

NINE MILE POINT UNIT 1
INSERVICE INSPECTION PROGRAM
TECHNICAL EVALUATION REPORT

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TECHNICAL EVALUATION REPORT
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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 place on the licensee if the requirements were imposed. This report provides evaluations of the various requests for relief by the licensee, Niagara Mohawk Power Corporation (NMPC), of Nine Mile Point Unit 1. It deals only with inservice examinations of components and with system pressure tests. Inservice tests of pumps and valves (IST programs) are being evaluated separately.

* Hereinafter referred to as Section XI or Code.



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

For plants with Operating Licenses issued prior to March 1, 1976, the provisions of the November 1, 1979, revision are effective after September 1, 1976, at the start of the next one-third of the 120-month interval. During the one-third of an interval and throughout the remainder of the interval, inservice examinations shall comply with the latest edition and addenda of Section XI, incorporated by reference in the Regulation, on the date 12 months prior to the start of that one-third of an interval. For Nine Mile Point Unit 1, the ISI program and the relief requests evaluated in this report should cover the entire current 120-month inspection interval (December 1979 - December 1989)*. This program was based upon the 1974 Edition of Section XI of the ASME Boiler and Pressure 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 (7) listed at the end of this report pertain to previous information transmittals on ISI between the licensee and the Commission. By letters of April 26 and November 22, 1976,^(1,3) the Commission provided general ISI guidance to all licensees. Submittals in response to that guidance were made by the licensee on June 4, 1976,⁽²⁾ and December 9, 1976.⁽⁴⁾ The ISI program was submitted by the licensee on May 2, 1980.⁽⁵⁾ By letter of April 14, 1982⁽⁶⁾ the Commission requested additional information to complete the review

*As of August 26, 1982, the licensee has not acknowledged that this is correct inspection interval.



of the ISI program. This information was furnished by the licensee on July 30, 1982.⁽⁷⁾

From these submittals, a total of 9 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. The requests are evaluated in the following sections of this report.

In addition, other relief requests originally made by the licensee⁽⁵⁾ were withdrawn by Reference 7. These were: Full Penetration Welds, Category B-D; Feedwater Check Valve Bolting, Category B-G-1; Reactor Pressure Vessel Support Skirt, Category B-H; and Pressure Retaining Welds in Piping, Pumps and Valves in Systems Which Circulate Reactor Coolant, Category C-F.

I. CLASS 1 COMPONENTS

A. Reactor Vessel

1. Requests for Relief 1 and 2, Appendix E: (5) Pressure 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 shall be performed 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. The examination may be performed at or near the end of each inspection interval.

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:

Category B-A: All pressure retaining welds in the reactor vessel beltline region.

Category B-B: All pressure retaining welds in the reactor vessel shell other than in the beltline region, and all meridional and circumferential welds in the bottom head.

Proposed Alternative Examination

For those Category B-A and B-B welds for which code relief is requested, remote visual examination from the vessel inside diameter will be performed on the accessible weld length. One-third of the accessible weld length will be examined each inspection interval.



Licensee's Basis for Requesting Relief

These welds are not accessible due to plant design and high radiation levels.

Category B-A Welds:

Accessibility for inspection of welds in the core beltline region (Category B-A) was not provided for in the original plant design. Inspection from outside the vessel is prevented due to the vessel's permanent mirror insulation (which is mounted to the vessel) and close proximity of the sacrificial shield wall. There is approximately 7 inches of clearance between the insulation and the shield wall which is insufficient to allow direct access of personnel. Even if the non-replaceable insulation were removed from the reactor vessel, only 4 inches of additional clearance would be afforded, which is still insufficient for personnel access.

Category B-B Welds:

Accessibility for inspection of the longitudinal and circumferential welds in the vessel shell (Category B-B) area was not provided for in the original plant design. Inspection of some welds from outside the vessel is prevented due to the vessel's permanent mirror insulation (mounted to the vessel). Inspection of the other welds is prevented due to the vessel's permanent mirror insulation and close proximity of the sacrificial shield wall. There is approximately 7 inches of clearance between the insulation and wall which is insufficient to allow direct access of personnel. Even if the insulation were removed, only 4 inches of additional clearance would be afforded, which is still insufficient for personnel access.

Examination from the vessel outside diameter of the meridional and circumferential welds in the lower vessel head is prevented by the insulation configuration and Control Rod Drive housings.

