category B-L-2, Item B5.7

Code Requirement

Visual examination of pump internal pressure boundary surfaces is required.

One pump in each of the group of pumps performing similar functions in the system shall be examined during each inspection interval. The examinations may be performed at or near the end of the inspection interval.

Code Relief Request

Relief is requested from the visual examination of the internal surfaces of the reactor recirculation pumps 2AP34 and 2BP34 at the pressure boundary.

Proposed Alternative Examination

The internal surfaces of the recirculation pump casings will be visually examined whenever these surfaces are accessible as a result of disassembly for other maintenance purposes. In the interim, annual performance tests will be conducted to verify pumping capability and to indicate the condition of internal clearances. This data, coupled with the hydrostatic tests performed once per inspection interval and the external inspections performed during seal maintenance, will provide adequate assurance of structural integrity.

Licensee's Basis for Requesting Relief

This requirement, in absence of other required maintenance, would necessitate dismantling a recirculation pump solely to perform a visual inspection of internal surfaces, and as such, represents an unnecessary exposure to radiation and contamination and an excessive expense. A job of this scope also presents an unnecessary risk of an industrial accident due to the cramped quarters and limited visibility resulting from the use of full anti-C protective equipment.

The disassembly of this pump constitutes a maintenance job of major proportions that, due to plant design, involves removing the motor and transporting it outside the containment. Movement of such large heavy components within the drywell with the attendant hazard of accidental damage to other safety related piping and equipment constitutes a risk to reactor safety. We estimate that the dismantling and reassembly of one pump would consume more than 10,000 manhours and in excess of one month of round-the-clock effort and would result in a cumulative dose of between 100 and 500 man-rem.

The net result of this major effort would be a visual inspection consuming about 8 manhours. The questionable benefit to be obtained from such an inspection when measured against the cost in man-rem appears to be in conflict with the concept of "As Low as Reasonably Achievable." In view of the cost in dollars, potential hazards, and man-rem and in view of the minimal benefits to be obtained, the licensee concludes that this Code requirement is impractical for Peach Bottom.

Evaluation

The visual examination is to determine whether unanticipated severe degradation of the casing is occurring due to phenomena such as erosion, corrosion, or cracking. However, previous experience during examinations of pumps at other plants has not shown any significant degradation of casings.

The disassembly of the reactor recirculation pumps to the degree necessary to examine the internal pressure retaining surfaces is a major effort, involving large personnel exposures and the generation of large amounts of radioactive waste. In view of the effort required to disassemble a pump, the information returned from visual examination of its internal surfaces would be marginal.

The licensee has committed to the concept of visual examination if the pump is disassembled for maintenance. Meanwhile, pressure and flow are monitored during pump operation to assess performance.

The visual examination of the internal pressure boundary may be performed at or near the end of the 10-year inspection interval. The Code committee and the Electric Power Research Institute (EPRI) are undertaking a program to assemble and

evaluate results of visual examination of internal pump casing surfaces. Within the next two years, this program should provide a more definitive basis for the Code committee and NRC for upholding or modifying this Code requirement. Since so many licensees consider this requirement impractical and an undue burden, it is reasonable to postpone a decision to grant relief until at least that program is completed. The licensee could submit a new relief request at that time.

Visual examination of the externals of the pump casings could be conducted for leakage when pressure tests are performed as required by IWB-5000.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the Code-required visual examination discussed above, a more definitive technical basis is needed. It is further concluded that the alternative examination discussed above will provide added assurance of structural reliability. Therefore, the following is recommended:

(a) Relief should not be granted at this time from the visual examination of the internal surfaces of the reactor recirculation pump at the pressure boundary.

(b) The licensee's proposal to perform a visual examination whenever the surfaces are made accessible because a pump is disassembled for maintenance purposes should be accepted.

(c) Visual examination of the externals of the pump casings should be conducted for leakage when pressure tests are performed as required by IWB-5000.

