

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

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION RELATED TO REQUESTS FOR RELIEF FROM INSERVICE INSPECTION REQUIREMENTS POWER AUTHORITY OF THE STATE OF NEW YORK JAMES A. FITZPATRICK NUCLEAR POWER PLANT DOCKET NO. 50-333

INTRODUCTION

By letters dated May 25, 1976, March 20, 1979, September 10, 1979, December 5, 1980, March 18, 1981, June 21, August 20, September 28, and December 29, 1982, the Power Authority of the State of New York submitted its inservice inspection program, revisions, or additional information related to requests for relief from certain Code requirements determined to be impractical to perform on the James A. FitzPatrick Nuclear Power Plant during the inspection interval. The program is based on the 1974 Edition including Summer 1975 Addenda of Section XI of the ASME Code, and covers the last 80 months of the current 120month inspection interval from November 28, 1978 to July 28, 1985.

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EVALUATION

Requests for relief from the requirements of Section XI which have been determined to be impractical to perform have been reviewed by the Staff and the Staff's contractor, Science Applications, Inc. The contractor's evaluations of the licensee's requests for relief and his recommendations are presented in the Technical Evaluation Report (TER) attached (Attachment 1). The staff has reviewed the TER and agrees with the evaluations and recommendations except in those cases where the licensee submitted additional information to support justification of granting relief or in those cases where generic problems have been determined to exist and augmented examinations are being required (See Table I, B4.6, B - J). A summery of the determinations made by the staff is presented in the following tables:

CLASS 1 COMPONENTS

IWB-2600 ITEM NO.	IWB-2500 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS	
81.1	. B-A	Reactor Vessel	Welds in Beltline	Volumetric	Examine Only if and When Entire Core is Removed for any Reason	NOT GRANTED	
B1.2	B-B	Reactor Vessel	Welds in Shell (Other than Belt- line) and Welds in Bottom and Closure Heads	Volumetric	Examine Only if and When Entire Core is Removed for any Reason	NOT GRANTED	
81.4	B-D	Reactor Vessel	All Nozzles Inner Radii	Volumetric	None	NOT GRANTED (1)
B1.11	B-G-2	Reactor Vessel	Pressure- Retaining Bolting Less than 2-Inch Diameter	Visual	Visual When Bolting is Removed for Maintenance or Other Purposes	NOT GRANTED (1)

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CLASS	1 C	OMPONENTS
(Cont	inued)

IWB-2600 ITEM NO.	IWB-2500 FXAM. CAT.	SYSTEM OR Component	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
B4.12	B-G-2	Residual Heat Removal System Flange Bolting	Pressure- Retaining Bolting Less than 2-Inch Diameter	Visual	Visual When Bolting is Removed for Maintenance or Other Purposes	NOT GRANTED (1)
85.9	B-G-2	Recircu- lation System (Decon- tamination Flange Bolting)	Pressure- Retaining Bolting Less than 2-Inch Diameter	Visual	Visual When Bolting is Removed for Maintenance or Other Purposes	NOT GRANTED (1)
B6.9	B-G-2	Vaives	Pressure- Retaining Bolting Less than 2-Inch Diameter	Visual	Visual When Bolting is Removed for Maintenance or Other Purposes	NOT GRANTED (1)
B4.12	B-G-2	Recircu- lation Pump Mechanical Seal Bolting	Pressure- Retaining Bolting Less than 2-Inch Diameter	Visual	Visual When Bolting is Removed for Maintenance or Other Purposes	NOT GRANTED (1)
B1.14	8-1-1	Reactor Vessel	Vessel Cladding	Visual	None	GRANTED

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IWB-2600 ITEM NO.	IWB-2500 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
B1.18	B-0	Control Rod Drives	Stub Tube- to-CRD Housing Peripheral Welds	Volumetric	None	GRANTED PROVIDED VISUAL EXAMINATION IS PERFORMED DURING HYDROSTATIC TEST (1)
B4.5	B-J	Fiping	Welds Located Inside Pene- trations	Volumetric	Volumetric Examination of Welds Outside and Immediately Adjacent to Containment Penetration	GRANTED (1)
B4.6	B-J	Piping	Inaccessible Branch Pipe Connection Welds Exceed- ing Six Inch Diameter	Volumetric	Surface or Visual	NOT GRANTED (2)
B4.7	B-J	Piping	Inaccessible Branch Pipe Connection Welds Six Inch Diameter and Smaller	Surface	Visual	NOT GRANTED
B4.8	B-J	Piping	Inaccessible Socket Welds	Surface	Visual	NOT GRANTED

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CLASS 1 COMPONENTS (Continued)

IWB-2600 ITEM NO.	IWB-2500 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
B4.9	B-K-1	Piping Supports	Inaccessible Integrally- Welded Supports	Volumetric	Surface or Visual	NOT GRANTED
B4.10	B-K-2	Piping Supports	Inaccessible [*] Support Components	Visual	Visual	NO RELIEF REQUIRED
B4.1	B-F	Piping	Inaccessible Safe-End to Piping Welds	Volumetric and Surface	Surface or Visual	NOT GRANTED
B5.4	B-K-1	Pumps	Integrally- Welded Supports	Volumetric	Surface or Visual	NOT GRANTED
B5.5	B-K-2	Pump Supports	Support Components	Viscal	Visual	NO RELIEF REQUIRED
86.4	B-K-1	Valves	Integrally- Welded Supports	Volumetric	Surface or Visual	NOT GRANTED
86.5	B-K-2	Valve Supports	Support Components	Visual	Visual	NO RELIEF REQUIRED

CLASS 1 COMPONENTS (Continued)

IWB-2600 ITEM NO.	IWB-2500 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
B5.7	8-L-2	Recircu- lation Pumps	Pump Casings Internal Surfaces	Visual	Visual When Pump is Dis- assembled for Maintenance	GRANTED (1)
B6.7	B-M-2	Valves	Valve Bodies Internal Surfaces	Visual	Visual When Valve is Dis- assembled for Maintenance	GRANTED (1)
B4.6	B-J	Residual Heat Removal	Branch Pipe Connection Weld No. 20-10-141	Volumetric	Surface	NOT GRANTED (2)

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 Considers Additional Information Provided in Letter Dated September 28, 1982; Not Included in TER.

(2) Additional Information Provided in Letter Dated December 29, 1982; Not Included in TER.

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CLASS 2 COMPONENTS

IWC-2600 ITEM NO.	IWC-2520 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
C2.1	C-F, C-G	Piping	Circumferen- tial Butt Welds	Volumetric	Surface in Lieu of Volumetric Piping Greater than 4-Inch NPS and 0.5 Inch Wall Thickness or Less	GRANTED FOR SYSTEMS OTHER THAN ECCS, CHRS, AND RHR
C2.2	C-F, C-G	Piping	Longitudinal Weld Joints in Fittings	Volumetric	Surface in Lieu of Volumetric for Piping Greater than 4-Inch NPS and 0.5 Inch Wall Thick- ness or Less	GRANTED FOR SYSTEMS OTHER THAN ECCS, CHRS, AND RHR
C2.3	C-F, C-G	Piping	Branch Pipe- to-Pipe Weld Joints	Volumetric	Surface in Lieu of Volumetric for Piping Greather than 4-Inch NPS and 0.5 Inch Wall Thick- ness or Less	GRANTED FOR SYSTEMS OTHER THAN ECCS, CHRS, AND RHR (2)

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CLASS 2 COMPONENTS (Continued)