Evaluation

Imposition of the Code requirements would necessitate removing portions of the concrete biological shield and the permanently installed insulation to perform the required examination of the welds listed from the vessel exterior. The only examinations that the licensee can perform from the internal of the reactor pressure vessel are visual examinations of those accessible welds. The vessel internals preclude examination of certain internal areas, i.e., the core shroud and the core plate preclude examination of the lower head circumferential and meridional welds and other welds in the lower part of the vessel.



The reactor pressure vessel was the subject of a special study (a) conducted by the Nuclear Regulatory Commission as part of the staff's regulatory activities to evaluate and update information on the integrity of the reactor vessel to ensure that the integrity of the vessel is maintained at a high level throughout its service life. The study concluded that Nine Mile Point reactor vessel includes sufficient margin of design conservatism that, in combination with the very conservative limits established for operation, provides adequate assurance for safe continued operation. The reactor vessel was designed to Sections I and VIII of the ASME Boiler Pressure Vessel Code. However, the requirements of these Codes were supplemented by the requirements of Nuclear Code Cases and purchase specifications so that the design and material acceptance inspections were essentially in accordance with the rules of the ASME Code, Section III. Primary stresses in the vessel core region are low approximately 3/4 of those permitted by the ASME Code, Section III. The reactor vessel is presently monitored for radiation damage in the beltline region by a surveillance program in accordance with ASTM-E185-73 to the extent possible and therefore conforms to the intent of 10 CFR 50, Appendix H.

This examination requirement is impractical due to the existing design that precludes access to the welds. In addition, high radiation fields are present that severely restrict access to the reactor pressure vessel. The only welds accessible for the Code-required examinations are those in the closure head. To maintain the extent of examination, an alternative inservice inspection program would be required. The examination of the accessible Category B-B welds in the closure head could be increased to achieve an examination sample equivalent to the Category B-A and B-B welds for which relief was requested. The closure head welds (Category B-B) are subjected to different stresses than the welds in the body of the reactor pressure vessel (Categories B-A and B-B). But an examination of an increased amount of closure head welds is about the only meaningful alternative examination that could substitute for examining the welds in the reactor pressure vessel body. In addition, visual examinations from the inside of the vessel should be performed during each inspection interval on 100% of those welds that are accessible; the licensee has proposed examination of only one-third of the accessible weld length during each inspection interval. Also, visual inspections of the areas beneath the reactor pressure vessel could be performed during system leakage and hydrostatic tests. All these examinations should furnish sufficient information to evaluate the continued structural reliability of the welds in the reactor pressure vessel.

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 examinations of the identified welds with the following provisions:

- (a) The examinations of the accessible Category B-B welds are increased to achieve, to the extent possible, an examination sample equivalent to the Category B-A and B-B welds for which relief is requested.
- (b) Visual examinations of 100% of the accessible Category B-A and B-B welds are performed from the inside of the reactor pressure vessel.
- (c) Visual inspection of the areas beneath the reactor pressure vessel is conducted for evidence of leakage during system hydrostatic tests when performed as required by IWB-5000.

References

References 5, 6 and 8.



2. Request for Relief 4, Appendix E; (5) Class 1 Bolting,
Category B-G-1, Item B1.8

Code Requirement

Volumetric and surface examinations shall be made on reactor vessel closure studs and nuts, 2-in. and larger in diameter, when removed.

The areas shall include bolts, studs, nuts, bushings, washers, and threads in base material and flange ligaments between threaded stud holes.

The 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.

Code Relief Request

Licensee requests relief from the surface examination of the reactor vessel closure head studs and nuts.

Proposed Alternative Examination

Visual examination will be performed as an alternative to the code-required surface examination for which relief is requested.

Licensee's Basis for Requesting Relief

The reactor vessel closure head studs and nuts have been Parkerized (corrosion treatment) which renders surface examination results invalid.

Evaluation

Parkerizing is similar to anodizing. A thin film is deposited upon the surface of the reactor vessel closure studs and nuts for corrosion protection. This film would interfere with surface testing of the studs and nuts and render the examination results invalid. Thus, the requirement to perform a surface examination of the reactor pressure vessel studs and nuts



is impractical. Since the film is thin, Parkerizing does not totally interfere with ultrasonic examination of the studs and nuts; hence, volumetric examination of the reactor vessel closure studs and nuts will be performed as required by the Code. The licensee proposes to perform a visual examination in lieu of the surface examination. The volumetric and visual examinations should provide sufficient information to evaluate the structural integrity of the studs and nuts.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the pressure-retaining bolting examination 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 surface examination of the reactor vessel closure head studs and nuts provided that the proposed visual examinations are performed.

