Station Support Department
10CFR50.55a

PECO NUCLEAR

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PECO Energy Company
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965 Chesterbrook Boulevard
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February 7, 2000

Docket No. 50-277
50-278

License No. DPR-44
DPR-56

U.S. Nuclear Regulatory Commission
Attn: Document Control Center
Washington, DC 20555

Subject: Peach Bottom Atomic Power Station, Units 2 and 3
Request for Permanent Relief from Circumferential Shell Weld Inspection Requirements

References: 1. Letter from R. A. Capra (U.S. Nuclear Regulatory Commission (USNRC)) to G. D. Edwards (PECO Energy Company), dated December 2, 1998

2. Letter from J. F. Stolz (USNRC) to G. A. Hunger, Jr. (PECO Energy Company), dated October 7, 1997

Dear Sir/Madam:

As discussed in NRC Generic Letter 98-05 ("Boiling Water Reactor Licensees Use of the BWRVIP-05 Report to Request Relief from Augmented Examination Requirements on Reactor Pressure Vessel Circumferential Shell Welds"), Boiling Water Reactor (BWR) licensees may request permenant relief from the inservice inspection requirements of 10 CFR 50.55a(g) for the volumetric examination of circumferential reactor pressure vessel welds. Accordingly, PECO Energy Company (PECO Energy) is requesting relief from the following requirements: 1) examination of the RPV circumferential shell welds (Section XI Exam Cat. B-A, Item No. B1.11) as required by 10 CFR 50.55a(g)(6)(ii)(A)(2), 2) inservice inspection requirements for circumferential welds contained in the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, 1980 Edition through Winter 1981 Addenda, 3) inservice inspection requirements for circumferential welds contained in the current third ten-year interval ASME Boiler and Pressure Vessel Code, Section XI, 1989 Edition, and 4) inservice inspection requirements for circumferential welds contained in all future versions of the ASME Code through the end of the current operating licenses for Peach Bottom Atomic Power Station (PBAPS), Units 2 and 3.

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Similar requests for an alternative to the circumferential shell weld inspection requirements were granted in the Reference 1 letter for Peach Bottom Atomic Power Station (PBAPS), Unit 2, and in the Reference 2 letter for PBAPS, Unit 3. These alternatives contained data that supported the requests for a period of two (2) operating cycles. Information contained in the attached request supports relief through the end of the current operating license.

We request your approval by July 7, 2000. If you have any questions, please contact us.

Very truly yours,

James A. Hutton
Director-Licensing

Attachment

cc: H. J. Miller, Administrator, Region I, USNRC
A. C. McMurtray, USNRC Senior Resident Inspector, PBAPS

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<u>Proposed Relief</u>

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<u>Basis for Proposed Relief</u>

The basis for this request is documented in the report "BWR Vessel and Internals Project, BWR Reactor Pressure Vessel Shell Weld Inspection Recommendations (BWRVIP-05)", that was transmitted to the NRC in September 1995. As discussed in Generic Letter 98-05, the staff has completed its final review of the information submitted by the BWRVIP and the staff's safety evaluation was transmitted to Carl Terry, Chairman of the BWRVIP, in a letter dated July, 1998. The staff concluded that the BWRVIP-05 proposal, as modified, to eliminate BWR vessel circumferential weld examinations, is acceptable.

As discussed in this Generic Letter, licensees may request permanent (i.e., for the remaining term of operation under the existing, initial license) relief by demonstrating that: 1) at the expiration of their license, the circumferential welds will continue to satisfy the limiting conditional failure probability for circumferential welds in the staff's July, 1998 safety evaluation, and 2) licensees have implemented operator training and established procedures that limit the frequency of cold over-pressure events to the amount specified in the staff's July, 1998 safety evaluation.

BWRVIP-05 provides the technical basis for eliminating inspection of Boiling Water Reactor (BWR) RPV circumferential shell welds. The BWRVIP-05 report concludes that the probability of failure of the BWR RPV circumferential shell welds is orders of magnitude lower than that of the axial shell welds. The NRC staff has conducted an independent risk-informed assessment of the analysis contained in BWRVIP-05. This assessment also concluded that the probability of failure of the BWR RPV circumferential welds is orders of magnitude lower than that of the axial shell welds.

