

VERMONT YANKEE NUCLEAR POWER STATION
INSERVICE INSPECTION PROGRAM
TECHNICAL EVALUATION REPORT

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Science Applications, Inc.
McLean, Virginia 22102

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TECHNICAL EVALUATION REPORT
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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, Vermont Yankee Nuclear Power Corporation (VYNPC), of Vermont Yankee. It deals only with the 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

*Hereinafter referred to as Section XI or Code.



a later edition and addenda of Section XI. The updating intervals were extended from 40 months to 120 months to be consistent with intervals as defined in Section XI.

For plants with Operating Licenses issued prior to March 1, 1976, the provisions of the November 1, 1979, revision are effective after September 1, 1976, at the start of the next one-third of the 120-month interval. During the one-third of an interval and throughout the remainder of the interval, inservice examinations shall comply with the latest edition and addenda of Section XI, incorporated by reference in the regulation, on the date 12 months prior to the start of that one-third of an interval. For Vermont Yankee Nuclear Power Station, the ISI program and the relief requests evaluated in this report cover the last 60 months of the current 120-month inspection interval; i.e., from November 30, 1977,* to November 29, 1982. 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 U.S. 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 (16) listed at the end of this report pertain to previous information transmittals on ISI between the licensee and the NRC. 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

*Because of the relatively new ISI requirements at the time of its commercial operation, Vermont Yankee was permitted by virtue of its approved technical specifications, to have its first 40-month inspection program completed in 60 months. Hence, the second 40-month period started November 30, 1977.



guidance were made by the licensee on May 13, 1976,⁽²⁾ April 29, 1977,⁽⁴⁾ December 27, 1977,⁽⁶⁾ December 29, 1977,⁽⁷⁾ January 30, 1979,⁽⁸⁾ April 25, 1979,⁽¹⁰⁾ and April 30, 1979.⁽¹¹⁾ The December 29, 1977,⁽⁷⁾ and the January 30, 1979,⁽⁸⁾ letters submitted for approval, proposed changes to Vermont Yankee's technical specifications. Revisions to the ISI Program Document⁽¹¹⁾ were made on June 25, 1979, October 18, 1979, May 13, 1980, June 27, 1980, October 1, 1980, and December 21, 1981. By letter of March 12, 1982,⁽¹⁵⁾ the NRC requested additional information to complete this review. This information was furnished by the licensee on April 14, 1982.⁽¹⁶⁾

From these submittals a total of 27 requests for relief from Code requirements or for updating to a later code were identified. These requests are evaluated in the following sections of this report. In addition to those evaluated, the licensee has withdrawn one relief request (H-8, Fuel Pool Cooling and Cleanup Lines, Class 3) during the preparation of this report.



I. CLASS 1 COMPONENTS

A. Reactor Vessel

1. Requests for Relief B-1 and B-2, Reactor Vessel Pressure Retaining Welds, Categories B-A and B-B, Items B1.1 and B1.2

Code Requirement

Category B-A: Volumetric examination of the shell longitudinal and circumferential welds (in the core region) may be performed at or near the end of each inspection interval and 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.

Category B-B: This category includes vessel shell welds not in Category B-A or B-C and all head welds. The volumetric examinations performed during each inspection interval 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.

Code Relief Request

Relief is requested from the volumetric examination of the longitudinal and circumferential welds in the core beltline region (B-A) and the circumferential and meridional seam welds on the bottom head (B-B).

Proposed Alternative Examination

The vessel is hydrostatically tested before startup after each refueling outage.

Licensee Basis for Requesting Relief

The Category B-A welds are inaccessible due to vessel insulation and bio-shield configuration. There are approximately 8-1/2 inches from the outside of the insulation to the inner shield wall. The insulation is approximately 4-inches thick and 1-inch from the vessel wall. Access to the insulation for removal is through the nozzle ports (away from beltline region). The bottom head Category B-B welds are inaccessible due to the mirror insulation configuration. Insulation rests above a steel support frame under the bottom head. CRD penetrations protruding down through framework also limit access to head.

Evaluation

Imposition of the Code requirements would necessitate the removal of portions of the biological shield and the permanently installed insulation to perform the required examination from the vessel exterior of the Category B-A welds and B-B welds on the bottom head.



The reactor vessel is presently being monitored for radiation damage in the beltline region by a surveillance program that meets the intent of Appendix H, 10 CFR 50. Any changes in the fracture toughness properties of vessel material over its service lifetime would be detected and corrective action could be taken to minimize the risk of material failure.

It is currently planned to perform the Code-required examinations on seven Category B-B welds on the top head (6 meridional, 1 circumferential), two longitudinal Category B-B shell welds, and two Category B-C welds (head-to-flange and vessel-to-flange). These examinations should provide an indication of the condition of the welds for which relief is requested since they are in a similar environment. During 1983 refueling outage, the licensee proposes to investigate the possibility of performing remote visual examinations of the inaccessible welds.

Adhering to Category B-A code requirements is impractical due to existing plant design and geometry. To maintain the extent of examination, however, an alternative inservice inspection program of both volumetric and visual examinations should be implemented. The volumetric examination of accessible Category B-B welds should be increased to achieve 1) an examination sample whose total weld length is equal to that required for the Category B-A and B-B welds for which relief was requested, or 2) 100% of the length of each accessible Category B-B weld, whichever is less. In addition, visual examination for gross leakage as proposed by the licensee should be performed during each system pressure test in accordance with IWB-1220(c).

Conclusions and Recommendations

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

Relief should be granted from volumetric examination of the identified welds for the 10-year inspection interval with the following provisions:

- (a) The examination of the accessible Category B-B welds should be increased to achieve 1) an examination sample whose total weld length is equal to that required for the Category B-A and B-B welds for which relief was requested, or 2) 100% of the length of each accessible Category B-B weld, whichever is less.
- (b) General visual examinations per IWB-1220(c) should be made during each system pressure test for evidence of leakage in the areas of the lower head and the shield annulus below the vessel.