References

References 5, 6 and 7.



3. Request for Relief 9. Appendix E; (5) Interior Attachments to Reactor Vessels, Category B-N-2, Item B1.16

Code Requirement

Visual examinations shall be performed during each inspection interval and shall include 100% of the visually accessible attachment welds and visually accessible surfaces of the core-support structure. This examination may be performed at or near the end of the inspection interval.

The areas shall include attachments and core-support structures welded to the vessel wall of the direct cycle boiling water type.

Code Relief Request

Licensee requests relief from the visual examination of the liquid poison sparger attachments to the reactor pressure vessel.

Proposed Alternative Examination

None.

Licensee's Basis for Requesting Relief

The liquid poison spargers are not accessible for visual inspection during normal refueling outages.

Evaluation

The original request for relief, item 9 of Appendix E⁽⁵⁾, categorized the liquid poison sparger attachments as B-N-1. In Reference 7, the licensee recategorized these as B-N-2, and stated that no code relief is required since these attachments are not accessible for examination by removal of components during a normal refueling outage, as stated in the Code. It is true that for Category B-N-1 components the examination requirements depend upon accessibility during normal refueling outages. However, the Code does not include such a dependency clause for Category B-N-2 components.

The liquid poison spargers are welded to the Reactor Pressure Vessel wall for support. The Code requires that these welds be examined visually once an interval to provide additional assurance that the Standby Liquid Control System will perform as designed, when needed. No justification has been presented to show that the Code requirements are impractical.



Conclusions and Recommendations

Based on the above evaluation, the Code requirements have not been shown to be impractical. Therefore it is recommended that this relief request be denied. If, at the end of the interval the licensee has not been able to perform the Code required examinations, he should submit a code relief request at that time. That code relief request should include specific details justifying why the required examinations cannot be performed.

References

References 5, 6 and 7.

- B. Pressurizer
Does not apply to BWRs.
- C. Heat Exchangers and Steam Generators
No relief requests.



D. Piping Pressure Boundary

1. Request for Relief 6, Appendix E; (5) Support Members for Piping, Valves and Pumps, Category B-K-1, Items B4.9, B5.4 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 integrally welded external support attachments for piping, valves and pumps.

Proposed Alternative Examination

Integrally welded support attachments will be liquid penetrant examined in place of ultrasonic examinations. A visual examination will be recommended if the surface conditions can not be made compatible with proper surface penetrant examination prerequisites.

Licensee's Basis for Requesting Relief

Category B-K-1 supports at Nine Mile Point Unit 1 are in the configuration shown in Figure IWB-2500-15 (1977 Code). However, these welds are fillet welds rather than full penetration and cannot be volumetrically examined as required.

Liquid penetrant examination has been performed on a number of the welds. Since the weld surface was never prepared for surface examination, but left in the "as-welded" condition, surface examinations show a large number of irrelevant indications. These indications are of such an extent that they would mask any relevant indications. Periodically, as allowed by operational and radiation exposure considerations, some of these welds have been prepared for surface examination. Those welds that have been prepared will receive a surface examination. The welds not prepared will receive a visual (VT-1, 1977 Code) examination. Additionally, all welds not prepared will receive a surface examination for information only. This examination will be documented but the results will not be used to accept or reject the subject weld.



Evaluation

Because of the weld design, i.e., fillet welds, ultrasonic examination required by the Code is impractical.

Substitution of surface for volumetric examination would be acceptable as is evidenced by the changes in the later editions of the Code for Category B-K-1 components, which permit surface examination of Class 1 integrally welded support attachments for piping, pumps and valves. However, there is no basis for permitting substitution of visual for volumetric examination of Class 1 integrally welded support attachments. Consequently, visual examination would not be an acceptable alternative examination.

The licensee should be permitted to update to the 1977 Edition of Section XI, through Summer 1978 Addenda, for Category B-K-1 components. Surface examination would be performed on all integrally welded support attachment welds where volumetric examination is not applicable. Should it not be possible to perform surface examinations on some welds, the licensee could submit code relief requests for those particular welds at that time. The justification for these code relief requests should contain engineering data that demonstrate that adequate safety factors are contained in the design of each weld joint so that there are no questions relative to the safety of those welds for which code relief is requested. Otherwise, there is no basis for determining the safety of those particular welds, since they cannot be adequately examined.