References

References 5, 7, 10, 12 and 14.

F. Valve Pressure Boundary

1. Hydraulic Shock Suppressors for Class 1 Valves, Category B-K-2, Item B6.5

The request to examine hydraulic shock suppressors for Class 1 piping, pumps and valves in accordance with the requirements of the plant Technical Specifications (see I.D.1 of this report) applies here. Therefore, the following is recommended:

Relief from the examination requirements of Table IWB-2500, Category B-K-2, should be granted, provided the licensee examines and tests Class 1 hydraulic shock suppressors in accordance with the plant Technical Specification requirements, including the related reporting requirements.

2. Request for Relief 2.4.3; Internal Surfaces of Valves, Category B-M-2, Item B6.7

Code Requirement

Visual inspection of the internal pressure boundary surfaces, on valves exceeding 4-in. nominal pipe size shall be performed.

One valve in each group of valves of the same constructional design, e.g., globe, gate, or check valve, manufacturing method and manufacturer that performs similar functions in the system shall be examined during each inspection interval.

The examinations may be performed at or near the end of the inspection interval.

Code Relief Request

Relief is requested from the visual examination of the internal surfaces at the pressure boundary of the Class 1 valves exceeding 4-inch diameter nominal pipe size.

Proposed Alternative Examination

The following specific valves: recirculation pump suction valves (MO-2-43A, B), recirculation pump discharge valves (MO-2-53A & B), recirculation loop equalizing valves (MO-2-65A & B), RHR injection line manual block valves (VV-10-81A & B), and any valve whose disassembly would require extreme measures to isolate, or presents a substantial personnel safety hazard, will be subjected to visual inspection of the internal surfaces of the valve body when disassembled for maintenance in accordance with the code and

documented procedures. If one valve in each group of valves of the same design, manufacturing method, manufacturer, and function, is not disassembled for maintenance which provides access to the internal pressure boundary during an inspection interval, an examination consisting of UT wall thickness readings on selected valves will be considered as an alternate. The number of valves to be examined will be based on Section XI requirements.

This inspection program coupled with periodic leak tests and hydrostatic tests will provide adequate assurance of the structural integrity. Other Class 1 valves will be inspected in accordance with Section XI requirements.

Licensee's Basis for Requesting Relief

Disassembly of these valves solely for visual inspection, in absence of other required maintenance, represents an unnecessary exposure to radiation and contamination and an excessive expense.

The recirculation pump suction valves would require offloading the fuel elements and draining the reactor prior to disassembly. Work on recirculation pump discharge valves, recirculation loop equalizing valves, and RHR injection manual block valves would require installation of plugs in the jet pump risers. Preparatory work of this scope is considered impractical for the sole purpose of conducting a visual examination. Contamination levels in the valves associated with the recirculation loops are particularly high due to the physical location of these valves at the bottom of the system.

Evaluation

The disassembly of large valves to the degree necessary to examine the internal pressure retaining surfaces (bodies) is a major effort involving large personnel exposures. To do this disassembly solely to perform a visual examination of the internal casing is impractical. The visual examination specified is to determine whether unanticipated severe degradation of the casing is occurring due to pheomena such as erosion or corrosion.

The licensee has committed to the concept of visual examination when any valve whose disassembly would require extreme measures to isolate, or presents a substantial personnel safety hazard, is disassembled for maintenance. This commitment by the licensee should be accepted.

The visual examination of the internal pressure boundary may be performed at or near the end of the 10-year inspection interval. The end of the first interval for Peach Bottom Units 2 and 3 are July and December 1984, respectively. Therefore,

relief from examination requirements is not necessary until then because the licensee will be in compliance with the regulation up to that time. Since so many licensees consider this requirement impractical and an undue burden, it is reasonable to postpone a decision to grant relief until near the end of the inspection interval when additional relevant information from this unit and from the industry in general will be available.