References

References 11 and 16.



Science Applications, Inc.

2. Request for Relief B-3; Primary Nozzle to Vessel Weld,
Nozzle N-15, Category B-D, Item B1.4

Code Requirement

The extent of volumetric examination of each nozzle shall cover 100% of the volume to be inspected as shown in Figure IWB-2500D of the Code. All nozzles shall be examined during each inspection interval.

Code Relief Request

Relief is requested from the volumetric examinations required by the code on the vessel drain nozzle, N-15.

Proposed Alternative Examination

This nozzle is included as an instrument line and is visually inspected for leakage during the vessel hydrostatic test every refueling outage.

Licensee Basis for Requesting Relief

Nozzle N-15 is located just off the center of the bottom head. N-15 is inaccessible due to mirror insulation configuration and the nozzle's location amidst a forest of control rod drives.

Evaluation

Nozzle N-15 is physically inaccessible, being surrounded by control rod drive nozzles, making examination of this nozzle impractical.

This nozzle is one of 30 on the reactor vessel; the other 29 nozzles are planned to be examined to Code requirements. All the nozzles are subject to similar environmental conditions. The Code examination of the 29 accessible nozzles and a visual examination of all bottom head nozzles during system pressure tests should provide adequate information as to the integrity of Nozzle N-15.

Conclusions and Recommendations

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

Relief should be granted from the Code-required volumetric examinations of this nozzle. General visual examinations per



IWB-1220(c) should be required, however, during each system pressure test for evidence of leakage in the area of the lower head.

References

Reference 11.

3. Request for Relief B-8; Reactor Vessel Integrally Welded Supports, Category B-H, Item B1.12

Code Requirement

In the case of vessel support skirts, the volumetric examination performed during each inspection interval shall cover at least 10% of the circumference of the weld to the vessel. In the case of support lug attachments, 100% of the welding to the vessel shall be volumetrically examined.

Code Relief Request

Relief is requested from volumetric examination of the integrally welded reactor vessel supports.

Proposed Alternative Examination

Surface and visual nondestructive examinations (NDE) will be performed on the upper portion of each stabilizer each inspection interval.

Licensee Basis for Requesting Relief

The reactor vessel skirt is uninspectable for two primary reasons:

- (1) The covering mirror insulation is structured in a manner that is not removable since there are many support members and locked, interconnecting insulation pieces. The weld is available only through a removable inspection panel that is nine feet below, with 8-1/2 inches of parallel wall clearance between weld and insulation.
- (2) Radiation levels inside the bio-shield wall, against the bottom head are 1-10 R/hr. Estimated personnel exposures would be 10-100 man-rem during the insulation removal, examination and insulation replacement process.



The reactor vessel stabilizer brackets are attached with vee-prep fillet-type welds. An ultrasonic examination (UT) of these welds would not be useful. The bottom side of the stabilizer weld is inaccessible due to its location at the top of the bio-shield wall.

Evaluation

Access to the reactor vessel integrally welded supports is impeded by the reactor vessel insulation, structural support components, and the biological shield. Performing volumetric examinations on the welds which are at least partially accessible requires much more setup and examination time in a radiation field than does surface NDE. The resulting personnel exposure would be excessive. The licensee has committed to subject these welds to surface and visual examinations. Based on the geometry and loading conditions of these partial penetration welds, any flaws would most likely be generated at the weld surface and thus be detectable by surface examination.

Conclusions and Recommendations

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

Relief should be granted from the Code-required volumetric examinations on the integrally welded supports, provided that all the accessible welds in Item B1.12 are examined visually and by surface NDE techniques.

References

Reference 11.



Science Applications, Inc.

B. Pressurizer
Not applicable to BWRs.

C. Heat Exchangers
No relief requests.

D. Piping Pressure Boundary

1. Request for Relief B-7; Piping to Fitting Welds, Category B-F, Item B4.1; and Category B-J, Items B4.5, B4.6 and B4.7

Code Requirement

Category B-F: The volumetric and surface examinations performed during each inspection interval shall cover the circumference of 100% of the welds.

Category B-J: The volumetric and/or surface examinations performed during each inspection interval shall cover all of the area of 25% of the circumferential joints including the adjoining 1-foot sections of longitudinal joints and 25% of the pipe branch connection joints.

Code Relief Request

For circumferential weld joints between piping and valves, elbows, reducers, etc., relief is requested to perform ultrasonic examinations from the pipe side of each weld only.

Proposed Alternative Examination

The licensee expects acceptable test results from the pipe side of the weld and base metal.

Licensee Basis for Requesting Relief

Ultrasonic examination can be performed from the pipe side of the weld only. Geometries of the fittings prohibit meaningful ultrasonic results.

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 1973 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.

Article III-4420 of the 1977 Code, Summer 1978 Addenda, provides for the angle beam JT of welds from one side only, using a full V-path. The required angle beam calibration is given in Article III-3230.

Updating to the 1977 Code, Summer 1978 Addenda, for piping examination per IWA-2232 would allow the licensee to perform the proposed alternative examinations on the subject welds in accordance with Appendix III without the need for relief from Code requirements. All the requirements of IWA-2232 (Appendix III) should be met, including modifications to existing calibration blocks where required. The licensee also has requested (see V.A.1 of this report) to use Appendix III for all piping examinations.

Recommendations

Based on the compliance of the proposed alternative examinations with Appendix III of the 1977 Code, Summer 1978 Addenda, approval should be given, pursuant to 10 CFR 50.55a(g)(4)(iv), to update to that code for performing these piping examinations. The update should be to paragraph IWA-2232 of the newer code. This paragraph implements Appendix III for applicable welds. All the requirements of IWA-2232 (Appendix III) should be met, including modifications of existing calibration blocks where required.

References

Reference 11.



2. Request for Relief B-9; Primary Containment Penetration Process
Pipe to Flued Head Welds, Category B-J, Item B4.5

Code Requirement

The volumetric examinations performed during each inspection interval shall cover all of the area of 25% of the circumferential joints including the adjoining 1-foot sections of longitudinal joints and 25% of the pipe branch connection joints.

