UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THE FIRST 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN

REQUESTS FOR RELIEF 1RR-24 AND 2RR-21

FOR

PENNSYLVANIA POWER & LIGHT COMPANY

SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2

DOCKET NUMBERS 50-387 AND 50-388

1.0 INTRODUCTION

The Technical Specifications (TSs) for Susqehanna Steam Electric Station, Units 1 and 2, state that the inservice inspection of the American Society of Mechanical Engineers (ASME) Code Class 1, 2, and 3 components shall be performed in accordance with Section XI of the ASME Boiler and Pressure Vessel Code and applicable Addenda as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). It is stated in 10 CFR 50.55a(a)(3) that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable edition of Section XI of the ASME Code for Susquehanna, Unit 1, first 10-year inservice inspection (ISI) interval is the 1980 Edition through the Winter 1980 Addenda (80W80), and 1980 Edition through Winter 1981 Addenda (80W81) for Susquehanna Unit 2.

Pursuant to 10 CFR 50.55a(g)(5), if the licensee determines that conformance with an examination requirement of Section XI of the ASME Code is not practical for its facility, information shall be submitted to the Commission in support of that determination and a requirement made for relief from the

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ASME Code requirement. After evaluation of the determination, pursuant to 10 CFR 50.55aa(g)(6)(i), the Commission may grant relief and may impose alternative requirements that are determined to be authorized by law, will not endanger life, property, or the common defense and security, and are otherwise in the public interest, giving due consideration to the burden upon the licensee that could result if the requirements were imposed.

In a letter dated January 9, 1996, PP&L submitted to the NRC requests for the Susquehanna Steam Electric Station relief numbers 1RR-24 for Unit 1 and 2RR-21 for Unit 2.

2.0 EVALUATION AND CONCLUSIONS

The staff, with technical assistance from its contractor, the Idaho National Engineering Laboratory (INEL), has evaluated the information provided by the licensee in support of its First 10-Year Interval Inservice Inspection Program Plan requests for relief 1RR-24 and 2RR-21 for Susquehanna Steam Electric Station, Units 1 and 2. Based on the information submitted, the staff adopts the contractor's conclusions,and recommendations presented in the attached Technical Letter Report.

The staff concludes that the licensee has made a reasonable effort to maximize examination coverage of the reactor pressure vessel shell welds through the use of improved inspection equipment and has examined 96% of the total weld length of all vessel shell welds. This provides reasonable assurance that the structural integrity of the reactor vessel welds will be maintained in service. Imposing the augmented vessel examination coverage requirements of 10 CFR 50.55a(g)(6)(ii)(A) would result in a burden without a compensating increase in quality and safety. Therefore, the licensees proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Attachment: Technical Letter Report

Principal Contributor: T. McLellan

Date: March 7, 1997

TECHNICAL LETTER REPORT
ON THE FIRST 10-YEAR INTERVAL INSERVICE INSPECTION
REQUESTS FOR RELIEF 1RR-24 AND 2RR-21
PENNSYLVANIA POWER & LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION, UNITS 1 AND 2
DOCKET NUMBERS 50-387 AND 50-388

1.0 INTRODUCTION

By letter dated January 9, 1996, the licensee, Pennsylvania Power & Light Company, submitted requests for Relief 1RR-24 (Unit 1) and 2RR-21 (Unit 2) regarding the augmented examination of the reactor pressure vessel (RPV) required by 10 CFR 50.55a(g)(6)(ii)(A). The Idaho National Engineering Laboratory (INEL) staff has evaluated the information provided by the licensee regarding these requests for relief in the following section.

2.0 EVALUATION

The Code of record for the Susquehanna Steam Electric Station first 10-year inservice inspection (ISI) interval is the 1980 Edition, Winter 1980 Addenda (80W80) of Section XI of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code for Unit 1, and the 1980 Edition through Winter 1981 Addenda (80W81) of Section XI for Unit 2. The information provided by the licensee in support of the requests for relief has been evaluated and the bases for disposition are documented below.

Request for Relief 1RR-24 (Unit 1) and 2RR-21 (Unit 2), 10 CFR 50.55a(g)(6)(ii)(A), Augmented Reactor Pressure Vessel Examination

Regulatory Requirement: In accordance with 10 CFR 50.55a(g)(6)(ii)(A), all licensees must implement once, as part of the inservice inspection interval in effect on September 8, 1992, an augmented volumetric examination of the RPV welds specified in Item B1.10 of Examination Category B-A of the 1989 Edition of the ASME Code. Examination Category B-A, Items B1.11 and B1.12 require volumetric examination of essentially 100% of RPV circumferential and longitudinal shell welds, as defined by Figures IWB-2500-1 and -2, respectively. Essentially 100%, as defined by 10 CFR 50.55a(g)(6)(ii)(A)(2), is greater than 90% of the examination volume of each weld.

Licensee's Relief Request: The licensee requested relief from examining essentially 100% of the Units 1 and 2 RPV circumferential and longitudinal shell welds listed in Table 1RR-24/2RR-21 below. The augmented examination requirements have been met for the other 15 RPV shell welds in each unit.

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TABLE 1RR-24/2RR-21			
Weld ID	Item #	Coverage Obtained	Limiting Condition
AD	B1.11	85.6%	Permanent RPV mirror insulation support steel precludes complete examination
BK	B1.12	81.1%	
BM	B1.12	81.1%	

Licensee's Basis for Requesting Relief (as stated):

"Examination of the affected welds will be performed to the maximum extent practical using both automated and manual ultrasonic techniques from the RPV OD surface. This is the most practical examination approach for all Susquehanna reactor pressure vessel welds while still maintaining an acceptable level of quality and safety.