The licensee could submit a new relief request at that time for each valve classification for which a valve has not been disassembled and examined in each unit. Submitting such relief requests as soon as possible after the next-to-last scheduled outage of the inspection interval and at least six months before the scheduled start of the last outage would minimize delays and outage time.

In the event that a Code required valve is not disassembled for maintenance during the interval, the licensee proposes to consider ultrasonic wall thickness measurements. Such measurements, using the minimum wall thickness requirements of Section III of the ASME Code as the acceptance standard and done to paragraph T-560, Section V, 1977 Edition, Winter 1978 Addenda, are potentially an acceptable alternative examination. However, detailed procedures, establishing such parameters as frequency and location of measurements, would have to be developed. If the licensee is seriously considering UT thickness measurements for future inspection intervals, he would be well advised to make baseline measurements at representative locations on any valve opened for maintenance.

The licensee has proposed to perform visual examinations of the valves when the system pressure tests are conducted. This commitment should be accepted.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the valves discussed above, there is not presently enough justification for granting relief from the impractical Code requirements. Therefore, the following is recommended:

(a) Relief should not be granted at this time from visual examination of the internal pressure boundary surfaces on valves exceeding 4-in. nominal pipe size.

(b) The licensee's proposal to perform the Code-required examinations whenever the valves are opened because of maintenance should be accepted.

(c) During other inspection periods, the licensee should perform visual examinations for leakage as proposed when the system pressure tests (IWA-5000) are conducted in accordance with the requirements for Category B-P.

(d) The licensee should submit specific relief requests as the end of the inspection interval approaches for each valve classification for which a valve has not been disassembled and examined in each unit.

(e) When the licensee is properly prepared to perform UT thickness measurements of the valve bodies, and so requests, permission should be granted to do so.

References

References 5, 7, 8, 9, 10, 12 and 14.

II. CLASS 2 COMPONENTS

No relief requests.

III. CLASS 3 COMPONENTS

No relief requests.

IV. PRESSURE TESTS

A. General

No relief requests.

B. Class 1 System Pressure Tests

1. Request for Relief 2.4.4; Class 1 Systems Hydrostatic Pressure Tests

Code Requirement

IWB-5222 requires that Class 1 systems and components be subjected to a system hydrostatic test at pressures ranging from 110% to 102% of nominal operating pressure (P_o), dependent upon test temperatures in the range of 100°F to 500°F.

Code Relief Request

Relief is requested from the Class 1 system hydrostatic test pressure requirements.

Proposed Alternative Examination

The test would be conducted at 1075 psig instead of 1088 psig at 185°F. The Class 1 system hydrostatic test will be conducted with all relief valves in place at a test pressure approximately 30 psig below the lowest nominal relief valve setting. In the event relief valve settings are changed, test pressure will be changed accordingly, but will not be less than 105% of the system nominal operating pressure (P_o) at test temperatures below 350°F.

Licensee's Basis for Requesting Relief

At present, Technical Specifications require a minimum temperature of 185°F before pressurizing to greater than 250 psig. This temperature would require a hydrostatic test pressure of 108.3% P_o (approximately 1088 psig). The present setting of the four lowest set relief valves is 1105 psig $\pm$ 11 psig. The licensee proposes to conduct the hydrotest with all relief valves in place and to raise the pressure to within 30 psig of the lowest nominal relief valve setting. This provides a reasonable margin to allow for pressure control, while recognizing the setting tolerance of the valves. Under present conditions this would result in a hydrotest which is 13 psig less than the Code requirement at the minimum test temperature. At higher test temperatures (> 250°F), Peach Bottom would be in compliance with the Code; however, the higher temperatures make inspection of the drywell upper elevations very difficult from the standpoint of personnel stay time.

The only alternative that permits meeting the Code at the lowest test temperature is removal of the relief valves. This job is expensive both in dollars and man-rem and necessarily results in lengthening the refueling outage because such work is always on the critical path to returning the reactor to service. The licensee concludes that adequate confidence in the structural integrity of the Class 1 systems and components can be gained by the proposed hydrostatic test and that removal of the relief valves to permit testing to a slightly higher pressure is not justified.