Code Relief Request

Relief is requested from the volumetric examination of the circumferential pipe to flued head welds in the following containment penetrations:

1. Main Steam A, B, C and D -- 18"
2. Feedwater A and B -- 16"
3. RHR A Supply -- 20"
4. RHR B and C Return -- 24"
5. HPCI Steam Supply -- 10"
6. RCIC Steam Supply -- 3"
7. Core Spray A and B -- 8"
8. Head Spray -- 4"

Proposed Alternative Examination

During the primary coolant boundary hydrostatic pressure test at or near the end of each 10-year inspection interval, visual inspection from within the primary containment will be performed to detect leakage from internal welds. In addition, routine surveillance of process monitoring instrumentation will detect significant leakage during reactor operation.

Licensee Basis for Relief

Each of the above lines enters the primary containment via a penetration assembly. In each case the Class 1 process pipe has one circumferential pressure retaining weld which is inaccessible for ultrasonic examination. In addition, the complex design of the penetration makes double-wall radiography extremely difficult and unreliable. Meaningful volumetric examination of these welds is not possible.

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 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 should be volumetrically examined, where practical, over 100% of its length during each inspection interval. Such an examination would maintain sample size. Also, the licensee should conduct visual examinations at these penetrations as proposed.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the code requirements are impractical. It is further concluded that the alternative examination discussed above will provide necessary added assurance of structural reliability. Therefore, 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

Reference 11.



3. Request for Relief B-4; Miscellaneous Class 1 Piping Integrally Welded Attachments, Category B-K-1, Item B4.9

Code Requirement

The volumetric examinations performed during each inspection interval shall cover 25% of the integrally welded supports.

Code Relief Request

Relief is requested from the code requirement to volumetrically examine 37 integrally welded pipe attachments for pipe hangers in Class 1 systems.

Proposed Alternative Examination

Surface and visual NDE will be performed on the integral attachment welds.

Licensee Basis for Requesting Relief

Supports are attached by partial penetration welds.

Evaluation

Because of weld design, the volumetric examination required by the code is impractical. As an alternative, the licensee has proposed to subject these welds to surface and visual NDE. Based on the loading conditions of these types of welds, any flaws would most likely be generated at the weld surface and thus be detectable by surface examination.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the code requirements are impractical. It is further concluded that the alternative examinations 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 above integrally welded attachments, provided that these welds are examined by surface and visual NDE methods according to the prescribed schedule.

References

Reference 11.



E. Pump Pressure Boundary

1. Request for Relief B-6; Pump P-18-1A and P-18-1B Casings, Category B-L-2, Item B5.7

Code Requirement

Pump internal pressure boundary surfaces are to be visually examined. 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 casings.

Proposed Alternative Examination

The pump casings will be examined if and when the pumps are disassembled for maintenance.

Licensee Basis for Requesting Relief

The Code requirement is for visual inspection of one component in each group during each inspection interval. Disassembly of a pump which has been functioning within acceptable parameters for the sole purpose of inspection is contrary to good maintenance practices, since the likelihood of failure may be increased. Furthermore, these components are subjected to an alternate form of performance and/or leakage monitoring, such as inservice pump and valve testing, Appendix J leak rate testing, or primary coolant system leak detection. The pumps in this category are constructed of cast austenitic stainless steel which has been identified as unlikely to experience failure by cracking. Finally, considering the uncertain benefit involved, it is difficult to justify the additional radiation exposure which would be incurred (estimated at 410 man-rem per pump).

Evaluation

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

The disassembly of the reactor recirculation pumps to the degree necessary to examine the internal pressure-retaining surfaces is a major effort, involving large personnel exposures and the generation of large amounts of radioactive waste. In view



of the effort required to disassemble a pump, the information returned from visual examination of its internal surfaces would be marginal.

The licensee has committed to the concept of visual examination if a 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 examinations of internal pump 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 should submit a new relief request at that time.

Conclusions and Recommendations

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

- (1) Relief should not be granted at this time from the visual examination of the internal surfaces of the reactor recirculation pumps at the pressure boundaries.
- (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 11 and 16.



Science Applications, Inc.

2. Request for Relief B-4; Integrally Welded Attachments to Pumps,
Category B-K-1, Item B5.4

Code Requirement

The volumetric examinations performed during each inspection interval shall cover 25% of the integrally welded supports.

Code Relief Request

Relief is requested from the code requirement to volumetrically examine 12 integrally welded attachments for pump supports in Class 1 systems.

Proposed Alternative Examination

Surface and visual NDE will be performed on the integral attachment welds.

Licensee Basis for Requesting Relief

Supports are attached by partial penetration welds.

Evaluation

Because of the geometry of these partial penetration welds, the volumetric examination required by the Code is impractical. As an alternative, the licensee has proposed to subject these welds to surface and visual NDE. Based on the loading conditions of these types of welds, any flaws would most likely be generated at the weld surface and thus be detectable by surface examination.

Conclusions and Recommendations

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

Relief should be granted from the volumetric examination of the above integrally welded attachments, provided that these welds are examined by surface and visual NDE methods according to the prescribed schedule.

References

Reference 11.



F. Valve Pressure Boundary

1. Request for Relief B-5; Class 1 Valve Bodies, Category B-M-2, Item B6.7

Code Requirement

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 visually examined during each inspection interval. This examination may be performed on the same valve selected for the Category B-M-1 examination.

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 Class 1 valve bodies as shown on Table F-1.

Proposed Alternative Examination

Valve bodies shall be inspected if and when valves are disassembled for maintenance or other purposes.