IWC-2600 ITEM NO.	IWC-2520 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
C2.1	C-F, C-G	Piping	Inaccessible Circumfer- ential Butt Welds	Volumetric	Surface or Visual	NOT GRANTED
C2.2	C-F, C-G	Piping	Inaccessible Longitudinal Weld Joints in Fittings	Volumetric	Surface or Visual	NOT GRANTED
C2.3	C-F, C-G	Piping	Inaccessible Branch Pipe- to-Pipe Weld Joints	Volumetric	Surface	GRANTED (2)
C2.5	C-E-1	Piping Supports	Inaccessible Integrally- Welded Supports	Surface	Visual	NOT GRANTED
C2.6	C-E-2	Piping Supports	lnaccessible Support Components	Visual	Visual	NO RELIEF REQUIRED
C4.3	C-E-1	Valve Supports	Inaccessible Integrally- Supports	Surface	Visual	NOT GRANTED

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CLASS 2 COMPONENTS (Continued)

IWC-2600 ITEM NO.	IWC-2520 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS
C4.4	C-E-2	Valve Supports	Inaccessible Support Components	Visual	Visual	NO RELIEF REQUIRED
C2.4	C-D	Piping Pressure- Retaining Bolting	Bolts, Studs, Nuts Bushings, Threads, and Flange Ligaments of Bolting Greater than 1-Inch Diameter	Visual and Either Surface or Valumetric	Update to Requirements of the 1977 Edition of Section XI	GRANTED
C3.2	C-D	Pumps Pressure- Retaining Bolting	Bolts, Studs, Nuts, Bush- ings, Threads and Flange Ligaments of Bolting Greater than 1-Inch Diameter	Visual and Either Surface or Volumetric	Update to Requirements of the 1977 Edition of Section X1	GRANTED

CLASS 2 COMPONENTS (Continued)

IWC-2500 ITEM NO.	IWC-2520 EXAM. CAT.	SYSTEM OR COMPONENT	AREA TO BE EXAMINED	REQUIRED METHOD	LICENSEE PROPOSED ALTERNATIVE EXAMINATION	RELIEF REQUEST STATUS	
C4.2	C-D	Valves Pressure- Retaining Bolting	Bolts, Studs, Nuts, Bush- ings, Threads and Flange Ligaments of Bolting Greater than 1-Inch Diameter	Visual and Either Surface or Volumetric	Update to Requirements of the 1977 Edition of Section XI	GRANTED .	

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(2) Additional Information Provided in Letter Dated December 29, 1982; Not Included in TER

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CLASS 3 COMPONENTS

					PROPOSED		
IWD-2600	IWD-2520	SYSTEM OR	AREA TO BE	REQUIRED	ALTERNATIVE	RELIEF REQUEST	
ITEM NO.	EXAM. CAT.	COMPONENT	EXAMINED	METHOD	EXAMINATION	STATUS	

[NO RELIEF REQUESTS]

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PRESSURE TESTS

SYSTEM OR COMPONENT	IWA-5000, IWB-5000, IWC-5000 & IWD-5000 TEST PRESSURE REQUIREMENT	LICENSEE PROPOSED ALTERNATE TEST PRESSURE	RELIEF REQUEST STATUS	
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[NO RELIEF REQUESTS]

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ULTRASONIC EXAMINATION TECHNIQUE

SYSTEM OF COMPONENT	REQUIREMENT	ALTERNATIVE TEST METHOD	RELIEF REQUEST STATUS			
Class 1 Thin Wall Compo- nents 0.375 Inch Wall Thickness or Less if Nominal Pipe Size Exceeds 3-Inches	Article 5, Section V	Surface	NOT GRANTED (1)			

 Considers Additional Information Submitted by Letter Dated December 29, 1982; Not Considered in TER

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GENERAL RELIEF REQUESTS

ALL CLASSES/COMPONENTS

SYSTEM OR COMPONENT	REQUIREMENT	LICENSEE	RELIEF REQUEST STATUS
Class 1 Exempt Components	Examination Given in IWB-2500 and IWB-2600	Exempted Under IWB-1220 (B)(1), Makeup Capa- bility	GRANTED (2)
Class 2 Exempt Components	Examinations Given in IWC-2520 and IWC-2600	Exempted Under IWC-1220 (a)	GRANTED FOR SYSTEMS OTHER THAN RHRS, CHRS AND ECCS
Class 1, 2, 3 Repair Pro- cedures	IWA-4000	Licensee Requests Use of Code or Standard Used for Original Fabrication	RELIEF IS NOT REQUIRED

(2) Additional Information Provided in September 29, 1982 Letter Which was not Available for TER Review.

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Based on the review summarized, the staff concludes that relief granted from the examination requirements and alternate methods imposed through this document give reasonable assurance of the piping and component pressure boundary and support structural integrity, that granting relief where the code requirements are impractical is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest considering the burden that could result if they were imposed on the facility.

ENVIRONMENTAL CONSIDERATION

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We have determined that granting relief from specific ASME Section XI Code requirements does not authorize a change in effluent types or total amounts nor an increase in power level and will not result in any significant environmental impact. Having made this determination, we have further concluded that this is an action which is insignificant from the standpoint of environmental impact and, pursuant to 10 CFR §51.5(d)(4), that an environmental impact statement or negative declaration and environmental impact appraisal need not be prepared in connection with the grant of this relief.

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CONCLUSION

We have concluded, based on the considerations discussed above, that: (1) because this action does not involve a significant increase in the probability or consequences of accidents previously considered and does not involve a significant decrease in a safety margin, the action does not involve a significant hazards consideration, (2) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, and (3) such activities will be conducted in compliance with the Commission's regulations and the issuance of this action will not be inimical to the common defense and security or to the health and safety of the public.

Date: January 31, 1984

Attachment: Technical Evaluation Report

1 A

SAI Report No. 186-028-09

JAMES A. FITZPATRICK NUCLEAR POWER PLANT INSERVICE INSPECTION PROGRAM TECHNICAL EVALUATION REPORT

Submitted to:

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

> Science Applications, Inc. McLean, Virginia 22102

> > September 30, 1982

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<u>TECHNICAL EVALUATION REPORT</u> JAMES A. FITZPATRICK NUCLEAR POWER PLANT 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, Power Authority of the State of New York (PASNY) of James A. FitzPatrick Nuclear Power Plant. 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.

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

* Hereinafter referred to as Section XI or Code.

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 onethird 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 James A. FitzPatrick Nuclear Power Plant, 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 28, 1978, to July 28, 1985. 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 (11) listed at the end of this report pertain to previous information transmittals on ISI between the licensee and the Commission. By letters of April 22 and November 17, 1976, ^(1,3) the Commission provided general ISI guidance to all licensees. Submittals in response to that guidance were made by the licensee on May 25, 1976, ⁽²⁾ March 20, 1979, ⁽⁴⁾ September 10, 1979, ⁽⁵⁾ December 5, 1980, ⁽⁶⁾ and March 18, 1981. ⁽⁷⁾ On August 25, 1981, ⁽⁸⁾ the Commission granted interim approval of the ISI program, pending detailed review. By letter of April 14, 1982, ⁽⁹⁾ the Commission requested additional information

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to complete this review. This information was only partially furnished by the licensee in submittals of June 21, 1982, $^{(10)}$ and August 20, 1982. $^{(11)}$ As a result, some relief requests are recommended for denial in this report because of insufficient information. The remaining information has been scheduled to be furnished to the Commission in October 1982 by the licensee.

