



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

SUPPLEMENTAL SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

ON THE FIRST TEN-YEAR INSERVICE INSPECTION PROGRAM

GULF STATES UTILITIES COMPANY

RIVER BEND STATION, UNIT 1

DOCKET NO. 50-458

INTRODUCTION

Gulf States Utilities Company, the licensee, prepared the first Ten-Year Interval Inservice Inspection (ISI) Program for the River Bend Station, Unit 1, Revision 2, to meet the requirements of the 1980 Edition, Winter 1981 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code except that the extent of examination for Class 2 piping welds in the Residual Heat Removal (RHR) and Emergency Core Cooling (ECC) Systems was determined by the requirements of the 1974 Edition, Summer 1975 Addenda of Section XI of the ASME Boiler and Pressure Vessel Code. The first inspection interval began on June 16, 1986 and ends June 16, 1996.

The information in the River Bend Station, Unit 1 first Ten-Year Interval ISI Program, through Revision 1, submitted July 16, 1986 was reviewed including the requests for relief from the ASME Code Section XI requirements which the licensee has determined to be impractical. The review was performed using the Standard Review Plan, NUREG-0800, Section 5.2.4, "Reactor Coolant Boundary Inservice Inspections and Testing," and Section 6.6, "Inservice Inspection of Class 2 and 3 Components." In a letter dated January 21, 1987, the staff requested additional information that was required in order to complete the review of the ISI Program. The requested information was provided and Revision 2 of the ISI Program was submitted by the licensee in letters dated February 27, 1987, March 10, 1987, and June 2, 1987.

The NRC staff, with technical assistance from its contractor, Idaho National Engineering Laboratory (INEL), evaluated the ISI program and found it acceptable and in compliance with 10 CFR 50.55a(g)(4). The staff's evaluation was issued on October 20, 1987. The ISI program was evaluated for (a) compliance with the appropriate ASME Code edition and addenda, (b) acceptability of the examination sample, (c) exclusion criteria, and (d) compliance with ISI related commitments identified during the review for the Operating License. The request for relief from the requirements of Section XI of the ASME Code was reviewed and evaluated by our contractor. The staff concurred with the contractor's evaluation except that relief was not granted for Category B-A welds in the examination of the reactor pressure vessel because the procedure for the examination of these welds was under review by the staff.

On February 17-18, 1988, the staff and INEL personnel met with representatives of Gulf States Utilities Company to discuss the relief requests not granted on

8808110169 880801
PDR ADOCK 05000458
PDC

Category B-A reactor pressure vessel welds in our Safety Evaluation of October 20, 1987, and the procedures used for inspecting the reactor pressure vessel at the River Bend Station, Unit 1. Gulf States Utilities Company requested that the NRC reconsider the requests for relief from the requirements of Section XI in view of the additional information discussed at the February 17-18, 1988 meeting.

EVALUATION

The licensee's submittals were evaluated as follows:

RELIEF REQUEST RR0012A

- | | | |
|-------------------|---|--|
| COMPONENT | - | Reactor pressure vessel longitudinal shell weld BG, Category B-A |
| CODE | - | Weld was fabricated in accordance with ASME Section III Class 1 requirement. Inservice inspection will be in accordance with ASME Section XI 1980 Edition, including Winter 1981 Addenda |
| REQUIREMENT | - | Longitudinal shell welds will be 100% volumetrically examined in accordance with IWB-2500-1, Category B-A, Item B1.12 |
| BASIS FOR REQUEST | - | Inservice volumetric inspection coverage of longitudinal shell weld BG will be reduced at an adjacent nozzle due to interference with the automated ultrasonic inspection equipment. Complete preservice ultrasonic examination coverage was achieved for transverse reflectors for longitudinal shell weld BG. Coverage for parallel reflectors included 100% of the weld and was approximately 95% for adjacent metal in the 1/2 t zone due to interference with the automatic examination equipment caused by adjacent nozzle. The inservice inspection coverage for weld BG will be the same as that obtained during the preservice ultrasonic examination of the weld. Completion of the remaining portion of the required examination is impractical and would result in undue hardship without a compensating increase in safety. |
| CONCLUSION | - | The volumetric examination of the subject weld is impractical because of the interference caused by a nozzle adjacent to the weld. A significant percentage of the inservice volumetric examination will be performed. |