Licensee Basis for Requesting Relief

The Code requirement is for visual inspection of one component in each group during each inspection interval. Disassembly of a valve which has been functioning within acceptable parameters for the sole purpose of inspection is contrary to good maintenance practices, since the likelihood of failure may be increased. Furthermore, all of these components are subjected to an alternate form of performance and/or leakage monitoring, such as inservice valve testing, Appendix J leak rate testing, or primary coolant system leak detection. All valves in this category are constructed of cast austenitic stainless or carbon steels, which have been identified as unlikely to experience failure by cracking. Finally, considering the uncertain benefit involved, it is difficult to justify the additional radiation exposure which would be incurred. (Average exposure per valve is 39 man-rem; maximum for a valve is 272 man-rem.)

With the exception of valves in Groups 10 and 11, which are periodically removed from service in accordance with the plant's Technical Specifications, valves are normally disassembled only when they give indications of degraded performance. While components in roughly half of the groups have been made available during the first ten years of plant operation for inspection at a frequency which meets or exceeds Code requirements, others have never been disassembled to date, and there is no certainty that future maintenance activities will



TABLE F-1. Class 1 Valve Bodies

Component Group	Component Identification	Estimated Man-Hours (each valve)	Estimated Man-Rem (each valve)
1	V2-43A & B	120 (136 if seal weld is replaced)	108.0 (122.0)
		120 (136 if seal weld is replaced)	108.0 (122.0)
2	V2-65A & B	120 (136 if seal weld is replaced)	240.0 (272.0)
3	V2-28A & B	96	7.5
4	V2-29A & B	90	7.0
5	V23-15	72	5.5
	V23-16	90	0.9
6	V14-12A & B	72	4.5
7	V14-13A & B	60	6.0
8	V14-14A & B	120	12.0
9	V2-80A thru D	104	8.5
	V2-86A thru D	80	6.5
10	SV2-70A & B	96	14.0
11	RV2-71A thru D	76	11.5
12	V10-17	72	1.5
13	V10-18	120	72.0
14	V10-25A & B	72	1.5
15	V10-46A & B	120	72.0
16	V10-81A & B	136 (152 if seal weld is replaced)	81.0 (91.0)
	V10-88	136 (152 if seal weld is replaced)	81.0 (91.0)
17	V10-27A & B	72	1.5
18	V2-27A	72	0.7
(New Group)	V2-96A	72	0.7



result in disassembly of one component per group during each inspection interval. In our estimation, 10 years of plant operation have shown that established monitoring practices in this area are adequate to protect the public health and safety.

Evaluation

The visual examination specified is to determine whether unanticipated severe degradation of the body is occurring due to phenomena such as erosion or corrosion. However, the disassembly of large valves to the degree necessary to inspect the internal pressure retaining surfaces (bodies) is a major effort in terms of exposure to personnel and radioactive waste generation. To do this disassembly solely to perform a visual examination of the internal surfaces is impractical.

The licensee has examined valves in roughly half the groups. This relief request covers the remaining groups. The licensee has committed to the concept of visual examination if a valve is disassembled for maintenance. However, the end of this interval is November 29, 1982. It is apparent that relief is justified for the first inspection interval.

For subsequent intervals, specific relief should be requested toward the end of each interval for each group of valves in which no valve was disassembled for maintenance and Code examined.

For those inspection intervals when valve maintenance does not occur (as in the case of the interval considered in this report), visual examinations should be performed when the system pressure tests (IWA-5000) are conducted in accordance with the requirements for Category B-P.

Conclusions and Recommendations

Based upon the above evaluation, it is concluded that for the valves discussed above and for the inspection interval considered in this report, the Code requirements are impractical. It is further concluded that the alternative visual examination discussed will provide necessary added assurance of structural reliability. Therefore, the following is recommended:

Relief should be granted from the Code required internal visual examinations on the subject valves for the inspection interval ending in 1982. The valves should be examined during system hydrostatic tests as proposed in accordance with Category B-P.

During future inspection intervals, the licensee should submit specific relief requests as the end of the inspection



interval approaches for each valve group if a valve has not been disassembled for maintenance and examined.

References

References 11 and 16.



Science Applications, Inc.

II. CLASS 2 COMPONENTS

A. Pressure Vessels

1. Request for Relief C-1; Residual Heat Removal (RHR) Heat Exchanger Nozzle Welds, Category C-B, Item C1.2

Code Requirement

The volumetric examination shall cover 100% of the nozzle-to-vessel attachment weld.

Code Relief Request

Relief is requested from the volumetric examination of the nozzle-to-vessel welds on the RHR heat exchangers.

Proposed Alternative Examination

Surface and visual examinations shall be performed on the reinforcement saddle-to-nozzle and reinforcement saddle-to-vessel welds.

Licensee Basis for Requesting Relief

Nozzle design configuration prohibits useful volumetric examination of the nozzle welds since each weld is 100% covered by a reinforcement saddle.

Evaluation

Volumetrically examining the subject welds is impractical because they are covered by a reinforcement saddle that is not bonded to the weld surface. This configuration would return poor UT results. The welds that attach the saddle to the nozzle and vessel are fillet type welds whose configurations would also return poor UT results. The licensee's proposed alternative examination should provide adequate assurance of nozzle integrity.

Conclusions and Recommendations

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

Relief should be granted from the code examinations for the subject welds, provided that the saddle-to-vessel and saddle-to-nozzle welds are surface and visually examined according to the prescribed schedule.

References

Reference 11



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2. Request for Relief B-7; Piping to Fitting Welds, Category C-F, Items C2.1, C2.2 and C2.3; and Category C-G, Items C2.1, C2.2 and C2.3

The request for relief to perform volumetric examinations of pipe-to-fitting joints from one side only (see I.D.1 of this report) applies here. Therefore, the following is recommended:

Based on the compliance of the proposed alternative examinations with Appendix III of the 1977 Code, Summer 1978 Addenda, approval should be given, pursuant to 10 CFR 50.55a(g)(4)(iv), to update to that code for performing these piping examinations. The update should be to paragraph IWA-2232 of the newer code. This paragraph implements Appendix III for applicable welds. All the requirements of IWA-2232 (Appendix III) should be met, including modifications of existing calibration blocks where required.