From these submittals, a total of 37 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

 <u>Request for Relief per Notes 1-4, Appendix A-1⁽⁵⁾; Pressure-</u> Retaining Welds, Categories B-A and B-B, Items B1.1 and B1.2

Code Requirement

Category B-A (In Reactor Vessel Beltline Region):

Volumetric examination of the shell longitudinal and circumferential welds during each inspection interval shall cover at least 10% of the length of each longitudinal weld, and 5% of the length of each circumferential weld, with the minimum length of weld examined equal to one wall thickness. The examination may be performed at or near the end of each inspection interval.

The length of weld to be examined shall be increased to at least 50% of the length when the longitudinal and circumferential welds have received an exposure to neutron fluence in excess of 10^{19} byt (E_n of 1 MeV or above).

Category B-B (In Vessels)

Volumetric examinations shall be performed during each inspection interval and shall cover at least 10% of the length of each longitudinal shell weld and meridional head weld and 5% of the length of each circumferential shell weld and head weld. The examination may be performed at or near the end of each inspection interval.

Code Relief Request

Relief is requested from the volumetric examination of the following reactor pressure vessel welds:

All welds

Category

B-B

B-A

Reactor pressure vessel longitudinal and circumferential welds above sacrificial shield

Reactor pressure vessel welds within sacrificial shield and above jet pump support plate

Bottom head circumferential and meridional welds inside support skirt

Proposed Alternative Examination

The Category B-A welds and those Category B-B welds within the sacrificial shield and above the jet pump support plate will be examined in accordance with the Code only if and when the entire core is removed for any reason. The Category B-B bottom head circumferential and meridional welds inside the support skirt will be visually examined during the 10-year hydrostatic test.

Licensee's Basis for Requesting Relief

Category B-A Welds:

With the core in place, high radiation levels in the vicinity of the subject welds make it impractical to attempt examination. Additionally, due to limited external accessibility to the circumferential and longitudinal welds because of structural interferences, the 50% examination requirement after exposure to 10¹⁹ nvtof fast neutrons cannot be performed. Vessel internal examination is impractical because the necessary scanning equipment is not yet available, positioning is extremely difficult, and accurate interpretation of test results is impossible due to the cladding.

Various inspections and tests are performed and operational constraints are strictly observed to assure the integrity of this vessel. These include:

Item

Reference

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- (a) Visual examination during hydrostatic test each inspection interval
- (b) Minimum pressurization temperature restrictions and associated surveillance program
- (c) Thermal transient restrictions
- (d) Reactor coolant system leakage monitoring

Code required hydrostatic test

Technical Specification Paragraph 3.6.B

Technical Specification Paragraph 3.6.A

Technical Specification Paragraph 3.6.D

Category B-B Welds:

Examination of the longitudinal and circumferential welds above the sacrificial shield from the vessel internal surface is theoretically possible but is not presently practical as indicated above for B-A welds.

With the core in place, high radiation levels in the vicinity of the reactor pressure vessel welds within the sacrificial shield and above the jet pump support plate make it impractical to attempt examination. Examination from the vessel internal surface is theoretically possible, but is not presently practical as indicated above for B-A welds.

Volumetric examination of the bottom head circumferential and meridional welds inside the support skirt is impractical because of the large number of penetrations in this area.

Evaluation

The licensee requests code relief from the examination of all welds in the body of the reactor pressure vessel due to the presence of high radiation levels when the core is in place. The licensee is willing to perform the examinations when the core is removed for any reason. But this is not likely to occur during the inspection interval.

High radiation level is not sufficient justification by itself for ruling that a code required examination is impractical. Sufficient access to the welds has been provided to permit the code required examinations, and since access has been provided to the welds, the licensee should at least attempt to perform a best-effort volumetric examination of the welds in the body of the reactor pressure vessel.

Limited external accessibility to the circumferential and longitudinal welds, because of structural interferences, precludes the 50% examination requirement after exposure to 10¹⁹ nvt of fast neutrons. This is understandable.

The licensee has addressed the possibility of performing the Code required examinations from the inside of the reactor pressure vessel. Due to internal interferences in the vessel, the complications caused by the cladding in the interpretations of test results and the lack of necessary internal scanning equipment, this approach has not been developed.

Certain head meridional and circumferential welds are partially or wholly accessible for inservice examinations.

If it is not possible to achieve a full examination of the Category B-A welds or some of the Category B-B welds, then an alternative inservice inspection program would be required to maintain the extent of examination. The examination of the accessible Category B-B welds could be increased, to the extent possible, to achieve an examination sample equivalent to the Category B-A and B-B welds for which relief was requested. In addition, visual inspections of the identified welds for which Code relief was requested, to the extent possible, could be performed during system leakage and hydrostatic tests. Such examinations should furnish sufficient information to evaluate the structural reliability of the welds.

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Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the code requirements are not impractical. Therefore, the following is recommended:

Relief should not be granted from the volumetric examination of the identified welds at this time.

- Licensee should attempt to perform the code required examinations of the Category B-A and B-B welds on the basis of a best-effort volumetric examination. Should it not be possible to fully perform the Code required examinations, then the licensee should submit another code relief request that is specific to the particular welds that could not be fully examined.
- Visual inspection of the accessible portions of those welds which cannot be fully code examined should be conducted for evidence of leakage during system hydrostatic tests when performed as required by IWB-5000.

References

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Reference 5.

Science Applications, Inc.

Code Requirement

The extent of the volumetric examination of each nozzle shall cover 100% of the volume to be inspected as shown in Figure IWB-2500D, which includes the primary nozzle-to-vessel welds and inside radiused sections. All nozzles shall be examined during each inspection interval.

Code Relief Request

Relief is requested from the volumetric examination of the nozzle inner radius (NIR) of all nozzles on the Reactor Pressure Vessel (RPV), except those on the closure head.

Proposed Alternative Examination

None.

Licensee's Basis for Requesting Relief

No acceptable procedure exists for examination of the inner radii from the nozzle O.D. due to technical problems with interpretation of results. Automated equipment is not available to perform examinations from the nozzle I.D.

Evaluation

Most licensees are able to perform the Code required volumetric examinations of the NIR of all nozzles on the RPV. Some request relief for only one or two nozzles, usually because of inaccessibility. Hence, the examination of the NIR of the RPV nozzles is within the state-of-the-art technology.

Automated equipment is not available to the licensee to perform examinations from the nozzle ID, but the licensee is willing to commit to perform the volumetric examination of the nozzle-to-vessel weld from the OD. Normally when this examination is performed from the nozzle OD, the NIR examination can also be performed by changing transducers.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the examination of the NIR of the RPV nozzles there is not enough justification for declaring the Code requirements impractical. Therefore, the following is recommended:

- (a) Relief should not be granted at this time from the volumetric examination of the NIR of the RPV nozzles.
- (b) The licensee should be encouraged to pursue more rigorously the state-of-the-art technology for this examination.
- (c) The licensee should submit another relief request as the end of the inspection interval approaches for those nozzles that he has not been able to examine in accordance with the Code.

References

Reference 5.

3. <u>Requests for Relief per Notes 9, 14, 17 and 19, Appendix A-1(5);</u> <u>Pressure-Retaining Bolting, Smaller Than 2 Inches in Diameter,</u> Category B-G-2, Items B1.11, 54.12, B5.9 and B6.9

Code Requirement

Category B-G-2 - Pressure-Retaining Bolting, Smaller Than 2 inches in Diameter

The areas shall include bolts, studs, and nuts.

The examinations performed during each inspection interval shall cover 100% of the bolts, studs, and nuts.

Bolting may be examined either in place under tension, when the connection is disassembled, or when the bolting is removed.