Evaluation

System hydrostatic testing is required by the plant Technical Specifications to be conducted at a minimum temperature of 185°F to meet the fracture toughness criteria applicable to ferrite materials of which the system components are constructed.

The licensee indicates that there is a need to meet the Code at the lowest test temperature, which in this case is 185°F, and that need is not really evident. The Code allows testing at reduced pressures as the testing temperature is raised up to 500°F.

The licensee states that temperatures above 250°F make inspection of the dry well upper elevations very difficult from the standpoint of personnel stay time. Hence, it follows that on this basis, 250°F or lower would be an acceptable testing temperature. From IWB-5222(b), 250°F corresponds to 1.07 P_o, or 1075 psig, based on the licensee's calculations of 1088 psig at 108.3% P_o. Therefore, the licensee can test at 250°F and 1075 psig and remain within the Code requirements. This allows the licensee to keep the testing pressure within 30 psig of the lowest nominal relief valve setting of 1105 psig ± 11 psig.

Conclusions and Recommendations

Based on the evaluation above, it is concluded that the licensee can comply with the requirements in IWB-5222 for the pressure test discussed above. Therefore, relief is not necessary from these requirements and should not be granted.

References

References 5, 7 and 10.

C. Class 2 System Pressure Tests

No relief requests.

D. Class 3 System Pressure Tests

1. Request for Relief 4.3.1; Class 3 Systems Hydrostatic Pressure Tests

Code Requirement

The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the requirement of testing at 1.10 times the system design pressure for the High Pressure Service Water (HPSW) System, Emergency Service Water (ESW) System, and their respective portions of the Emergency Cooling System.

Proposed Alternative Examination

The HPSW system, the ESW system, and their respective portions of the Emergency Cooling Systems will be pressure tested to 1.10 times the system operating pressure.

Licensee's Basis for Requesting Relief

Testing these systems to 110% design pressure is beyond the capability of the system pumps and therefore would require the use of a special hydrostatic test pump. The available test connections on these systems are 3/4 and 1 inch lines and would sharply limit the inflow capability from the hydrostatic pump, thereby necessitating leak-tightness of system 14, 16, 20, and 24 inch valves to successfully perform the tests. Such leak-tightness is not otherwise a requirement for systems of this type and considerable maintenance expense would be required to make the valves leak-tight for test purposes only. In addition, testing to 110% design pressure would require taking the entire ESW or HPSW system out of service at the same time which would require the cessation of all shutdown cooling. For the above reasons, the licensee concludes that a hydrostatic test to 110% design pressure is impractical for systems of this type.

Testing to 110% of operating pressure is practical and could be accomplished using the system pumps and throttling at the cooling tower inlet valves: MO-48-0502 (A,B,C) for the HPSW system, and MO-48-0501 (A,B,C) for the ESW system. Testing in this manner will provide adequate assurance of the structural integrity of these systems.

Evaluation

The 1977 Edition of the Section XI has been referenced in 10 CFR 50.55a and inservice examinations may meet the requirements of this edition in lieu of those from previous editions with the following provisions:

(a) Commission approval is required to update to the more recent edition (pursuant to 10 CFR 50.55a (g)(4)(iv)).

(b) When applying the 1977 Edition, all of the addenda through Summer 1978 Addenda must be used.

(c) Any requirement of the more recent edition which is related to the one(s) under consideration must also be met.

The 1977 Code, Summer 1978 Addenda, allows the system hydrostatic test pressure to be 1.10 times the nominal operating pressure for systems with Design Temperatures of 200°F or less.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing of the HPSW System and the ESW System should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda. This approval would allow testing at 1.10 times operating pressure.

References

References 5, 7, 8, 9 and 10.