III. CLASS 3 COMPONENTS

No relief requests.

IV. PRESSURE TESTS

A. General

1. Request for Relief H-3; All Uninsulated Safety Class 1, 2 and 3 Systems

Code Requirement

IWA-5210(a): The pressure-retaining components shall be visually examined while the system is under the hydrostatic test pressure and temperature. The test pressure and temperature shall be maintained for at least four hours prior to the performance of the examinations.

Code Relief Request

Relief is requested from the code requirement to hold test pressure for four hours prior to visual examination of uninsulated Safety Class 1, 2 or 3 piping.

Proposed Alternative Examination

The duration of hydrostatic test holding time prior to examination for all uninsulated Safety Class 1, 2 and 3 Systems will be 10 minutes.

Licensee Basis for Requesting Relief

Later editions of the ASME Boiler and Pressure Vessel Code permit "components wherein both the base metal and weld deposit are exposed for visual examination" to be subjected to a minimum test time of 10 minutes.

Evaluation

The licensee should update to the 1977 Code, Summer 1978 Addenda, which would allow a 10-minute hold time for uninsulated Class 1, 2 and 3 piping/components during pressure tests.

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.

Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda. This approval would allow a 10-minute hold time for the subject uninsulated piping during pressure tests.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



② Request for Relief H-7; Containment Air Sampling Lines, Class 2 and 3

Code Requirement

Class 2 - IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Class 3 - IWD-5200(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code requirements to pressure test the containment air sampling system.

Proposed Alternative Examination

Containment isolation piping and valves are tested during the 44 psig Type A test. Other portions are in a normally operating condition. Routine operator surveillance would detect evidence of leakage.

Licensee Basis for Requesting Relief

The system is designed for air. All lines are less than 1-inch and have no access for a test connection.

Evaluation

The lack of a test connection is insufficient justification for not pressure testing a section of piping that is covered by the code. Therefore, some form of test connection should be provided. That, plus updating to the 1977 Code (S-78 Addenda), would eliminate the need for relief from code requirements.

By updating to the 1977 Code, Summer 1978 Addenda, the licensee can pressure test the portions of this system covered by the code using air as the working fluid. Any portions that provide containment isolation and are not isolable from the containment atmosphere would appropriately be pressure tested along with the containment vessel during the proposed leak test. Pressure testing the remainder of that part of the system covered by the code can be done to less stringent pressures than those required by the 1974 Code.

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.

Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, the licensee should test any portion of the containment air sampling that is covered by the Code, installing any test connections required. Also, 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.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



B. Class 1

None.

C. Class 2

1. Request for Relief H-1; All Safety Class 2 Systems

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

IWA-5230: The system leakage test and system hydrostatic pressure test shall be conducted at a test temperature that will satisfy the following requirements ...

(b)(2): ...as required, to meet the fracture toughness criteria applicable to ferritic materials of system components as specified by the enforcement authorities having jurisdiction at the plant site.

Code Relief Request

Relief is requested from the code requirement to raise Class 2 system temperatures to a minimum of 100°F for hydrostatic tests.

Proposed Alternative Examination

Normal system water sources will be used to fill the lines and conduct the hydrostatic test.

Licensee Basis for Requesting Relief

Unless normal system temperature is near the required test temperature, the required test temperature cannot be achieved without heating the water. Vermont Yankee has no means of heating the water through the test pumps.

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.

The temperature specification in the 1977 Code (S-78 Addenda) is at the discretion of the owner (IWC-5230(b)), effectively allowing Class 2 systems to be hydrotested at ambient temperatures. Updating to the 1977 Code (S-78 Addenda) would eliminate the need for relief from code requirements.

Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda. This approval would allow testing of Class 2 systems using water at ambient temperature.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



2. Request for Relief H-2; Containment Atmospheric Control System,
Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the code requirement to pressure test the containment atmospheric control system to 1.25 P_D (125 psig).

Proposed Alternative Examination

Containment isolation piping and valves are tested for integrity during the 44 psi, type A leak test.

Licensee Basis for Requesting Relief

System is designed for air. The only means of isolating the system for a pressure test is with single check or butterfly valves which will not hold back a 125 psig hydrostatic pressure.

Evaluation

Updating to the 1977 Edition, Summer 1978 Addenda, would allow the use of air as the pressure test medium (IWC-5210(b)) and would also allow a less restrictive test pressure (IWC-5222(a)). The licensee should update to the newer Code for pressure tests. This should eliminate the need for relief. However, if any undesirable effects on boundary valves are identified under the updated test procedure, they would provide the basis for future relief requests.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda. Any relief needed from the new Code requirements should be requested based upon the new test pressure/procedure.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



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3. Request for Relief H-4; Reactor Cleanup Water Discharge Line (CUW-55) Safety Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the Code requirement to pressure test the portion of line CUW-55 between valves V12-62 and V12-63 to 1.25 times P_D .

Proposed Alternative Examination

The portion of line CUW-55 between valves V12-62 and V12-63 will be included in the 1.1 times P_D test of the Class 3 line, CUW-54.

Licensee Basis for Requesting Relief

The portion of CUW-55 between V12-63 and V12-62 cannot be isolated from the Safety Class 3 line CUW-54. Extending the 1.25 times P_D test boundary beyond V12-63 would overpressurize CUW-54.

Evaluation

Articles IWC-5222(a) and IWD-5223(a) of the 1977 Code (S-78 Addenda) both provide for a piping section to be tested according to the setting of the lowest set relief valve that protects it. Since this piping section is apparently unisolable from the Class 3 piping, the relief valve in that Class 3 piping also protects the piping in question. Therefore, updating to the newer code accomplishes the objective of allowing the subject piping to be tested with the upstream Class 3 piping, and relief from Code requirements would not be needed.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

References 11 and 16.



4. Request for Relief H-5; Residual Heat Removal (RHR) Pump Casing and Discharge Lines, Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the code requirement to pressure test the RHR pump casings and immediate discharge lines (to first isolation valves) at the same test pressure as the RHR system lines downstream.