Item No.	Components and Parts to be Examined	Examination Method	
B1.11	Reactor Vessel Pressure-Retaining Bolting	Visual	
B4.12 35.9 B6.9	Piping Pressure-Retaining Bolting Pump Pressure-Retaining Bolting Valve Pressure-Retaining Bolting	Visual Visual Visual	

Code Relief Request

The licensee requests relief from the visual examination of the following Category B-G-2 requirements:

Item No.

B1.11	Reactor pressu	are vessel bolts, studs and nuts (note 9);
B4.12	Residual Heat	Removal (RHR) flange bolting (note 14);
B4.12	Recirculation (note 14);	System decontamination flange bolting
B5.9	Recirculation and	pump mechanical seal bolting (note 17);
86 0	Value bolting	(noto 10)

B6.9 Valve bolting (note 19).

Proposed Alternative Examination

Visual examination will be performed when the equipment is disassembled for maintenance or other purposes.

Licensee's Basis for Requesting Relief

When bolted equipment is disassembled for maintenance or for other reasons, visual inspections are made on a routine basis. Consequently, many of the items listed above in the

code relief request will be routinely inspected when disassembled for maintenance or for other reasons, during the inspection interval. The performance of Code required visual examinations, in addition to the routine visual examinations performed during maintenance, would be a needless expense in terms of time spent, dollars, and radiation exposure with no additional compensating increase in safety.

Evaluation

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The licensee could satisfy the Code requirements by performing a visual examination of the bolting in place under tension. However, the licensee has no confidence in this method of examination for determining the condition of the bolting.

The licensee has committed to the concept of visual examination if the bolting is disassembled for maintenance. However, the licensee has not supplied enough justification to establish that the Code visual examination requirements are impractical. As the end of the interval approaches, the licensee should be encouraged to provide additional justification and specific Code relief requests for bolting that has not been disassembled and examined.

For those inspection periods when bolting maintenance does not occur, visual examinations of bolted joints could be performed when the system pressure tests (IWA-5000) are conducted in accordance with the requirements for Category B-P.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the bolting discussed above, there is not presently enough justification for declaring the code requirements impractical. Therefore, the following is recommended:

- (a) Relief should not be granted at this time from visual examination of pressure-retaining bolting, smaller than 2 inches in diameter.
- (b) The licensee's proposal to perform the code required examinations whenever the bolting is disassembled because of maintenance should be accepted.
- (c) During other inspection periods, the licensee should perform visual examinations of the

bolted joints 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 bolting which has not been disassembled and examined.

References

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References 5, 9 and 11.

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<u>Request for Relief per Note 10, Appendix A-1⁽⁵⁾; Interior</u> <u>Clad Surfaces of Reactor Vessels, Category B-I-1, Item B1.14</u>

Code Requirement

The areas shall include at least six patches (each 36 sq. in.) evenly distributed, in the closure head, and six patches (each 36 sq. in.), evenly distributed in accessible sections of vessel shell.

The examinations performed during each inspection interval shall cover 100% of the patch areas. Visual examination shall be performed on vessel cladding.

Code Relief Requests

Relief is requested from performing examinations of the vessel cladding patches.

Proposed Alternative Examination

None.

Licensee's Basis for Requesting Relief

The requirement for this examination has been dropped from later addenda of the Code, such as the Summer 1978 Addenda. Visual examination of the internal surfaces of the reactor vessel is covered in Examination Category B-N-1.

Evaluation

The 1977 Edition of 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 (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 requirements for examining vessel cladding are deleted from the 1977 Edition with addenda through Summer 1978.

Recommendations

Pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the Summer 1978 Addenda for Category B-I-1 items. This approval would delete the requirement to examine these items.

References

Reference 5.

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 Request for Relief per Note 12, Appendix A-1;⁽⁵⁾ Pressure Retaining Welds in Control Rod Drive Housings, Category B-0, Item B1.18

Code Requirement

Volumetric weld examinations shall be performed during each inspection interval and shall include 100% of the welds in 10% of the peripheral control rod drive (CRD) housings. The examinations may be performed at or near the end of the inspection interval.

Code Relief Request

Relief is requested from the volumetric examination of the stub tube to CRD housing peripheral welds.

Proposed Alternative Examination

None.

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Licensee's Basis for Requesting Relief

Should the CRD housing weld fail, the leakage path to the failure meets the makeup exclusion criteria and is therefore excluded from volumetric examination in accordance with IWB-1220(b)(1).*

Evaluation

The licensee has shown that the maximum flow path resulting from a complete failure of the CRD housing weld is less than that of the makeup system which has sufficient capacity to shut down and cool the reactor in an orderly manner. The requirements of paragraph IWB-1220(b)(1) are satisfied and the examinations required for Code exempted components will be performed by the licensee.*

All peripheral CRD housing welds should be visually examined during the system hydrostatic pressure tests in accordance with IWB-1220(c).

The licensee's bases for requesting relief and this evaluation are based on verbal statements. Written verification is expected in October.

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Conclusions and Recommendations*

Based on the above evaluation, it is concluded that for the welds discussed above, the code requirements for exemption of volumetric examinations have been satisfied. It is further concluded that an alternative examination would provide necessary added assurance of structural reliability. Therefore, the following is recommended:

Relief should be granted from the volumetric examination of 100% of the welds in 10% of the peripheral CRD housings, provided all peripheral CRD housing welds are visually examined during the system hydrostatic pressure tests in accordance with IWB-1220(c).

References

References 5, 9 and 11.

The licensee's bases for requesting relief and this evaluation are based on verbal statements. Written verification is expected in October.

B. Pressurizer

Does not apply to BWRs.

- C. Heat Exchangers and Steam Generators No relief requests.
- D. Piping Pressure Boundary
 - 1. <u>Request for Relief R3, Appendix B;⁽⁵⁾ Inaccessible Welds,</u> <u>Class 1 and 2 Systems, Categories B-F, B-J, B-K-1, B-K-2,</u> <u>C-F, C-G, C-E-1 and C-E-2, Items B4.1, B4.5 through</u> <u>B4.10, B5.4, B5.5, B6.4, B6.5, C2.1 through C2.3, C2.5,</u> C2.6, C4.3 and C4.4

Code Requirement

See 1974 Edition of Section XI through Summer 1975 Addenda.

Code Relief Request

Licensee requests code relief from various volumetric and surface examinations.

Proposed Alternative Examination

Surface or visual examination, as appropriate, would be performed in lieu of volumetric examination. Visual examination would be performed during hydrostatic testing once every 10 years in lieu of the surface examination.

Licensee's Basis for Requesting Relief

Component welds whose physical location within the plant restricts access to the weld due to such factors as: being located within a wall sleeve or penetration, in a high radiation area, very high in a room, adjacent to a wall or other restriction without sufficient clearance to perform examinations are included in request for relief R3.

Specific reasons for requesting exemption from an examination requirement will be provided in each instance.

Evaluation

Appendix B of Reference 5 lists Code relief requests but does not provide sufficient information to enable a determination that the Code requirements are impractical to be made. The licensee has stated that "specific reasons for requesting exemption from an examination requirement will be provided in each instance", but as of this writing, has not." The licensee should provide sufficient information on each weld for which relief is requested to demonstrate that the Code requirements are impractical.

The inaccessible welds within the containment penetration assemblies, the triple flued heads, are discussed in I.D.3 of this report.