2. Request for Relief 4.3.2; Class 3 Systems Pressure Testing

Code Requirement

In the case of buried components (e.g., underground piping), valves shall be provided to permit isolation of the buried portions of piping for the purpose of conducting a system pressure test in lieu of the visual examination. A loss of system pressure during the test shall constitute evidence of component leakage.

Code Relief Request

Relief is requested from performing system pressure tests on buried piping in the High Pressure Service Water (HPSW) System, Emergency Service Water (ESW) System, and their respective portions of the Emergency Cooling System.

Proposed Alternative Examination

These systems will be visually inspected at accessible portions of the piping and at pipe tunnel penetrations.

Licensee's Basis for Requesting Relief

Selected isolation valves and test connections were not incorporated into the design of these cooling systems to permit a pressure decay test of the buried piping. Isolation of the entire cooling system is impractical since it would require taking the entire ESW or HPSW systems out of service, resulting in the cessation of all shutdown cooling. More than 95% of the ESW and HPSW piping is accessible for visual inspection.

Evaluation

The 1977 Edition of the Section XI has been referenced in 10 CFR 50.55a and inservice examinations may meet the requirements of this edition in lieu of those from previous editions with the following provisions:

(a) Commission approval is required to update to the more recent edition (pursuant to 10 CFR 50.55a (g)(4)(iv)).

(b) When applying the 1977 Edition, all of the addenda through Summer 1978 Addenda must be used.

(c) Any requirement of the more recent edition which is relatec to the one(s) under consideration must also be met.

The 1977 Code Summer 1978 Addenda, allows the visual examination for ev idence of leakage at the areas of each end of the buried components.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing of the buried piping in the HPSW System and the ESW System should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda. This approval would allow visual examination for leakage at each end of the buried components.

References

References 5, 7, 8, 9 and 10.

V. GENERAL

A. Ultrasonic Examinations

1. Code Relief Request per letter of February 19, 1980; Ultrasonic Examination Evaluations

Code Requirement

Where acceptance standards for a particular component or Examination Category are in the course of preparation, evaluation shall be made of any indications detected during any inservice examination that exceed the acceptance standards for materials and welds specified in the Section III edition applicable to the construction of the component in order to determine disposition. Such disposition shall be subject to review by the enforcement authority having jurisdiction at the plant site.

Code Relief Request

Philadelphia Electric Company requests modification to an ultrasonic examination requirement in the 1974 edition of Section XI of the ASME Boiler and Pressure Vessel Code, as applicable to the Inservice Inspection Program at Peach Bottom Atomic Power Station. Specifically, the licensee requests that the acceptance criteria in Article IWA-3000, Paragraph IWA-3100(b) referenced to the original construction code be based on a code no earlier than that utilized during the baseline inservice inspection examinations (1968 Edition of ASME Section III).

Proposed Alternative Examination

The licensee proposes that the construction code referenced in Paragraph IWA-3100(b) be interpreted at Peach Bottom to mean the 1968 Edition of ASME Section III. This approach will maintain the necessary consistency between the baseline examinations and future ISI examinations to meet the intent of ASME Section XI. It is requested that this relief be considered applicable to all examinations conducted at Peach Bottom under the 1974 Edition of Section XI.

Licensee's Basis for Requesting Relief

The adoption of the 1974 Edition of Section XI has created some inconsistencies between examinations conducted today and those conducted during previous ISI examinations, including the baseline. The governing code for the baseline

examinations at Peach Bottom was the 1971 Edition of ASME Section XI and where practicable the guidelines of Addenda through Winter 1971. Examinations performed to the 1971 Edition of the Code were evaluated as per Article IS-300, in accordance with the acceptance criteria specified in the 1968 Edition of the ASME Code, Section III. Baseline examinations and all examinations conducted prior to September 1978 were evaluated in accordance with this Code. Subsequently, the standard for the Peach Bottom Inservice Inspection Program was upgraded to the 1974 Edition of ASME Code Section XI, including Addenda through Summer 1975 in accordance with 10 CFR 50.55a. The adoption of the 1974 Edition of Section XI creates an inconsistency for Peach Bottom in that Article IWA-3000, Paragraph IWA-3100(b), now specifies that indications be evaluated in accordance with the acceptance criteria of the Code applicable to the construction of the component. At Peach Bottom, certain components were constructed to the 1965 Edition of ASME Section III, which predates the 1968 Edition of ASME Section III used for the entire baseline examination. The calibration blocks, examination procedures, and evaluation criteria are so significantly different between the 1965 Code and later editions, that there is very little correlation between respective examination results.