Therefore, the limited Section XI ultrasonic examination provides an acceptable level of inservice structural integrity and compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

RELIEF REQUEST RR0012C

- | | | |
|-------------------|---|---|
| COMPONENT | - | Reactor pressure vessel circumferential shell weld AB, Category B-A |
| CODE | - | The reactor vessel shell weld AB was fabricated in accordance with ASME Section III Class 1 requirements. Inservice inspections will be performed in accordance with ASME Section XI 1980 Edition, including Winter 1981 Addenda. |
| REQUIREMENT | - | Reactor vessel shell weld AB will be 100% volumetric examined for inservice inspection in accordance with ASME Section XI, IWB-2500-1, Category B-A, Item B1.11. |
| BASIS FOR REQUEST | - | The reactor vessel circumferential shell weld AB is located in a beveled area, i.e., a transition in wall thickness. Due to the physical geometry of the weld, it is not possible to pass an automated examination head over the weld and maintain couplant and transducer orientation. |

During the preservice ultrasonic examination of weld AB, the automated coverage was supplemented by manual ultrasonic inspection and full coverage of weld AB was obtained.

During inservice ultrasonic examination of weld AB, high radiation levels will prohibit manual UT examination, and coverage will be limited to that which can be obtained by automated UT examination. It is estimated that for parallel reflectors, the root of the weld and approximately 67% of the remaining weld metal will be examined by both 45° and 60° angle beams from both sides of weld AB. For transverse reflectors, virtually no coverage of the weld metal will be obtained, and approximately 90% of the adjacent metal will be examined. Completion of the remaining portion of the required examination is impractical and would result in undue hardship without a compensating increase in safety.

CONCLUSION - Based on the weld geometry, an acceptable percentage of the Code-required volumetric examination will be performed on weld AB. Supplementing the automated ultrasonic examination with a manual ultrasonic examination in order to obtain full coverage of weld AB would result in radiation exposure to personnel.

It is concluded that the automated ultrasonic examination to be conducted by the licensee provides an acceptable level of inservice structural integrity and that compliance with specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

RELIEF REQUEST RRO012D

COMPONENT - Reactor pressure vessel bottom head to reactor vessel circumferential weld AA, Category B-A.

CODE - The bottom head to reactor vessel weld AA was fabricated in accordance with ASME Section III Class 1 requirements.

Inservice inspections will be performed in accordance with ASME Section XI 1980 Edition, including Winter 1981 Addenda.

REQUIREMENT - Bottom head to reactor vessel weld AA will be volumetric examined for inservice inspection in accordance with ASME Section XI, IWB-2500-1, Category B-A, Item B1.2.

BASIS FOR REQUEST - The bottom head to reactor vessel circumferential weld AA is located at the edge of a bevel or transition in vessel diameter. The geometry is such that it can be examined from only the vessel side of the weld. All of the required adjacent base metal on the shell side of the weld and essentially 100% of the weld itself was examined by 45° and 60° angle beams normal to the weld during preservice inspection. Approximately 50% of the adjacent base metal on the bottom head side of the weld was examined using 45° and 60° angle beams normal to the weld from the shell side of the weld. The weld was examined 100% for transverse reflectors in both directions on the shell side of weld AA. There was essentially no coverage for transverse reflectors from the bottom head side of the weld and there was no coverage using 45° and 60° angle beams from the bottom head

side of the weld. During inservice ultrasonic inspection of weld AA, the examination coverage will be similar to that obtained during the preservice inspection.

During inservice inspection, automated ultrasonic examination will be performed from one side, (vessel shell side). This is required because of surface irregularity (handgrinding causing pitch and roll profile) in the immediate weld area and the material transition area below the weld. The weld centerline location (measurement from tangent of transition) on the vessel shell may vary up to 2 inches along the vessel circumference, (C = 730.42 in.). The pitch and roll profile along the slope transition supplements the insufficient surface measurement to provide a meaningful ultrasonic (45° and 60°) examination.

Additional manual ultrasonic examination in this area will increase the total exposure rate for personnel at River Bend Station. Additional examination will also increase man-hour requirements which directly impacts outage cost and duration.