The licensee could perform visual examinations of the welds included in this relief request when the system pressure tests (IWA-5000) are conducted in accordance with the requirements for Category B-P.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, there is not presently enough justification for granting relief from the Code requirements, except for inaccessible welds within the containment penetration assemblies. Therefore, the following is recommended:

- (a) Relief should not be granted at this time from the code requirements as requested, except as discussed in I.D.3 of this report.
- (b) The licensee should perform visual examinations of the welds included in this relief request 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 for each weld for which code relief is requested. The requests should contain sufficient information to demonstrate that the code requirements are impractical.

References

References 5, 9 and 11.

The licensee has been asked for this information and a response is expected in October 1982.

 Request for Relief per Note 14, Appendix A-1;⁽⁵⁾ Pressure Retaining Bolting, Smaller Than 2 Inches in Diameter, Category B-G-2, Item B4.12

The relief request from the visual examination of pressure retaining bolting (see I.A.3 of this report) applies here. The licensee has committed to perform the Code required examinations whenever the bolting is disassembled. However, the licensee has not supplied enough justification to establish that the Code visual examination requirements are impractical. As the end of the interval approaches, the licensee should provide additional justification and specific Code relief requests for bolting that has not been disassembled and examined.

<u>Request for Relief per Note 13, Appendix A-1⁽⁵⁾; Pressure-</u> Retaining Welds in Piping, Category B-J, Item B4.5

Code Requirement

Volumetric weld examinations shall be performed during each inspection interval and shall cover all the area of 25% of the circumferential joints including the adjoining 1 ft. sections of longitudinal joints and 25% of the pipe branch connection joints.

Code Relief Request

Relief is requested from the volumetric examination of all the pressure-retaining welds which are of the penetration flued head to process pipe type and are listed in Appendix B of Reference 5.

Proposed Alternative Examination

A visual examination will be performed during system leakage and hydrostatic pressure tests.

Licensee's Basis for Requesting Relief

The penetration flued head to process pipe welds are inaccessible for any type of examination.

Evaluation

The identified welds are completely inaccessible for volumetric or surface examination because the welds are located inside a containment penetration. Each primary containment penetration assembly, due to its design, leaves one pressure retaining piping weld inaccessible

for examination by either surface or volumetric means. The welds can only be examined by inspecting for evidence of leakage during system hydrotests.

The initial design of the assemblies did not provide for accessibility for inservice examinations. If it is assumed, though, that the workmanship and quality assurance of the welding, as well as the preservice examinations, were adequate, then an examination of the first pressure boundary weld (process piping to flued head) outside the containment should reflect service-induced failures for that particular piping section. Thus, the first pressure boundary weld outside the containment on each of these process pipes would be volumetrically examined, where practical, over 100% of its length during each inspection interval. Such an examination would maintain sample size. The licensee could also conduct visual examinations at these penetrations as proposed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for these welds, 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 should be granted from the volumetric examination of the identified welds, with the following provisions:

- (a) The first pressure boundary weld outside the containment on each of these process pipes should be volumetrically examined, where practical, over 100% of its length during each inspection interval.
- (b) The proposed visual examinations should be performed on the containment penetration assemblies when leakage and hydrostatic tests are conducted in accordance with IWB-1220(c).

References

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References 5, 9 and 11.

4. <u>Request for Relief R4, Appendix B(5); Pressure-Retaining</u> <u>Welds in Piping, Categories B-J, C-F and C-G, Items B4.6</u> and C2.3

Code Requirement

1974 Edition of Section XI through Summer 1975 Addenda

Category B-J:

Volumetric weld examinations shall be performed during each inspection interval and shall cover all the area of 25% of the circumferential joints including the adjoining 1 ft. sections of longitudinal joints and 25% of the pipe branch connection joints.

In the case of pipe branch connections, the areas shall include the weld metal, the base metal for one pipe wall thickness beyond the edge of the weld on the main pipe run, and at least 2 in. of the base metal along the branch run.

1977 Edition of Section XI through Summer 1978 Addenda

Category B-J:

For branch pipe connection welds of nominal pipe size greater than 2 inches in diameter surface and volumetric examinations shall be performed each inspection interval. For branch pipe connection welds of nominal pipe size 2 inches and less in diameter, surface examinations shall be performed each inspection interval.

> 1974 Edition of Section XI through Summer 1978 Addenda

<u>Category C-F</u>: Pressure-Retaining Welds in Piping, Pumps, and Valves in Systems which Circulate Reactor Coolant

Volumetric weld examinations shall cover 100% of the welds. This examination shall be scheduled over the lifetime of the plant (four intervals with three periods within each interval).

Category C-G:

Pressure-Retaining Welds in Piping, Pumps, and Valves in Systems which Circulate other than Reactor Coolant

Volumetric weld examination of 50% of the total number of welds shall be performed. The examination shall cover 100% of the weid. This examination shall be scheduled over the lifetime of the plant (four intervals with three periods within each interval).

> 1977 Edition of Section XI through Summer 1978 Addenda

Category C-F: Pressure-Retaining Welds in Piping

Surface examinations shall be performed on piping welds 1/2 inch or less nominal wall thickness and on branch connections. Examinations shall be performed each inspection interval. The welds selected for examination shall include 50% of the main steam system welds, and 25% of the welds in all other systems.

Code Relief Request

Licensee requests relief from the volumetric examination of branch pipe to pipe welded joints that are Class 1 and greater than 5 inches in diameter or are Class 2.

Proposed Alternative Examination

A surface examination would be performed in lieu of the volumetric examination.

Licensee's Basis for Requesting Relief

The physical design of branch connections does not permit meaningful volumetric examination. This fact has been recognized by ASME Section XI and the requirement for volumetric examination of branch connections has been dropped from later Addenda of the Code (e.g., 1977 Edition, Summer 1978 Addenda).

Evaluation

Surface examination has been substituted for volumetric examination of Class 1 branch pipe connection welds of nominal pipe size 2 in. and less in the 1977 Edition of Section XI, through Summer 1978 Addenda.

Surface examination has been substituted for volumetric examination of Class 2 branch piping in the 1977 Edition of Section XI through Summer 1978 Addenda. By updating to the 1977 Edition, Summer 1978 Addenda, the licensee is permitted to substitute surface examination for volumetric examination of Class 1 branch pipe connection welds of nominal size 2 in. and less and for all Class 2 branch pipe connection welds.

Recommendations

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, for Category B-J and C-F items. This approval would substitute surface examination for volumetric examination for all Class 2 branch piping and for all Class 1 branch pipe connection welds of nominal size 2 in. and less.

Approval should be denied for the request to substitute surface examination for volumetric examination for Class 1 branch piping greater than 6 in. in diameter.

References

References 5, 9 and 11.

 <u>Request for Relief R5, Appendix B⁽⁵⁾; Integrally Welded</u> <u>Supports for Piping, Valves and Pumps, Category B-K-1</u>, <u>Items B4.9, B5.4</u>, and B6.4

Code Requirement

The volumetric examination performed during each inspection interval shall cover 25% of the integrally welded supports. The areas shall include the integrally welded external support attachments. This includes the welds to the pressure-retaining boundary and the base metal beneath the weld zone and along the support attachment member for a distance of two support thicknesses.

Code Relief Request

Relief is requested from the volumetric examination of all Class 1 integrally-welded external support attachments for piping, pumps and valves.

Proposed Alternative Examination

A surface examination will be substituted for the volumetric examination of all Class 1 integrally welded external support attachments for piping, pumps and valves.