The 1977 Edition, Summer 1978 Addenda, 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 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 components permits surface examination of integrally welded support attachments for piping, pumps and valves where volumetric examination of such welds is not applicable.

Conclusions and Recommendations

Based on the above evaluation, relief from the Code requirements 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, for Category B-K-1 items. This approval would permit surface examination of Class 1 integrally



welded support attachments for piping, pumps and valves where volumetric examination of such welds is not applicable.

Where surface examination of Class 1 integrally welded support attachments for piping, pumps and valves is not possible, the licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

References

References 5, 6 and 7.



E. Pump Pressure Boundary

1. Request for Relief 6, Appendix E;⁽⁵⁾ Support Members for Piping, Valves and Pumps, Category B-K-1, Item B5.4

The request for relief from volumetric examination of integrally welded external support attachments for pumps (I.D.1 of this report) applies here. 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 examination of Class 1 integrally welded support attachments for pumps where volumetric examination of such welds is not applicable.

Where surface examination of Class 1 integrally welded support attachments for pumps is not possible, the licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

2. Request for Relief 7, Appendix E;⁽⁵⁾ Internal Surfaces of Pumps, Category B-L-2, Item B5.7

Code Requirement

Pump internal pressure boundary surfaces shall 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 at the pressure boundary.

Proposed Alternative Examination

If a reactor recirculation pump requires disassembly, a visual examination will be performed on the pump casing. Only one pump casing will be examined as required by the ASME Code.



E. Pump Pressure Boundary

1. Request for Relief 6, Appendix E;(5) Support Members for Piping, Valves and Pumps, Category B-K-1, Item B5.4

The request for relief from volumetric examination of integrally welded external support attachments for pumps (I.D.1 of this report) applies here. 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 examination of Class 1 integrally welded support attachments for pumps where volumetric examination of such welds is not applicable.

Where surface examination of Class 1 integrally welded support attachments for pumps is not possible, the licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

2. Request for Relief 7, Appendix E;(5) Internal Surfaces of Pumps, Category B-L-2, Item B5.7

Code Requirement

Pump internal pressure boundary surfaces shall 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 at the pressure boundary.

Proposed Alternative Examination

If a reactor recirculation pump requires disassembly, a visual examination will be performed on the pump casing. Only the pump casing will be examined as required by the ASME Code.



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.

The internal pressure boundary surfaces of the recirculation pumps are not normally accessible during operation or refueling/maintenance outages. Access requires the disassembly of the pump and removal of the impeller involving approximately six man-days.

The radiation levels in the general area of the pumps are approximately 100 mr-1.5R/hr; the pumps on contact are approximately 220 mr-1.5 R/hr. The estimated man-rem exposure for the disassembly, inspection, reassembly of one pump is broken down as follows:

Disassembly	-	0.85 man-rem (based on actual motor removal)
Inspection	-	0.5 man-rem (estimated)
Reassembly	-	<u>1.5</u> man-rem (estimated)
Total		2.85 man-rem/pump

The manufacturer does not recommend regular maintenance on the pumps. The pump technical manual indicates that if the pump is running normally, allow the pump to continue in operation.

The benefit received from this major effort is minimal considering employee exposure, potential damage to safety-related equipment, and cost in dollars.

Evaluation

The visual examination is to determine whether unanticipated severe cracking or erosion of the casing is 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 the degree necessary to examine the internal pressure retaining surfaces is a major effort, involving large personnel exposure 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 could submit a new relief request at that time.

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

Conclusions and Recommendations

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

- (a) Relief should not be granted at this time from the visual examination of the internal surfaces of the reactor recirculation pump at the pressure boundary.
- (b) The licensee's proposal to perform a visual examination whenever the surfaces are made accessible because a pump is disassembled for maintenance purposes should be accepted.
- (c) Visual examination of the externals of the pump casings should be conducted for leakage when pressure tests are performed as required by IWB-5000.

References

References 5, 6 and 7.