Evaluation

The governing code for the baseline examinations was the 1971 Edition of Section XI. Examinations performed to the 1971 Edition of the Code were evaluated, as allowed, in accordance with the acceptance criteria specified in the 1968 Edition of Section III. The baseline examinations and all examinations conducted prior to 1978 were evaluated in accordance with the 1968 Edition of Section III, and this forms the data bank for the preservice and inservice inspection programs at Peach Bottom. It would be impractical to discard the present data bank in favor of establishing a new evaluation criteria, especially where it is based on earlier Section III Code requirements.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the code required evaluations discussed above, the code requirements are impractical. It is further concluded that the alternative evaluations and examinations discussed above will provide necessary added assurance of structural reliability. Therefore, it is recommended that the relief request be granted to substitute the acceptance criteria of the 1968 Edition of ASME Section III for those components for which it is not the applicable edition for construction.

References

Reference 11.

B. Exempted Components

1. Class 1 Components and Piping Exemptions Based on Diameter per IWB-1220(b)

Code Requirement

Under the postulated conditions of loss of coolant from the component during normal reactor operation, the reactor can be shut down and cooled down in an orderly manner, assuming makeup is provided by the reactor coolant makeup system only. (Makeup system to use onsite power only.) However, in no instance may size exemption be more than 3 in. nominal pipe size.

Exemption

Licensee claims exemption from inspection in Class 1 piping systems for water piping 1 1/2 inches in diameter and less and for steam piping 3 inches in diameter and less.

Evaluation

Analysis shows that the reactor can be cooled down in an orderly manner using only the reactor coolant makeup system when there is a complete break in a 1 1/2-inches diameter water line, or a 3-inch diameter steam line. Therefore, the requirements of IWB-1220(b) have been met and the Code requirements to exempt these components satisfied.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for Class 1 piping systems, the justification for exemption from code requirements has been demonstrated. Therefore, it is recommended that exemption from volumetric examination of component and piping welds of water line sizes 1 1/2-inches diameter and under, and of steam line sizes 3-inches diameter and under, per IWB-1220(b), should be allowed.

References

References 5, 7, 8, 9, 10, 12 and 14.

2. Class 2 Components and Piping Exemptions Based on Chemistry Control per IWC-1220(c)

Code Requirements

Components which perform an emergency core cooling function, provided the control of the chemistry (to minimize corrosive effects) of the contained fluid is verified by periodic sampling and test.

Exemption

Licensee claims exemption from inspection of Class 2 components and piping based on IWC-1220(c) for portions of the following systems: Residual Heat Removal System, Core Spray Cooling System and the High Pressure Coolant Injection System.

Evaluation

The chemistry control provision was deleted from Paragraph IWC-1220 in the 1977 Edition of Section XI because practical evaluation, review and acceptance standards could not be defined. Hence, water chemistry control to minimize stress corrosion described in Paragraph IWC-1220(c) of Section XI, 1974 Edition, is not an acceptable basis for exempting ECCS components from inservice examination.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the Class 2 components and piping systems discussed above, the claims for exemption from examination per code requirements should not be allowed. It is recommended that the licensee revise the inservice inspection (ISI) program for Peach Bottom Nuclear Plant to include examination of those portions of the Residual Heat Removal System, the Core Spray Cooling System, and the High Pressure Coolant Injection System that were deleted from the current ISI program based on exemptions allowed by IWC-1220(c).