Licensee's Basis for Requesting Relief

The physical design of integrally welded supports (fillet or partial penetration welds) does not permit meaningful volumetric examination. This fact has been recognized by ASME Section XI and the requirement for only volumetric examination of integrally welded supports has been dropped from later Addenda of the Code (e.g., 1977 Edition, Summer 1978 Addenda).

Evaluation

The 1977 Edition of 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.

Updating to the 1977 Edition, Summer 1978 Addenda for Category B-K-1 items permits surface or volumetric examination of the weld, as applicable. However, the frequency of examination is increased from once to twice per plant lifetime (four inspection intervals).

Recommendations

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, for Category B-K-1 items. This approval would permit surface or volumetric examination of the weld, as applicable. However, the frequency of examination is increased from once to twice per plant lifetime (four inspection intervals).

References

Reference 5.

E. Pump Pressure Boundary

ι.	Request f	or Relief	per Note 14,		Appendix	A-1; ⁽⁵⁾ Pressu	ure
	Retaining	Bolting,	Smaller	Than	2 Inches	in Diameter,	
	Category	B-G-2, Ite	em 85.9				

The request for relief from the visual examination of pressure retaining bolting (see I.A.3 of this report) applies here.

The licensee has committed to perform the Code required examinations whenever the bolting is disassembled. However, the licensee has not supplied enough justification to establish that the Code visual examination requirements are impractical. As the end of the interval approaches, the licensee should provide additional justification and specific Code relief requests for bolting that has not been disassembled and examined.

<u>Request for Relief R3, Appendix B; (5)</u> Inaccessible Welds,
Class 1 Systems, Categories B-K-1 and B-K-2, Items B5.4 and B5.5

The request for relief from various volumetric and surface examination requirements (see I.D.1 of this report) applies here. The licensee should submit specific Code relief requests for each weld for which relief is requested. The Code relief requests should contain sufficient information to demonstrate that the Code requirements are impractical.

3. <u>Request for Relief R5, Appendix B; (5)</u> Integrally Welded Supports for Pumps, Category B-K-1, Item B5.4

The request to update to the 1977 Edition, Summer 1978 Addenda, applies here (see I.D.5 of this report). Therefore, the following is recommended:

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, for Category B-K-1 items. This approval would permit surface or volumetric examination of the weld, as applicable. However, the frequency of examination is increased from once to twice per plant lifetime (four inspection intervals).

Code Requirement

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Visual examination of pump internal pressure boundary surfaces is to be performed.

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 pump at the pressure boundary.

Proposed Alternative Examination

The internal surfaces of the recirculation pump casing will be visually examined whenever the surfaces are made accessible when a pump is disassembled for maintenance purposes.

Licensee's Basis for Requesting Relief

In absence of required maintenance, disassembly of a recirculation pump solely to perform a visual examination of internal surfaces is impractical. This would represent unnecessary exposure of employees to high radiation and contamination areas and excessive expense.

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 inspect 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.

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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. Therefore, relief from examination requirements is not necessary until then because the licensee will be in compliance with the Regulation up to that time. 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 that program is completed. The licensee could submit a new relief request at that time.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the visual examination discussed above, a more definitive technical basis is needed. Therefore, the following is recommended:

- 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.
- (2) 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.

References

References 5, 9 and 11.

F. Valve Pressure Boundary

Request f	or Reli	ef pe	r Not	te 14.	, 1	Appendix	A.	-1; (5)	Pressure
Retaining	Boltin	g Sma	ller	Than	2	Inches	in	Diamet	ter,
Category	B-G-2,	Item H	56.9						

The request for relief from the visual examination of pressure retaining bolting (see I.A.3 of this report) applies here.

The licensee has committed to perform the Code required examinations whenever the bolting is disassembled. However, the licensee has not supplied enough justification to establish that the Code visual examination requirements are impractical. As the end of the interval approaches, the licensee should provide additional justification and specific Code relief requests for bolting that has not been disassembled and examined.

 <u>Request for Relief R5, Appendix B; (5)</u> Integrally Welded Supports for Valves, Category B-K-1, Item B6.4

The request to update to the Summer 1978 Addenda applies here (see I.D.5 of this report). Therefore, the following is recommended:

Pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the Summer 1978 Addenda for Category B-K-1 items. This approval would permit surface or volumetric examination of the weld, as applicable. However, the frequency of examination is increased from once to twice per plant lifetime (four inspection intervals).

3. <u>Request for Relief R3, Appendix B; (5)</u> Inaccessible Welds, <u>Class 1 Systems, Categories B-K-1 and B-K-2, Iteris B6.4</u> and B6.5

The request for relief from various volumetric and surface examination requirements (see I.D.1 of this report) applies here. The licensee should submit specific code relief requests for each weld for which code relief is requested. The code relief requests should contain sufficient information to demonstrate that the code requirements are impractical.

 <u>Request for Relief per Note 18, Appendix A-1; (5) Valve Bodies</u>, <u>Category B-M-2</u>, Item B6.7

Code Requirement

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

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

An examination of the internal pressure boundary surfaces will be performed, to the extent practical, each time a valve is disassembled for maintenance purposes.

Licensee's Basis for Requesting Relief

The requirement to disassemble primary system valves for the sole purpose of performing a visual examination of the internal pressure boundary surfaces has only a very small potential of increasing plant safety margins and a very disproportionate impact on expenditures of plant manpower and radiation exposure.

Evaluation

The disassembly of large values 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 body is impractical.

The licensee has committed to the concept of visual examination if the valve is disassembled for maintenance. The visual examination specified is to determine whether anticipated severe degradation of the body is occurring due to phenomena such as erosion or corrosion.

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The visual examination of the internal pressure boundary may be performed at or near the end of the 10-year inspection interval. 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 plant 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. 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.

For those inspection periods when valve maintenance does not occur, visual examinations could be performed when the system pressure tests (IWA-5000) are conducted in accordance with the requirements for Category B-P.

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 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.

References

References 5, 9 and 11.

II. CLASS 2 COMPONENTS

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A. Pressure Vessels
No relief requests.

- B. Piping
 - <u>Request for Relief R1, Appendix B⁽⁵⁾; Pressure-Retaining</u> <u>Welds in Piping, Categories C-F and C-G, Items C2.1,</u> <u>C2.2 and C2.3</u>

Code Requirement

1974 Edition of Section XI through Summer 1978 Addenda

<u>Category C-F</u>: Pressure-Retaining Welds in Piping, Pumps, and Valves in Systems which Circulate Reactor Coolant

Volumetric weld examinations shall cover 100% of the welds. This examination shall be scheduled over the lifetime of the plant (four intervals with three periods within each interval).

> Category C-G: Pressure-Retaining Welds in Piping, Pumps, and Valves in Systems which Circulate other than Reactor Coolant

Volumetric weld examination of 50% of the total number of welds shall be performed. The examination shall cover 100% of the weld. This examination shall be scheduled over the lifetime of the plant (four intervals with three periods within each interval).

> 1977 Edition of Section XI through Summer 1978 Addenda

Category C-F: Pressure-Retaining Welds in Piping

Surface examinations shall be performed on piping welds 1/2 inch or less nominal wall thickness and on branch connections. Examinations shall be performed each inspection interval. The welds selected for examination shall include 50% of the main steam system welds, and 25% of the welds in all other systems.

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Code Relief Request

Licensee requests relief from the volumetric examination of Class 2 piping that is 0.5 inches nominal wall thickness or less for nominal pipe size over 4 inches.

Proposed Alternative Examination

A surface examination would be performed in lieu of the volumetric examination.