The independent NRC assessment utilized the FAVOR code to perform a probabilistic fracture mechanics (PFM) analysis to estimate RPV failure probabilities. Three key assumptions in the PFM analysis are: the neutron fluence was that estimated to be end-of-license mean fluence, the chemistry values are mean values based on vessel types, and the potential for beyond design basis events is considered. Although BWRVIP-05 provides the technical basis supporting an alternative, the following information is provided to show the conservatisms of the NRC analysis relative to the projected, end-of-license conditions for the PBAPS, Units 2 and 3 vessels.

<u>Basis for PBAPS, Unit 2 - Technical Evaluation</u>

During refueling outage 2R12 at PBAPS, Unit 2, which occurred in the fall of 1998, the PBAPS, Unit 2 reactor vessel was examined utilizing the General Electric GERIS-2000 system. During this examination, the C6 circumferential weld was examined. A cumulative code volume of approximately 75.8% was examined with no indications. Additionally, while performing the vertical weld examinations, an average incidental cumulative code volume of approximately 7.9% was examined for the four (4) circumferential welds. No reportable indications were found. The examination performed during 2R12 was an alternative approved by the NRC for PBAPS, Unit 2 in a safety evaluation report dated December 2, 1998 (Reference 1).

The following table illustrates that the PBAPS, Unit 2 plant has additional margin in comparison to the BWRVIP-05 Fracture Analysis limiting case (that is, B&W SN 2 in Table 7-7). The chemistry factor, ΔRT_{NDT}, margin term, mean ART, and upper bound ART are calculated consistent with the guidelines of Reg. Guide 1.99, Rev. 2.

Table 1 - Comparison of Peach Bottom 2 Fracture Analysis Parameters to the BWRVIP-05 Limiting Parameters

Parameter Description	PBAPS, Unit 2 Comparative Parameters at 32 EFPY	NRC Independent Assessment Limiting Fracture Analysis Parameters
Fluence, n/cm^2	8.8×10^{17}	1.25×10^{18}
Initial RT_{NDT}, °F	-32	-5
Chemistry Factor	76.4	190
Cu %	0.056	0.287
Ni %	0.96	0.60
ΔRT_{NDT}	24.8	87.9
Margin Term	24.8	62.2
Mean ART	-7.2	82.9
Upper Bound ART	17.6	145.1

As shown above, every parameter used in the limiting NRC independent assessment report (excluding Ni %) bounds the circumferential shell weld information for PBAPS, Unit 2 at 32 EFPY. 32 EFPY represents the end of the requested deferral period. The combination of the Ni % and Cu % determines the chemistry factor which is itself bounded by the NRC independent assessment.

<u>Basis for PBAPS, Unit 3 - Technical Evaluation</u>

During refueling outage 3R11 at PBAPS, Unit 3, which occurred in the fall of 1997, the PBAPS, Unit 3 reactor vessel was examined utilizing the General Electric GERIS-2000 system. During this examination, the C6 circumferential weld was examined. A cumulative code volume of approximately 69.3% was examined with no indications. Additionally, while performing the vertical weld examinations, incidental coverage of approximately 2-3% was obtained for the four (4) circumferential welds. No reportable indications were found. The examination performed during 3R11 was an alternative approved by the NRC for PBAPS, Unit 2 in a safety evaluation report dated October 7, 1997 (Reference 2).

The following table illustrates that the PBAPS, Unit 3 plant has additional margin in comparison to the BWRVIP-05 Fracture Analysis limiting case (that is, B&W SN 2 in Table 7-7). The chemistry factor, ΔRT_{NDT}, margin term, mean ART, and upper bound ART are calculated consistent with the guidelines of Reg. Guide 1.99, Rev. 2.

Table 2 - Comparison of PBAPS, Unit 3 Fracture Analysis Parameters to the BWRVIP-05 Limiting Parameters

Parameter Description	PBAPS, Unit 3 Comparative Parameters at 32 EFPY	BWRVIP-05 Limiting Fracture Analysis Parameters
Fluence, n/cm^2	7.9×10^{17}	1.25×10^{18}
Initial RT_{NDT}, °F	-50	-5
Chemistry Factor	136.9	190
Cu %	0.102	0.287
Ni %	0.942	0.60
ΔRT_{NDT}	42.2	87.9
Margin Term	42.2	62.2
Mean ART	-7.8	82.9
Upper Bound ART	34.4	145.1

As shown above, every parameter used in the limiting NRC independent assessment report (excluding Ni %) bounds the circumferential shell weld information for PBAPS, Unit 3 at 32 EFPY. 32 EFPY represents the end of the requested deferral period. The combination of the Ni % and Cu % determines the chemistry factor which is itself bounded by the NRC independent assessment.