Proposed Alternative Examination

The discharge lines from the pump to V10-47A&B and portions of minimum flow bypass lines RHR-14 A-D to V10-16A&B will be tested under the lower test pressure of RHR suction.

Licensee Basis for Requesting Relief

Inclusion of these 450 psi discharge lines in the 1.25 times P_D test boundary requires isolation on the suction side of the pumps. This in turn includes the intervening 150 psi suction lines in the high pressure test.

Evaluation

The 1977 Code, Summer 1978 Addenda, allows the suction and discharge piping of a centrifugal pump, up to the first isolation valve, and the pump casing to be included in the pressure test for the suction lines. Updating to the newer Code would eliminate the need for relief from Code requirements.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

References 11 and 16.



5. Request for Relief H-6; Service and Instrument Air System,
Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the code requirement to pressure test this system.

Proposed Alternative Examination

Containment isolation piping and valves are tested during Type A leak test every 3-1/3 years. Instrument air is subject to normal system pressure of approximately 100 psi, which is significantly greater than the 44 psi required for containment isolation.

Licensee Basis for Requesting Relief

The system is designed for air. The introduction of water may be detrimental to system operation. Instrument air is isolated by check valves, not designed for hydro integrity.

Evaluation

The licensee's proposed alternative examination is inadequate to provide the same information that is given by a hydrostatic test as to the integrity of these air lines. This is recognized in the 1977 Code, Summer 1978 Addenda, which makes a clear distinction between leak tests at normal operating pressures and hydrostatic tests at higher than normal pressures. The containment leak test provides no information on the integrity of any process pipe whose normal system pressure is greater than the test pressure.

Updating to the 1977 Code (S-78 Addenda) however, allows (a) the use of air as the pressure test working fluid (IWC-5210(b)) and (b) the use of the lowest relief valve setting in determining the test pressure (IWC-5222(a)). The whole system can be pneumatically tested using the above code requirements without using any check valves for test boundary valves. This would eliminate the need for relief from any code requirements.

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.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



6. Request for Relief H-13; Portions of the Drywell Sump Pump Discharge Lines, Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the code requirement to pressure test those portions of the drywell sump pump discharge lines from the containment penetration to second outboard containment isolation valve.

Proposed Alternative Examination

The lines are subjected to a yearly 44 psig Type C leak test and a Type A leak test approximately every three years.

Licensee Basis for Requesting Relief

The safety function of the piping is to contain the drywell atmosphere. It forms part of the primary containment isolation system. Hydrostatic testing is not appropriate.

Evaluation

Because these lines may carry radioactively contaminated water and are subject to the shut-off pressure of the drywell sump pumps, they should be tested to the code requirements for pressure tests. Updating to the 1977 Code (S-78 Addenda), however, would allow testing at less restrictive pressures. The newer code also gives better guidance on the pressure testing of pumps and their suction and discharge lines.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

References 11 and 16.



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7.

Request for Relief H-14; Containment Air Dilution System, Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from the code pressure test of the portions of the containment air dilution system from the primary containment penetration to the second outboard containment isolation valve.

Proposed Alternative Examination

The containment isolation portions of the system are subjected to a 44 psig Type A leak test every 3 1/3 years.

Licensee Basis for Requesting Relief

The system is designed for air. Introduction of water may be detrimental to system operation.

Evaluation

The licensee, by updating to the 1977 Code, Summer 1978 Addenda, can pressure test the portions of this system covered by the Code using air as the working fluid. Any portions which provide containment isolation and which are unisolable from the containment atmosphere would appropriately be pressure tested along with the containment vessel during the proposed leak test. Pressure testing the remainder of that part of the system covered by the Code can be done to less stringent pressures. Updating to the newer code would eliminate the need for relief.

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.



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Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.

8. Request for Relief H-15; Standby Liquid Control, Class 2

Code Requirement

IWB-5222(a): The system hydrostatic test shall be performed at a test pressure that, for the component located at the highest elevation in the system, is not less than 1.10 times the system nominal operation pressure (P_0) which corresponds with 100% rated reactor power, and at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested to perform the pressure test on the test connection of the standby Liquid Control System downstream from V11-16 according to the Class 1 test requirements rather than the Class 2 requirements.

Proposed Alternative Examination

The test connection is hydrostatically examined during the Safety Class 1 vessel hydro.



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Licensee Basis for Requesting Relief

Inclusion of this connection in the test boundary requires pressurization of SLC-11 to V11-18. SLC-11 is a Safety Class 1, 1,275 psi line. Subjecting this line to the 1,875 psig Safety Class 2 hydrostatic test pressure would cause over-pressurization.

Evaluation

Updating to the 1977 Code (S-78 Addenda) requirements for Class 2 systems would still require the test pressure in this section of pipe to be greater than the primary hydro pressure. It would be impractical to impose the Class 2 test requirements of either edition of the code on this piping. Alternatively, the subject piping should be included in the Class 1 test boundary of the primary system.

Conclusions and Recommendations

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

Relief should be granted from the applicable Class 2 Code requirements to pressure test this piping, provided that the piping section is tested according to the applicable Class 1 requirements.

References

Reference 11.



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9. Request for Relief H-16; Standby Gas Treatment System, Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from performing the code-required pressure testing on the Standby Gas Treatment (SBGT) System containment purge lines up to the SBGT units.

Proposed Alternative Examination

The containment isolation portions of the system are tested during the 44 psig Type A leak test every 3 1/3 years. The ductwork portions of the system are outside the scope of the ASME Code.

Licensee Basis for Requesting Relief

The system is designed for air, not for hydro integrity. The introduction of water may be detrimental to system operation.