CONCLUSION

- It was concluded from the licensee's submittal and review by the staff that the volumetric examination of weld AA, to the extent required by the Code, is impractical because of the component and/or weld geometry. A significant percentage of the inservice volumetric examination will be performed. To obtain information from the bottom head side of weld AA, a transducer would need to be placed between weld AA and the vessel skirt. This is a relatively small area, the surface of which is irregular due to hand grinding and presents a pitch and roll profile along the slope transition. The distance between the weld AA and the top of the skirt weld can also vary so that there would be insufficient space to place a transducer for a meaningful examination from the bottom head side of weld AA.

Therefore, it is concluded that the limited Section XI ultrasonic examination provides an acceptable level of inservice structural integrity and that compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

RELIEF REQUEST RR0012E

- COMPONENT - Reactor pressure vessel top head flange seam weld AG, Category B-A
- CODE - Weld was fabricated in accordance with ASME Section III Class 1 requirements. Inservice inspections will be performed in accordance with ASME Section XI 1980 Edition, Winter 1981 Addenda.
- REQUIREMENT - The head to flange weld will be surface and 100% volumetric examined for inservice inspection in accordance with ASME Section XI, IWB-2500-1, Category B-A, Item B1.40.
- BASIS FOR REQUEST - Due to the configuration, there is sufficient area to perform a meaningful ultrasonic examination from the top head side only.

The weld was examined volumetrically (manual ultrasonic) from the AH side of the weld. There was no ultrasonic examination coverage from the flange side. Full ultrasonic examination coverage was obtained from transverse and parallel reflectors from the AH side of the weld. During inservice ultrasonic examination of weld AG, the examination coverage should be similar to that obtained during the preservice inspection.

The weld will be surface examined in accordance with ASME XI, Class 2 requirements.

- CONCLUSION - We conclude from our review of this request that the volumetric examination of weld AG, to the extent required by the Code, is impractical because of the position of the weld in relation to the flange. The licensee proposes to perform a significant percentage of the Code-required inservice volumetric examination.

The limited Section XI ultrasonic examination along with the full surface examination, provides verification of an acceptable level of structural integrity. Compliance with the specific requirements of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

RELIEF REQUEST RR0012H

- COMPONENT - Reactor pressure vessel bottom head meridional seam welds DG and DH, Category B-A.

- CODE - Welds were fabricated in accordance with ASME Section III Class 1 requirements. Inservice inspections will be performed in accordance with ASME Section XI 1980 Edition, including Winter 1981 Addenda.
- REQUIREMENT - Reactor vessel head weld(s) DG and DH will be volumetric examined for inservice inspection in accordance with ASME Section XI, IWB-2500-1, category B-A, Item B1.22.
- BASIS FOR REQUEST - Inservice volumetric (ultrasonic) examination coverage of meridional welds DG and DH cannot be achieved due to installed control rod drive (CRD) assemblies penetrating through the bottom vessel head.
- Preservice inspection was performed by manual ultrasonic examination with full weld coverage and no recordable indications. This inspection was performed prior to CRD installation.
- Inspection of the weld(s) from beneath the bottom head will require removal of portions of the control rod drive (CRD). Performing the required examinations is impractical and would result in undue hardship (increase ALARA consideration and extended outage duration) without a compensating increase in safety.
- CONCLUSION - The staff evaluated the information submitted by the licensee and concluded that the Section XI volumetric examination of welds DG and DH is impractical and that compliance with the specific requirement of Section XI would result in hardship or unusual difficulties without a compensating increase in the level of quality and safety.

CONCLUSION

The NRC Staff concurs with the determination made by the licensee that Section XI ASME Code examination requirements for Category B-A welds in the reactor pressure vessel are impractical to perform at the River Bend Unit 1 facility. Therefore, relief is granted as requested for requests RR0012A, RR0012C, RR0012D, RR0012E, and RR0012H. The staff further concludes that reliefs granted from the examination and testing requirements and alternate methods imposed through this document give reasonable assurance of the reactor

pressure vessel integrity, that granting relief because of ASME Code requirement impracticality is authorized by law and will not endanger life or property, or the common defense and security, and is otherwise in the public interest considering the burden that could result if they were imposed on the River Bend Station, Unit 1.

Principal Contributor: F. Litton

Dated: August 1, 1988