F. Valve Pressure Boundary

1. Request for Relief 6, Appendix E; (5) Support Members for Piping, Valves and Pumps, Category B-K-1, Item B6.4

The request for relief from volumetric examination of integrally welded external support attachments for valves (I.D.1 of this report) applies here. 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 examination of Class 1 integrally welded support attachments for valves where volumetric examination of such welds is not applicable.

Where surface examination of Class 1 integrally welded support attachments for valves is not possible, the licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

2. Request for Relief 8, Appendix E; (5) Internal Surfaces of Valves, Category B-M-2, Item B6.7

Code Requirement

Visual examination 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 recirculation suction and discharge valves.



Proposed Alternative Examination

The internal pressure boundary surfaces of one recirculation suction or discharge valve will be examined, should valve maintenance be required and radiation exposure levels permit.

Visual (VT-2, 1977 Code) examinations of the valves are performed in conjunction with the system pressure tests (IWA-5000) and are conducted in accordance with the requirements for Category B-P.

Ultrasonic thickness testing was performed prior to implementation of our ASME Section XI In-service Inspection Program, and is being considered as an alternate method.

Licensee's Basis for Requesting Relief

During routine maintenance, visual examinations of valve body internal pressure boundary surfaces are performed and documented under existing plant administrative procedures.

It is estimated that the exposure to personnel to disassemble, examine, and reassemble each recirculation valve would be eight man-rem per valve. To inspect the recirculation valves requires unloading the core and draining the vessel before the valves can be disassembled.

The code-required examination would be performed if valve maintenance is required for one of the recirculation suction or discharge valves. Also, visual examinations of the valves are performed for evidence of leakage in conjunction with the system pressure tests (IWA-5000) and these are conducted in accordance with the requirements for Category B-P.

Evaluation

The disassembly of large valves to the degree necessary to inspect the internal pressure retaining surfaces (bodies) is a major effort involving large personnel exposures.

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 unanticipated severe degradation of the casing is occurring due to phenomena such as erosion or corrosion.

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 unit and from the industry in general will be available.

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

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

For those inspection periods when valve maintenance does not occur, visual examinations are 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 declaring the code requirements impractical. Therefore, the following is recommended:

- (a) Relief should not be granted at this time from visual examination of the internal pressure boundary surfaces on the recirculation suction and discharge valves.
- (b) The licensee's proposal to perform the code-required examinations whenever one of the valves is opened because of maintenance should be accepted.



- (c) During other inspection periods, the licensee should continue to perform visual examinations 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.
- (e) When the licensee is properly prepared to perform UT thickness measurements of the valve bodies, and so requests, permission should be granted to do so.

References

References 5, 6 and 7.



II. CLASS 2 COMPONENTS

A. Pressure Vessels

1. Request for Relief 10, Appendix E: (5) Pressure Retaining Nozzle Welds in Vessels, Category C-8, Item C1.2

Code Requirement

Volumetric examination of 100% of the nozzle-to-vessel attachment welds shall be performed.

One inlet and one outlet nozzle from the three shutdown cooling heat exchangers shall be examined over the life of the plant (four inspection intervals).

Code Relief Request

Relief is requested from the volumetric examination of the shutdown cooling heat exchanger inlet/outlet nozzle welds.

The welds include inlet and outlet nozzle attachment welds on heat exchangers #11, #12, and #13, welds HX-38-11IN-W, HX-38-11OUT-W, HX-38-12IN-W, HX-38-12OUT-W, HX-38-13IN-W and HX-38-13OUT-W.

Proposed Alternative Examination

A liquid penetrant examination has been substituted for the required volumetric method.

Licensee's Basis for Requesting Relief

The shutdown cooling heat exchangers (#11, #12, #13) inlet and outlet nozzles are fillet welded to the pressure vessel. Fillet welds cannot be ultrasonically tested and provide meaningful examination data.

Evaluation

Two 8-inch nozzles are recessed into the heat exchanger head on the tube side and welded to the head by fillet welds. The welds that are required to be examined are 3/4-inch fillet welds which cannot be adequately inspected by a volumetric examination as required by the Code. The licensee proposes to perform a surface examination on the fillet welds that are completely accessible. Weld cracking would be detected by the surface examination.



Visual examinations of the welds during periodic hydrostatic testing would provide additional assurance that an adequate level of safety will be maintained.

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 performing volumetric examination of the shutdown cooling heat exchanger inlet/outlet nozzle welds, provided that:

- (a) The proposed alternative surface examination is performed.
- (b) Visual examination of the welds for leakage is performed during periodic hydrostatic testing in accordance with IWC-5000.