Evaluation

The licensee, by updating to the 1977 Code, Summer 1978 Addenda, can pressure test the portions of this system covered by the Code, using air as the working fluid. Any portions that provide containment isolation and are not isolable from the containment atmosphere would appropriately be pressure tested along with the containment vessel during the proposed leak test. Pressure testing the remainder of that part of the system covered by the Code can be done to less stringent pressures. Updating to the newer Code would eliminate the need for relief.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



10. Request for Relief H-18; Control Rod Drive (CRD) Hydraulic Piping, Class 2

Code Requirement

IWC-5220(a): The system hydrostatic test pressure shall be at least 1.25 times the system design pressure (P_D) and conducted at a test temperature not less than 100°F except as may be required to meet the test temperature requirements of IWA-5230.

Code Relief Request

Relief is requested from performing the code-required pressure testing on the CRD drive water piping and hydraulic control units.

Proposed Alternative Examination

Substantial portions of this piping will experience a hydrostatic test pressure of 1018 psig during the reactor vessel hydro. The balance of the system functions at a normal operating pressure 20-40 psig greater than reactor pressure, and any evidence of leakage would be detected by routine operator surveillance.

Licensee Basis for Requesting Relief

Isolation of this piping for hydrostatic testing is impractical due to the large number of valves to be realigned, and could represent a potential safety hazard if any of these valves are inadvertently left in the test position.

An additional justification for not hydrostatically testing the CRD Hydraulic Control Units and associated piping at 2188 psig ($1.25 \times P_D$) would be the possibility of damage to inline components such as H₂O accumulators, air-operated scram valves, and various filter and instrumentation components which cannot practically be removed or valved out.

We believe that, since all piping and components in the Hydraulic Control Units experience elevated pressures (1000-1460 psig) either constantly or intermittently during plant operation, any evidence of leakage would be readily detected by routine operator surveillance.

Evaluation

The safety implications of a pressure boundary failure in the CRD hydraulic system go beyond normal loss of coolant concerns. A rupture in these lines could result in a loss of reactivity control, and may even lead to an undesirable reactivity addition



accident with attendant power excursion. For this reason, the CRD hydraulic system should be pressure-tested to the full extent of the applicable Class 2 Code requirements.

The risk of leaving one or more system valves in test position (as concerns the licensee) could be minimized by adequate administrative controls for valve tag-outs and pre-startup valve alignments. The risk of damaging certain system components should be minimized by using the test requirements of the 1977 Code (S-78 Addenda). The newer code allows the use of relief valve setpoints as the basis for determining test pressures. The test pressures determined using the newer code are intended to prevent damage to the included piping and components. The licensee should then update to the 1977 Code (S-78 Addenda) for pressure testing this system.

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.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

References 11 and 16.



Science Applications, Inc.

D. Class 3

1. Request for Relief H-9; Service Water System, Class 3

Code Requirement

IWD-5220(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code requirement to pressure test the service water return subsystem.

Proposed Alternative Examination

The visible portions of the service water system are observed during normal operation. The system runs approximately 100% of the time. Routine operator surveillance would detect evidence of leakage or degradation of support component capabilities.

Licensee Basis for Requesting Relief

It is possible to alternately shut down each of the two supply subsystems for purposes of hydrostatic testing, but the return subsystems, which join to form a common return line, must remain operational because the system must dissipate heat loads during all modes of operation. During shutdown, Service Water is required to cool the Residual Heat Removal heat exchangers which provide shutdown cooling to the reactor vessel, and the Reactor Building Closed Cooling Water heat exchangers which in turn provide cooling to the Fuel Pool Cooling heat exchangers. To compromise either of these capabilities by total shutdown of the Service Water System would not be conservative.

Evaluation

Configuring the plant to allow the total shutdown of the service water system would require excessive downtime of the plant. Also, a failure in the return section of the system would not prevent the cooling of vital components. Thus, securing the system solely for performing the Code-required pressure test is considered impractical. There are times, however, when service water must be secured for component replacement or other maintenance. At least once during an



interval, whenever the system needs to be down for maintenance, the Code-required pressure test should be performed on any section that cannot be tested while the system is operating.

Conclusions and Recommendations

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

Relief should be granted from the Code requirement to pressure test the combined return line portion of the service water system since it can only be tested with the system totally shut down. If, however, the service water system needs to be totally shut down or this section of the system must be isolated for maintenance, it should be Code pressure tested.

References

References 11 and 16.



Science Applications, Inc.

2. Request for Relief H-10; Diesel Air Start System, Class 3

Code Requirement

IWD-5200(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code requirement to pressure test the diesel air start system.

Proposed Alternative Examination

The air start system is constantly under a normal "operating" pressure of 250 psi, which is checked on every operator working shift.

Licensee Basis for Requesting Relief

The system is designed for air. The introduction of water may be detrimental to the diesels and system operation.

Evaluation

The licensee's proposed alternative examination is inadequate to provide the same information that is given by a hydrostatic test as to the integrity of this air system. This is recognized in the 1977 Code (S-78 Addenda) which makes a clear distinction between leak tests at normal operating pressures and hydrostatic tests at higher than normal pressures.

Updating to the 1977 Code (S-78 Addenda) however, allows (a) the use of air as the pressure test working fluid (IWD-5210(b)) and (b) the use of the lowest relief valve setting in determining the test pressure (IWD-5223(a)). The whole system can be pneumatically tested using the above Code requirements without introducing excess water into the system and using a less restrictive test pressure. This would eliminate the need for relief from any Code requirements.

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.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

References 11 and 16.



3. Request for Relief H-11; High Pressure Coolant Injection (HPCI) Turbine Drain Lines to Exhaust Steam Drain Pot, Class 3

Code Requirement

IWD-5200(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code requirement to pressure test these drain lines according to their design pressure.

Proposed Alternative Examination

These lines can be observed during HPCI system monthly surveillance operation.

Licensee Basis for Requesting Relief

These drains are not able to be isolated from lower design pressure exhaust lines and turbine casing.

Evaluation

Article IWD-5223(a) of the 1977 Code (S-78 Addenda) provides for a piping section to be tested according to the setting of the lowest set relief valve that protects it. Since these drains are not isolable from the HPCI turbine casing, the turbine's relief valves govern the test pressure of the drain lines in question. The testing of these drain lines, then, should be conducted only in accordance with whatever pressure tests are appropriate for the HPCI turbine. Updating to the newer code would eliminate the need for relief from code requirements for these lines.