Licensee's Basis for Requesting Relief

Volumetric examination of thin walled pipe does not produce reliable results. In recognition of this, later Addenda of Section XI (e.g., 1977 Edition, Summer 1978 Addenda) establish the volumetric examination cutoff point as 0.5 inch for Class 2 systems.

Evaluation

The licensee's code relief request can be satisfied by updating to the 1977 Edition of Section XI through Summer 1978 Addenda.

The 1977 Edition of 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.

Updating to the 1977 Edition, Summer 1978 Addenda, for Category C-F items substitutes surface examination for volumetric examination of all Class 2 piping 1/2 in. or less nomina? wall thickness but increases the examination frequency to once each inspection interval from once during the lifetime of the plant.

Recommendations

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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, for Category C-F items. This approval would substitute surface examination for volumetric examination of all Class 2 piping, 1/2 inch or less nominal wall thickness. However, the examination frequency would be increased to each inspection interval from once during the lifetime of the plant.

References

References 5, 9 and 11.

2. <u>Request for Relief R3, Appendix B; (5)</u> Inaccessible Welds, <u>Class 2 Systems, Categories C-F, C-G, C-E-1 and C-E-2,</u> <u>Items C2.1 through C2.3, C2.5 and C2.6</u>

The request for relief from various volumetric and surface examination requirements (see I.D.1 of this report) applies here. The licensee should submit specific code relief requests for each weld for which code relief is requested. The code relief requests should contain sufficient information to demonstrate that the code requirements are impractical.

3. <u>Request for Relief per Note 2, Appendix A-2; (5)</u> Pressure <u>Retaining Bolting Exceeding 1 Inch in Diameter, Category C-D,</u> Items C2.4, C3.2 and C4.2

Code Requirement

Visual examinations performed during each inspection interval shall cover 100% of the bolts, studs, nuts, bushings, and threads in base material and flange ligaments between threaded stud holes of one equivalent stream. For 25% of the bolted joints surface or volumetric examinations shall be performed on 10% of the bolting in each joint, but not less than two bolts or studs per joint.

Code Relief Request

The licensee requests permission to use the 1977 Edition, Summer 1978 Addenda, of Section XI.

Proposed Alternative Examination

The licensee would comply with the more recent edition of the Code.

Licensee's Basis for Requesting Relief

The code requirement is to either surface or volumetrically examine bolting exceeding 1 inch in diameter. This requirement is inconsistent and more restrictive than the Class 1 requirement (examine bolting 2 inches and greater) and later Section XI Advanda, such as the Summer 1978 Addanda (examine bolting exceeding 2 inches in diameter). The in-lieu-of examination for Class 2 bolting will be to surface or volumetrically examine bolting exceeding 2 inches in diameter.

Evaluation

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The 1977 Edition of 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.

Updating to the 1977 Edition, Summer 1978 Addenda, for Category C-D items exempts all Class 2 bolting, 2-in. in diameter, or less, from examination but substitutes volumetric for visual examination of bolts and studs of larger diameters.

Recommendations

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, for Category C-D items. This approval would exempt all Class 2 bolting, 2 in. in diameter or less from examination but substitutes volumetric for visual examination of bolts and studs of larger diameters.

References

Reference 5.

C. Pumps

 <u>Request for Relief per Note 2, Appendix A-2; (5) Class 2</u> <u>Pressure Retaining Bolting, Exceeding 1 Inch in Diameter,</u> <u>Category C-D, Item C3.2</u>

The request to update to the Summer 1978 Addenda applies here (see II.B.3 of this report). Therefore, the following is recommended:

Pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the Summer 1978 Addenda for Category C-D items. This approval would exempt all Class 2 bolting, 2 in. in diameter or less, from examination.

C. Valves

<u>Request for Relief per Note 2, Appendix A-2; (5) Class 2</u> <u>Pressure-Retaining Bolting, Exceeding 1 Inch in Diameter,</u> <u>Category C-D, Item C4.2</u>

The request to update to the Summer 1978 Addenda applies here (see II.B.3 of this report). Therefore, the following is recommended:

Pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the Summer 1978 Addenda for Category C-D items. This approval would exempt all Class 2 bolting, 2 in. in diameter or less, from examination.

2. <u>Request for Relief R3, Appendix B; (5)</u> Inaccessible Weids, <u>Class 2 Systems, Categories C-E-1 and C-E-2, Items C4.2</u> and C4.4

The request for relief from various volumetric and surface examination requirements (see I.D.1 of this report) applies here. The licensee should submit specific code relief requests for each weld for which code relief is requested. The code relief requests should contain sufficient information to demonstrate that the code requirements are impractical.

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III. CLASS 3 COMPONENTS No relief requests.

- IV. PRESSURE TESTS No relief requests.
- V. GENERAL
 - A. Ultrasonic Examination Techniques
 - 1. <u>Request for Relief R6</u>, Appendix B;⁽⁵⁾ Ultrasonic Examination of Class 1 Thin Wall Components

Code Requirement

IWA-2232 Ultrasonic Examination: Ultrasonic examination shall be conducted in accordance with the provisions of Appendix I. Where Appendix I (I-1200) is not applicable, the provisions of Article 5 of Section V shall apply.

I-1200 Limitations in Scope: The methods are limited to Class I and 2 ferritic vessels, 2-1/2 in. and over in wall thickness. Clad vessels are included.

ARTICLE 5 - ULTRASONIC EXAMINATION:

<u>T-510 Scope and General Requirements</u>: (a) This Article describes or references methods which are to be used in selecting and developing (see T-110(c)) ultrasonic examination procedures for welds, parts, components, materials, and thickness determinations, when examination to any part of this Article is a requirement of a referencing Code section.

<u>T-523 Tubular Products</u>: The ultrasonic examination of pipe, tubing, and fittings when required by a referencing Code section, shall be done to procedures meeting the requirements of the referencing Code section, and using the provisions of Standards SE-213, SE-214, and SE-273 or Article 23 to the extent these referenced methods are specified and applicable. Acceptance standards and repair provisions shall be as stated in the referencing Code section.

Code Relief Request

The licensee requests relief from the volumetric examination of Class 1 component connections, piping and associated valves, and vessels that are 0.375 in. nominal wall thickness or less, if nominal pipe size exceeds 3 in.

Proposed Alternative Examination

A surface examination would be substituted for the volumetric examination.

Licensee's Basis for Requesting Relief

Volumetric examination of thin walled pipe does not produce reliable results based on the materia! geometry and on the operator's ability, experience and other "human factors" intangibles that make the examination results nonreproducible. In order to provide a greater factor of safety for Class 1 systems compared to Class 2 systems, the cutoff point for volumetric examination is established as 0.375 inch for Class 1 systems.

Evaluation

This request for relief has inadequate justification. A similar request is covered in II.B.1, where Class 2 piping that is 1/2-in. nominal wall thickness or less is discussed.

Conclusions and Recommendations*

This relief request should be denied. The licensee has not furnished sufficient justification.

References

References 5, 9 and 11.

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^{*}The licensee has been asked to provide additional information. A response is expected in October 1982.

B. Exempted Components

 <u>Code Exemption per IWC-1220(a)</u>, <u>Components Exempted from</u> <u>Examination Based on Pressure and Temperature (Exemption E-1</u> <u>and Relief Request R2⁽⁵⁾</u>)

Code Requirement

1974 Edition Section XI through Summer 1975 Addenda IWC-1220(a):

The following components may be exempted from the examination requirements of IWC-2520:

(a) Components in systems where both the design pressure and temperature are equal to or less than 225 psig and 200°F, respectively.