References

References 5, 6, and 7.

B. Piping

1. Request for Relief 11, Appendix E: (5) Support Members for Piping, Valves and Pumps, Category C-E-1, Items C2.5, C3.3, and C4.3

Code Requirement

Surface examination shall be performed of the external support attachments, including 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 surface examination of all Group B integrally welded external support attachments.

Proposed Alternative Examination

All welds which have been prepared for surface examination will be examined as required. Those welds which have not been prepared for surface examination will receive a visual (VT-1, 1977 Code) examination. Additionally, all welds not prepared will receive a surface examination for information only.

Licensee's Basis for Requesting Relief

Relief is requested because these attachment welds were left in the "as-welded" condition during construction. After welding, these welds were never ground to provide a surface that could be dye penetrant tested. Surface limitations show a large number of irrelevant indications. These indications are of such an extent that they would mask any relevant indications. Periodically, as allowed by operational and radiation exposure considerations, some welds have been prepared for surface examination. Those welds not prepared will receive a visual examination. Additionally, all welds not prepared will receive a surface examination for information only. This examination is documented but the results will not be used to accept or reject the subject weld.



Evaluation

There is no basis for permitting substitution of visual for surface examination of Class 2 integrally welded support attachments for piping, pumps and valves. Consequently, visual examination would not be an acceptable alternative examination.

Surface examination should be performed on all integrally welded support attachment welds. Should it not be possible to perform surface examinations on some welds, the licensee should submit code relief requests for those particular welds at that time. The justification for these code relief requests should contain engineering data which demonstrate that adequate safety factors are contained in the design of each weld joint so that there are no questions relative to the safety of those welds for which code relief is requested. Otherwise there is no basis for determining the safety of those particular welds, as they cannot be adequately examined.

Conclusions and Recommendations

Based on the above evaluation, it is concluded that for the welds discussed above, the Code requirements have not been shown to be impractical. Hence, it is recommended that this code relief request be denied.

Where surface examination of Class 2 integrally welded support attachments for piping, pumps and valves is not possible, licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

References

References 5, 6 and 7.

C. Pumps

1. Request for Relief 11, Appendix E; ⁽⁵⁾ Support Members for Pumps, Category C-E-1, Item C3.3

The request for relief from surface examination of integrally welded external support attachments for piping, valves and pumps (II.B.1 of this report) applies here. Therefore, it is recommended that relief not be granted from the surface examination of integrally welded external support attachments for pumps.

Where surface examination of Class 2 integrally welded support attachments for pumps is not possible. The licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

D. Valves

1. Request for Relief 11, Appendix E; ⁽⁵⁾ Support Members for Valves, Category C-E-1, Item C4.3

The request for relief from surface examination of integrally welded external support attachments for piping, valves and pumps (II.B.1 of this report) applies here. Therefore, it is recommended that relief not be granted from the surface examination of integrally welded external support attachments for valves.

Where surface examination of Class 2 integrally welded support attachments for valves is not possible, the licensee should submit specific code relief requests for those welds that cannot be examined as required by the Code. These code relief requests should contain sufficient engineering data as justification to demonstrate the degree of safety involved in not examining the welds.

III. CLASS 3 COMPONENTS

No relief requests.

IV. PRESSURE TESTS

No relief requests.

V. GENERAL

No relief requests.



REFERENCES

1. G. Lear (NRC) to G. K. Rhode (NMPC), Nine Mile Point, Docket No. 50-220, April 26, 1976.
2. G. K. Rhode (NMPC) to G. Lear (NRC), Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, June 4, 1976.
3. G. Lear (NRC) to G. K. Rhode (NMPC), Nine Mile Point Nuclear Station Unit No. 1, Docket No. 50-220, November 22, 1976.
4. G. K. Rhode (NMPC) to G. Lear (NRC), Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, December 9, 1976.
5. D. P. Dise (NMPC) to T. A. Ippolito (NRC), Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, May 2, 1980.
6. D. B. Vassallo (NRC) to D. P. Dise (NMPC), April 14, 1982.
7. T. E. Lempges (NMPC) to D. B. Vassallo (NRC), Nine Mile Point Unit 1, Docket No. 50-220, DPR-63, July 30, 1982.
8. Evaluation of the Integrity of Vessels, NUREG 0081, June 1976.