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.



Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



4. Request for Relief H-12; Diesel Fuel Oil System, Class 3

Code Requirement

IWD-5220(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code-required pressure test of the diesel fuel oil system.

Proposed Alternative Examination

The diesels are run monthly. Routine operator surveillance would detect evidence of leakage.

Licensee Basis for Requesting Relief

The system is filled with diesel fuel oil. The introduction of water may be detrimental to diesels and fuel oil system.

Evaluation

Updating to the 1977 Edition, Summer 1978 Addenda, would allow the pressure testing of the diesel fuel oil system, using fuel oil (IWD-5210(b)), and would eliminate the need for Code relief.

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.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.



To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.

5. Request for Relief H-17; Advanced Off-Gas System, Class 3

Code Requirement

IWD-5200(a): The system test pressure shall be at least 1.10 times the system design pressure.

Code Relief Request

Relief is requested from the code pressure testing of the charcoal adsorbers and interconnecting piping in the Advanced Off-Gas System.

Proposed Alternative Examination

The system operates under vacuum (13.7 psia). Leakage would result in increased flow which would be detected by flow elements located downstream of the vacuum pumps.

Licensee Basis for Requesting Relief

The system is designed for air. The introduction of water would be detrimental to system operation.

Evaluation

The licensee, by updating to the 1977 Code, Summer 1978 Addenda, can pressure-test the portions of this system covered by the Code, using air as the working fluid. Any portions that provide containment isolation and are not isolable from the containment atmosphere would appropriately be pressure tested along with the containment vessel during its leak test. Pressure testing the remainder of that part of the system covered by the Code can be done to less stringent pressures. Updating to the newer Code would eliminate the need for relief.



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.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements on hydrostatic pressure testing should not be granted. Instead, pursuant to 10 CFR 50.55a(g)(4)(iv), approval should be granted to update to the requirements of the 1977 Edition, Summer 1978 Addenda.

To comply with (c) above, the licensee should also update to the newer version of the Code for all ISI pressure testing. The newer version of the Code gives much better guidance for conducting hydrostatic pressure tests.

References

Reference 11.



V. GENERAL

A. Ultrasonic Examination Technique

1. Request for Relief G-1; Ultrasonic Examinations

Code Requirement

IWA-2232: 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.

Code Relief Request

Relief is requested to perform Code ultrasonic examinations (UT) on piping using Appendix III of the 1974 Code, Summer 1976 Addenda, vice-Appendix I, etc., as stated above. Recording levels would be at 50% of the reference level.

Proposed Alternative Examination

See relief request above.

Licensee's Basis for Requesting Relief

As described in the NRC Safety Evaluation associated with Amendment No. 45, dated June 20, 1978, the licensee's present need is primarily for the identification of service-induced flaws. Procedures written to the Summer 1976 Code meet this objective.

Evaluation

Updating to the 1977 Code, Summer 1978 Addenda, for examination of piping welds would allow the licensee to perform the proposed alternative examination using the newer IWA-2232 (Appendix III for certain piping) without the need for relief from Code requirements, or for an exemption from regulations.

Title 10, Code of Federal Regulations, Part 50, paragraph 50.55a(b)(2)(i), states that when applying the 1974 Code, only the addenda through Summer 1975 may be used. However, 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.

Conclusions and Recommendations

Approval should be given, pursuant to 10 CFR 50.55a(g)(4) (iv), to update to the 1977 Code, Summer 1978 Addenda (IWA-2232), for performing UT examinations on all applicable piping (Appendix III). All the requirements of Appendix III should be met, including modifications of existing calibration blocks where required.

References

Reference 11.



B. Exemptions

1. Class 1 Exemptions

Code Requirement

IWB-1220(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. However, in no instance may size exemption be more than 3-in. nominal pipe size.

Exemptions in Question

Various Class 1 instrument or drain lines are exempted under the above criteria if they are steam-filled and less than 4 in. nominal pipe size (NPS).

Licensee's Position

For steam-filled instrument and drain lines, any piping sized less than 4 in. NPS is said to meet the exemption criteria of IWB-1220(b)(1).

Evaluation

The licensee states that 4-in. NPS steam lines can be exempted according to IWB-1220(b)(1). That claim is in conflict with the Summer 1975 Addenda, 1974 Edition, which establishes a maximum limit of 3 in. NPS for piping and components exempted under IWB-1220(b)(1). Thus, steam lines greater in size than 3 in. NPS cannot be exempted from ISI examination based on that requirement.

Conclusions and Recommendations

All steam-filled lines exempted as requested above and greater than 3 in. nominal pipe size should be examined according to applicable Code (IWB-2000) requirements. These exemptions should not be allowed.

References

Reference 11.



2. Class 2 Exemptions

Class 2 exemptions are acceptable.

3. Class 3 Exemptions

No exemptions are defined for Class 3 systems.

C. Other

No relief requests.



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3. R. W. Reid (NRC) to R. H. Groce (YAEC), November 17, 1976.
4. J. L. French (VYNPC) to R. A. Purple (NRC), WVY 77-47, April 29, 1977.
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6. R. H. Groce (VYNPC) to NRC, WVY 77-114, December 27, 1977.
7. D. E. Vandeburgh (VYNPC) to NRC, WVY 77-115, December 29, 1977.
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11. R. H. Groce (VYNPC) to T. A. Ippolito (NRC), WVY 79-51, Original ISI Program Document, April 30, 1979; and Revisions dated: 6/25/79, 10/18/79, 5/13/80, 6/27/80, 10/1/80, and 12/21/81.
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14. E. W. Jackson (VYNPC) to D. G. Eisenhut (NRC), FVY 81-153, November 4, 1981.
15. D. Vassallo (NRC) to R. Smith (VYNPC), March 12, 1982.
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