References

References 5, 7, 8, 9 and 10.

C. Other

1. Request for Relief 3.4.1; Classification of Main Steam Lines

Code Requirement

IWA-1400 - Owner's Responsibility:

Performance of the inservice inspections required by this Division shall be the responsibility of the owner of the nuclear power system. This responsibility shall include the following:

The owner of the nuclear power plant is responsible for determining the appropriate code class(es) for each component of the nuclear power plant. (Classification criteria are specified in 10 CFR 50, and in AEC Regulatory Guide 1.26, "Quality Group Classification and Standards".)

Regulatory Guide 1.26, Quality Group Classifications and Standards for Water-, Steam-, and Radioactive-Waste-Containing Components of Nuclear Power Plants:

C.1 The Group B quality standards given in Table 1* of this guide should be applied to water- and steam-containing pressure vessels, heat exchangers (other than turbines and condensers), storage tanks, piping, pumps, and valves that are either part of the reactor coolant pressure boundary defined in Paragraph 50.2(v) but excluded from the requirements of Paragraph 50.55a pursuant to footnote 1 of that section or not part of the reactor coolant pressure boundary but part of:

c. Those portions of the steam systems of boiling water reactors extending from the outermost containment isolation valve up to but not including the turbine stop and bypass valves and connected piping up to and including the first valve that is either normally closed or capable of automatic closure during all modes of normal reactor operation.

*Excerpt from Table 1

Components	Quality Standard B
Pressure Vessels	ASME Boiler and Pressure Vessel Code, Section III, "Nuclear Power Plant Components," Class 2 (see notes a,b,c next page)
Piping	As above
Pumps	As above
Valves	As above
Atmospheric Storage Tanks	As above
0-15 psig Storage Tanks	As above

(a) See Section 50.55a for guidance with regard to the Code and Addenda to be applied.

(b) ASME Code N-symbol need not be applied.

(c) The specific applicability of code case will be covered separately in other regulatory guides or in Commission regulations, where appropriate. Applicants proposing the use of code cases not covered by guides or regulations should demonstrate that an acceptable level of quality and safety would be achieved.

Code Relief Request

Licensee requests relief from performing code-required Class 2 examinations of the main steam lines outside the outermost containment isolation valves.

Proposed Alternative Examination

The main steam lines up to the turbine stop and bypass valves will be subjected to a hydrostatic test at the same time and under the same test conditions as the Class 1 components.

Licensee's Basis for Requesting Relief

Peach Bottom was designed and built prior to the requirement for a third valve in the main steam line. There are no safety-related structures, systems, or components which could be adversely affected by a pipe break in the main steam line downstream of the outermost containment isolation valve and such a pipe break does not result in significant offsite doses as set forth in the Final Safety Analysis Report (FSAR) Chapter 14 and Supplement 2. Consequently, there is no need to classify the Peach Bottom main steam lines as ASME Class 2 (equivalent) for purposes of inservice inspection.

Additionally, the following provides a more detailed justification for not performing the type of inspection required of ASME Class II piping:

(1) Physical access to welds in subject lines is not readily available. Scaffolds and platforms of significant size would have to be erected. Both dollar costs and radiation exposure would be significant.

(2) The as-built weld configuration in subject lines are not conducive to a UT examination (licensee's presently employed volumetric inspection technique). Weld crowns would have to be extensively reworked, again at a significant dollar and radiation exposure cost, to facilitate UT examinations. In addition, the alternative radiographic technique for volumetric examination could not be employed because of the vast amount of routine maintenance work that is performed in the surrounding areas.

(3) The piping material is mild steel and the licensee's records show that the same Class 1 piping at Peach Bottom has experienced no reportable indications during past inservice inspections. The licensee knows of no structural integrity problems or reports of failure in mild steel (main steam line) piping throughout the BWR industry.