PBAPS, Units 2 and 3 - Training and Procedures

The following information provides justification that PECO Energy has implemented operator training and established procedures at PBAPS, Units 2 and 3 that limit the frequency of cold over-pressure events to the amount specified in the staff's July, 1998 safety evaluation.

PECO Energy has in place procedures which monitor and control reactor pressure, temperature, and water inventory during all aspects of cold shutdown which would minimize the likelihood of a Low Temperature Over-Pressurization (LTOP) event from occurring. Additionally, these procedures are reinforced through operator training.

The code Leakage Pressure Test and the code Hydrostatic Pressure Test procedures which have been used at PBAPS, have sufficient procedural guidance to prevent a cold, over-pressurization event. The Leakage Pressure Test is performed at the conclusion of each refueling outage, while the Hydrostatic Pressure Test is performed once every ten years. Other pressurizations required for informational leakage inspections are performed in accordance with a procedure similar to the ASME Code test procedures. These pressurizations are infrequently-performed, complex tasks, and the test procedures are considered Plant Evolution / Special Tests. As such, a requirement is included in them for Operation's Section management to perform a "pre-job briefing" with all essential personnel. This briefing details the anticipated testing evolution with special emphasis on: conservative decision making, plant safety awareness, lessons learned from similar in-house or industry operating experiences, the importance of open communications, and, finally, the process in which the test would be aborted if plant systems responded in an adverse manner. Vessel temperature and pressure are required to be monitored throughout these tests to ensure compliance with the Technical Specification pressure-temperature curve. Also, the procedures require the designation of a Test Coordinator for the duration of the test who is a single point of accountability, responsible for the coordination of testing from initiation to closure, and maintaining Shift Management and line management cognizant of the status of the test.

Additionally, to ensure a controlled, deliberate pressure increase, the rate of pressure increase is administratively limited throughout the performance of the test. If the pressurization rate exceeds this limit, direction is provided to remove the CRD pumps, which are used for pressurization, from service.

With regard to inadvertent system injection resulting in an LTOP condition, the high pressure make-up systems (High Pressure Coolant Injection (HPCI) and Reactor Core Isolation Cooling (RCIC) systems, as well as the normal feedwater supply (via the Reactor Feedwater Pumps)) at PBAPS are all steam driven. During reactor cold shutdown conditions, no reactor steam is available for the operation of these systems. Therefore, it is not possible for these systems to contribute to an over-pressure event while the unit is in cold shutdown. Although auxiliary steam is used to test the associated turbines while the plant is shutdown, the pump is uncoupled from the turbine during the actual test which would prevent an LTOP condition.

Procedural control is also in place to respond to an unexpected or unexplained rise in reactor water level which could result from a spurious actuation of an injection system. Actions specified in this procedure include preventing condensate pump injection, securing ECCS system injection, tripping CRD pumps, terminating all other injection sources, and lowering RPV level via the RWCU system.

In addition to procedural barriers, Licensed Operator Training is in place which further reduces the possibility of the occurrence of LTOP events. During Initial Licensed Operator Training the following topics are covered: Brittle fracture and vessel thermal stress; Operational Transient (OT) procedures, including the OT on reactor high level; Technical Specification training, including Section 3.4.9, "RCS Pressure and Temperature (P/T) Limits"; and, Simulator Training of plant heatup and cooldown including performance of surveillance tests which ensure pressure-temperature curve compliance. In addition, operator training has been provided on the expectations for procedural compliance, as provided for in the Stations' Operations Manual.

In addition to the above, ongoing review of industry operating plant experiences is conducted to ensure that the PECO Energy procedures consider the impact of actual events, including LTOP events. Appropriate adjustments to the procedures and associated training are then implemented, to preclude similar situations from occurring at PBAPS.

Conclusion

Based on the documentation in BWRVIP-05, the guidance provided in GL 98-05, the risk-informed independent assessment performed by the NRC staff, and the additional information provided above, PECO Energy believes that permanent relief from the RPV circumferential shell welds examinations at PBAPS, Units 2 and 3 is justified.