Exemption

Exemption from examination of Class 2 piping welds is claimed according to IWC-1220(a), 1974 Edition of Section XI.

Relief Request

Class 2 components of systems or portions of systems that are not required to operate above a pressure of 275 psig or temperature of 200°F except for limited periods which are far less than one percent of normal plant operating time.

Evaluation

10 CFR 50.55a(b)(2)(iv)(A), as adopted in 44 FR 57912, states the following:

(iv) Pressure-retaining welds in ASME Code Class 2, piping (applies to Tables IWC-2520 or IWC-2520-L, Category C-F). (A) Appropriate Code Class 2 pipe welds in Residual Heat Removal Systems, Emergency Core Cooling Systems and Containment Heat Removal Systems, shall be examined. The extent of examination for these systems shall be determined by the requirements of paragraph IWC-1220, Table IWC-2520, Categories C-F and C-G, and paragraph IWC-2411 in the 1974 Edition, Summer 1975 Addenda, of Section XI of the ASME Code.

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Components in the RHRS, CHRS and ECCS cannot be exempted under IWC-1220(a). It is required that a representative sample of welds in these systems be examined.

The licensee can obtain some but not all the relief requested by updating to the 1977 Edition of Section XI through Summer 1978 Addenda. For those components other than RHRS, CHRS and ECCS that are not required to operate above a pressure of 275 psig or above a temperature of 200°F, relief can be obtained by updating. However, there is no justification for permitting the exception to the pressure and temperature limits, i.e., "except for limited periods which are far less than one percent of normal plant operating time."

The 1977 Edition of 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.

Updating to the 1977 Edition, Summer 1978 Addenda, would exempt all components in Class 2 systems, except RHRS, CHRS and ECCS, from examination that are not required operate above a pressure of 275 psig or above a temperature of 200°F.

Recommendations

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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 for components in Class 2 systems, except RHRS, CHRS and ECCS, that are not required to operate above a pressure of 275 psig or above a temperature of 200°F. Exceptions to these pressure and temperature limits should not be approved.

The Licensee should include a representative sample of welds on the RHRS, CHRS and ECCS components in the Inservice Inspection Program.

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References

Reference 5.

2. <u>Code Exemption per IWB-1220(b)(1)</u>, <u>Components Exempted from</u> <u>Examination Based on Reactor Coolant Makeup Capability</u> (Exemption E-2, Ref. 5)

Code Requirement

1974 Edition Section XI through Summer 1975 Addenda-IWB-1_0(b)(1):

The following components may be exempted from the examination requirements of IWB-2500:

(b)(1) Under the postulated condition 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.

Exemption

Exemption from examination of Class 1 piping welds is claimed according to IWB-1220(b)(1), 1974 Edition of Section XI.

Evaluation

This exemption is discussed in I.A.5 of this report.

The licensee has shown that the maximum flow path resulting from a complete failure of any of the exempted welds is less than that of the makeup system which has sufficient capacity to shut down and cool the reactor in an orderly manner. The requirements of paragraph IWB-1220(b) (1) are satisfied and the examinations required for Code exempted components will be performed by the licensee.*

Conclusions and Recommendations"

Based on the above evaluation, it is concluded that for the welds exempted by the E2 classification in the licensee's inservice inspection program, the code requirements for exemption of volumetric examinations have been satisfied.

References

References 5, 9 and 11.

The licensee's bases for requesting relief and this evaluation are based on verbal statements. Written verification is expected in October.

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C. Other

 <u>Request for Relief per Section 1.3.8 of Reference 5,</u> Repair Provisions

Code Requirement

IWA-4000 REPAIR PROCEDURES

IWA-4100 Scope

(a) This Article contains rules for the repair of the pressure-retaining boundary of components.

(b) Owners are responsible to document and maintain a Quality Assurance Program (NA-4000) for the repair program.

(c) If rules for a particular repair are not specified in this division, repairs may be performed in accordance with the provisions of the Code applicable to the construction of the component.

Code Relief Request

Relief is requested from the requirements of Article IWA-4000 of ASME Section XI Repair Procedures and the subsequent Articles IW3-4000, IWC-4000, and IWD-4000.

Proposed Alternative Examination

Systems and components reclassified herein in accordance with the inservice inspection requirements of 10 CFR 50, 50.2(v), 50.55a(g) and Regulatory Guide 1.26 as ASME Class 1, 2 and 3 shall be examined in accordance with this program. In lieu of the requirements of IWA-4000, IWB-4000, IWC-4000, and IWD-4000, and integrity of the repaired and/or replacement component, the following shall be accomplished:

Codes and Standards :

Repairs on the components of the systems classified in the inservice inspection program as ASME Class 1, 2 and 3, shall be made in accordance with the Code or Standard used for the original fabrication (later approved Editions and Addenda may be used).

Quality Assurance:

All work pertaining to repairs and replacements shall be performed in accordance with the requirements of the existing James A. FitzPatrick Quality Assurance Program.

Pressure Test:

After repairs by welding on the pressure retaining boundary of components (except repairs on cladding), a pressure test shall be performed in accordance with the provisions of IWA-5000, 1974 Edition, Summer 1975 Addenda.

Re-examination:

Re-examination shall include the method that detected the flaw requiring repair and shall be used to establish a new preservice record.

Procedure Review:

All repair procedures shall be available for review by the enforcement authorities having jurisdiction at the plant site.

Licensee's Basis for Requesting Relief

Because of the vintage of the James A.FitzPatrick Nuclear Power Plant, not all systems and components were originally designed and fabricated to the ASME Boiler and Pressure Vessel Code.

Evaluation

According to IWA-4100, if rules for a particular repair are not specified in Division 1 of Section XI, repairs may be performed in accordance with the provisions of the Code applicable to the construction of the component. The licensee proposes to perform repairs in accordance with the Code or Standards used for the original fabrication. Hence, Code relief is not required.

Recommendations

The request for relief from the requirements of IWA-4000, IWB-4000, IWC-4000 and IWD-4000 is not necessary. The Code relief request should be dealed.

References

Reference 5.

REFERENCES

- 1. R. W. Reid (NRC) to G. T. Berry (PASNY), April 22, 1976.
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- 3. R. W. Reid (NRC) to G. T. Berry (PASNY), November 17, 1976.
- 4. P. J. Early (PASNY) to T. A. Ippolito (NRC), ISI Report for Second Refueling Jutage, March 20, 1979.
- P. J. Early (PASNY) to T. A. Ippolito (NRC), JPN-79-57, <u>Inservice</u> <u>Inspection Program - Inservice Examination of Welds and Supports</u>, <u>James A. FitzPatrick Nuclear Power Plant</u>, Docket No. 50-333, September 10, 1979.
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- 7. J. P. Bayne (PASNY) to D. Eisenhut (NRC), <u>Submission of Inservice</u> Inspection Report, March 18, 1981.
- 8. T. A. Ippolito (NRC) to G. T. Berry (PASNY), August 25, 1981.
- D. B. Vassallo (NRC) to L. W. Sinclair (PASNY), <u>Inservice Inspection</u> <u>Program, James FitzPatrick Nuclear Power Plant</u>, <u>Docket No. 50-333</u>, April 14, 1982.
- J. P. Bayne (PASNY) to D. B. Vassallo (NRC), JPN-82-52, <u>Inservice</u> <u>Inspection Program - Request for Additional Information, James</u> FitzPatrick Nuclear Power Plant, Docket No. 50-333, June 21, 1982.
- 11. E. L. Zuffelt (PASNY) to G. A. Freund, TS-82-263, August 20, 1982.