Evaluation

Based on Regulatory Guide 1.26 the main steam lines outside the outermost containment isolation valves are classified Group B for quality standards, and Class 2 for Nuclear Power Plant Components per Section III. The requirements to examine Class 2 components were not established until the 1974 Edition of the Code was issued. The 1971 Edition of ~~Chapter~~ SECTION XI only required examination of Class 1 components. Since the construction permits for these units were issued in January 1968, no provisions were made for future weld examinations at the time that the main steam lines were designed.

The principal justification for the licensee's relief request is based upon the cost in exposure and in dollars to provide access to the welds and to prepare the weld crowns to facilitate ultrasonic examination. Since both of these units have been in commercial operation approximately eight years now, it would be impractical to require the code examinations for these steam lines.

The service life of carbon steel in main steam piping in the BWR industry has been excellent. The analysis of a pipe break accident in these steam lines has been demonstrated by the licensee in the FSAR as not being a safety hazard to the public. These same steam lines are not being inspected in other BWR plants, i.e., Cooper, Quad Cities 1 & 2, Hatch 1 & 2 and Pilgrim. Yet they are being inspected in Browns Ferry 1, 2 & 3, and at WPPSS WNP-2.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the Code requirements are impractical. It is further concluded that the alternative examination discussed above will provide necessary added assurance of structural reliability. Therefore, it is recommended that relief from performing Code-required Class 2 examinations of the main steam lines outside the outermost containment isolation valves be granted, provided that the proposed alternative examination is performed.

References

References 5, 7, 10, 12 and 14.

REFERENCES

1. G. Lear (NRC) to E. G. Bauer, Jr. (PEC), Peach Bottom Unit Nos. 2 and 3, Docket Nos. 50-277 and 50-278, April 26, 1976.

2. J. L. Hankins (PEC) to G. Lear (NRC), Docket Nos. 50-277 and 50-278, June 4, 1976.

3. G. Lear (NRC) to E. G. Bauer, Jr. (PEC), Peach Bottom Atomic Power Station Unit Nos. 2 and 3, November 22, 1976.

4. E. J. Bradley (PEC) to E. G. Case (NRC), Peach Bottom Atomic Power Station Units 2 and 3, Docket Nos. 50-277 and 50-278, May 5, 1977.

5. E. J. Bradley (PEC) to G. Lear (NRC), Peach Bottom Atomic Power Station Unit 2, Docket No. 50-277, August 4, 1977.

6. G. Lear (NRC) to E. G. Bauer, Jr. (PEC), Peach Bottom Atomic Power Station Unit No. 2, Docket No. 50-277, August 30, 1977.

7. E. J. Bradley (PEC) to G. Lear (NRC), Peach Bottom Atomic Power Station, Inservice Inspection Program, Unit 3, Docket No. 50-278, January 23, 1978.

8. T. A. Ippolito (NRC) to E. G. Bauer, Jr. (PEC), Docket Nos. 50-277 and 50-278, August 10, 1978.

9. S. L. Daltroff (PEC) to T. A. Ippolito (NRC), Docket Nos. 50-277 and 50-278, September 20, 1978.

10. S. L. Daltroff (PEC) to T. A. Ippolito (NRC), November 22, 1978.

11. S. L. Daltroff (PEC) to T. A. Ippolito (NRC), Peach Bottom Atomic Power Station Inservice Inspection for Units No. 2 and 3, Docket Nos. 50-277 and 50-278, February 19, 1980.

12. J. F. Stolz (NRC) to E. G. Bauer, Jr. (PEC), Docket Nos. 50-277 and 50-278, March 5, 1982.

13. S. L. Daltroff (PEC) to J. F. Stolz (NRC), Docket Nos. 50-277 and 50-278, April 5, 1982.

14. S. L. Daltroff (PEC) to J. F. Stolz (NRC), Peach Bottom Atomic Power Station, Units 2 and 3, NRC Request for Additional Information on the Peach Bottom ISI Program, Docket Nos. 50-277 and 50-278, June 11, 1982.