"The three RPV welds (AD, BK, and BM) with coverage less than 90% are located on the fourth RPV shell course (approximately 171" above the top of the beltline region). The examination restriction is caused by permanent RPV mirror insulation support steel. Plant design changes to effect greater examination coverage represent extreme hardship without a compensating return in increased plant safety.

"The obstruction allows examination of only 16.25 inches (each) of longitudinal welds BK and BM from both sides. The unexamined volume of welds BK and BM accounts for only 0.56% of the total RPV shell weld length. There is no unexamined volume for circumferential weld AD. The obstructed portion of weld AD can be examined from the other (unobstructed) side of the weld.

"Since all portions of the three obstructed welds are above the top of active fuel, the volume of weld that has been completely examined is representative of the weld volume not examined. With 96% overall RPV shell weld examination coverage, the inability to completely examine a very small percentage of the total RPV weld length does not present an increased risk to public health and safety.

"To date, the RPV shell welds have been examined twice and no service related flaw indications have been detected. Non-relevant fabrication flaw indications were recorded during both preservice inspection (PSI) baseline examinations and the first interval inservice examinations (ISI). The location and size of these indications has not changed between the PSI and the ISI examinations. The results from both examinations certify that RPV shell integrity continues to provide for acceptable levels of plant quality and safety.

"Overall ultrasonic examination coverage has increased significantly between the preservice examination and the inservice examinations. Improvements in manipulators and ultrasonic transducer design have resulted in increased coverage with the automated examination equipment. Performance of manual 'pick-up' examinations further enhances coverage. These examination improvements have resulted in an increase in the quality of the examination and increased assurance of plant safety.

"Alternative examination techniques for the subject welds were evaluated, and it was determined that no additional examination coverage was obtainable. Ultrasonic examination coverage of the three subject welds from the RPV ID surface was also evaluated. Coverage from the ID has been estimated to be approximately 80-85%, and offers no significant increase in coverage. Ultrasonic examinations from the RPV ID surface significantly impact refuel floor activities and resources with no commensurate increase in examination coverage or plant safety.

"Performance of RPV shell weld ultrasonic examinations from the RPV ID is not a prudent approach for Susquehanna. Actual RPV shell weld examination coverage from the RPV OD surface is 96% (based on total shell weld length). Whereas, overall ultrasonic examination coverage from the RPV ID has been estimated to be, at best, only 80-85%. Performance of supplemental external examinations would be necessary to maximize overall ID examination coverage to even match that achieved by the total OD examinations.

"Implementing an examination plan which combines both OD and ID examinations provides no commensurate increase in quality and/or plant safety. The combined examination approach would result in examination coverage which is essentially equivalent to the current OD examination coverage; however, the combined examination approach will require additional resources and result in increased radiation dose. The increase in radiation dose is from performance of expanded supplemental manual OD examinations required to obtain ID coverage equivalent to a complete OD examination."

Licensee's Proposed Alternative Examination (as stated):

"Examinations of the affected welds will be performed to the maximum extent practical using automated ultrasonic examination techniques from the RPV OD surface. In addition, the reactor pressure vessel pressure retaining welds are subject to VT-2 visual examination during system pressure testing in accordance with the requirements of Examination Category B-P."

Evaluation: To comply with the augmented reactor vessel examination requirements of 10 CFR 50.55a(g)(6)(ii)(A), licensees must perform volumetric examination on essentially 100% of each of the Item B1.10 shell welds. In accordance with the regulations, essentially 100% is defined as greater than 90% of the examination volume of each weld.

At Susquehanna Steam Electric Station, Units 1 and 2, the augmented coverage requirements cannot be met for three shell welds due to permanent RPV mirror insulation support steel that restricts access to the examination area. To achieve complete coverage for the subject welds, design modifications would be required to gain access from the outside (OD) surface. A potential alternative to performing volumetric examinations from the OD surface is an automated ultrasonic examination from the inside (ID) surface. The licensee has considered this option and determined that little or no increase in coverage can be achieved by performing an ID examination for these welds. Furthermore, ID examinations would significantly impact plant activities and would require additional resources on the refueling floor. Considering the difficulties associated with performing additional examinations from either the OD or the ID surface, it is concluded that imposition of such examinations would result in a substantial burden on the licensee.

The licensee has examined a substantial portion (>80%) of each of the three shell welds in each unit and has made a reasonable effort to maximize examination coverage of the RPV shell welds. Through the use of improved inspection equipment, the licensee has examined 96% of the total weld length of all the RPV shell welds. Considering that a significant percentage of the volumetric examination was completed, the INEL staff concludes that inservice degradation, if present, would have been detected and that reasonable assurance of the structural integrity of the RPV shell welds has been provided.

Based on the review of the information submitted by the licensee, it is concluded that examination coverage has been maximized from the OD surface and that reasonable assurance of the structural integrity of the RPV shell welds has been provided by the significant amount of examination coverage that was obtained. It is further concluded that additional examinations from either the ID or OD surface would not increase coverage significantly and that imposing the augmented vessel examination coverage requirements of 10 CFR 50.55a(g)(6)(ii)(A) would result in a burden without a compensating increase in quality and safety. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

3.0 CONCLUSION

The INEL staff has reviewed the licensee's submittal and concludes that the licensee has maximized examination coverage from the OD surface and that imposition of the coverage requirements of the Code and the Regulations would create a burden on the licensee without a compensating increase in quality and safety. Furthermore, the examination coverage achieved would have detected existing patterns of inservice degradation and reasonable assurance of the structural integrity of the RPV has been provided. Therefore, it is recommended that the licensee's proposed alternative be authorized pursuant to 10 CFR 50.55a(a)(3)(ii).

Date: March 7, 1997