May 19, 2003

Mr. David L. Wilson
Site Vice President
Monticello Nuclear Generating Plant
Nuclear Management Company, LLC
2807 West County Road 75
Monticello, MN 55362-9637

SUBJECT: MONTICELLO NUCLEAR GENERATING PLANT — THIRD 10-YEAR INTERVAL INSERVICE INSPECTION RELIEF REQUEST NO. 16, PARTS A, B, AND C (TAC NO. MB5487)

Dear Mr. Wilson:

Nuclear Management Company's, LLC (NMC's) letter of May 30, 2002, as supplemented February 10, 2003, submitted Relief Request Nos. 15 and 16 requesting relief from certain requirements of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The requests applied to the third 10-year interval of the inservice inspection (ISI) examination plan for the Monticello Nuclear Generating Plant. This letter and the enclosed safety evaluation address Relief Request No. 16, only. We addressed Relief Request No. 15 in our letter of October 1, 2002.

Relief Request No. 16 consists of the following three parts:

- Part A, Category B-A, "Pressure Retaining Welds in Reactor Vessel"
- Part B, Category B-D, "Full Penetration Welds of Nozzles in Vessels"
- Part C, Category B-J, "Pressure Retaining Welds in Piping"

In this request, and its supplemental letter of February 10, 2003, NMC explained why it was impractical for it to meet the ASME Code examination coverage requirements for the subject components. We evaluated this information and conclude that it is impractical for NMC to comply with the ASME Code examination coverage requirements for the subject components listed in Relief Request No. 16. We also find that the examinations NMC performed provide reasonable assurance of the structural integrity of the subject components. Accordingly, the

Nuclear Regulatory Commission staff grants relief pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval. All other requirements of the ASME Code, Section III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

Enclosed is our safety evaluation.

Sincerely,

/RA/

L. Mark Padovan, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-263

Enclosure: Safety Evaluation

cc w/encl: See next page

Nuclear Regulatory Commission staff grants relief pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year ISI interval. All other requirements of the ASME Code, Section III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.

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L. Mark Padovan, Project Manager, Section 1
Project Directorate III
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket No. 50-263

Enclosures: Safety Evaluation
Technical Letter Report

cc w/encl: See next page

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Monticello Nuclear Generating Plant

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

RELIEF REQUEST NO. 16, PARTS A, B, AND C

FOR THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION EXAMINATION PLAN

NUCLEAR MANAGEMENT COMPANY, LLC

MONTICELLO NUCLEAR GENERATING PLANT

DOCKET NO. 50-263

1.0 INTRODUCTION

Nuclear Management Company's, LLC (NMC's) letter of May 30, 2002, as supplemented February 10, 2003, submitted Relief Request Nos. 15 and 16 requesting relief from certain requirements of the American Society of Mechanical Engineers *Boiler and Pressure Vessel Code* (ASME Code), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components." The requests applied to the third 10-year interval of the inservice inspection (ISI) examination plan for the Monticello Nuclear Generating Plant. This safety evaluation addresses Relief Request No. 16, only. The U.S. Nuclear Regulatory Commission (NRC) staff addressed Relief Request No. 15 in its letter of October 1, 2002.

Relief Request No. 16 consists of the following three parts:

- Part A, Category B-A, "Pressure Retaining Welds in Reactor Vessel"
- Part B, Category B-D, "Full Penetration Welds of Nozzles in Vessels"
- Part C, Category B-J, "Pressure Retaining Welds in Piping"

In response to an NRC request for additional information, NMC provided additional information in its letter of February 10, 2003.

2.0 REGULATORY EVALUATION

ISI of nuclear power plant components is performed in accordance with the ASME Code, Section XI, and applicable addenda, as required by 10 CFR 50.55a(g), except where specific written relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i).

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the pre-service examination requirements, set forth in the ASME Code, Section XI, to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system

pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The applicable Code of record for the third 10-year ISI for Monticello is the 1986 edition of the ASME Code, Section XI.

3.0 TECHNICAL EVALUATION

The NRC's contractor, Pacific Northwest National Laboratory (PNNL), evaluated Relief Request No. 16 in the attached Technical Letter Report. The NRC adopts the evaluation and recommendation for granting reliefs contained in this report.

3.1 Part A, Category B-A, "Pressure Retaining Welds in Reactor Vessel"

ASME Code, Section XI, Examination Category B-A, Items B1.12 and B1.21, require 100 percent volumetric examination of reactor pressure vessel (RPV) circumferential head-to-shell weld VCBB-1 and longitudinal shell welds VLAA-1 and VLAA-2. Access limitations restrict volumetric coverages on these welds such that it is impractical for NMC to achieve 100 percent volumetric coverage. It would be a significant burden for NMC to perform the Code examinations because NMC would have to redesign and modify the RPV and its appurtenances to do the examinations. NMC's proposed alternative to the Code requirements is that it performed the examinations to the extent practical. NMC obtained 11 percent volumetric examination coverage for circumferentially-oriented, bottom head-to-shell weld VCBB-1, and 80.1 percent and 75.8 percent volumetric examination coverage for longitudinal shell welds VLAA-1 and VLAA-2, respectively. NMC also examined another circumferentially-oriented weld (vessel-to-flange weld VCBC-5) to the extent required by the Code, and did not detect any indications. In addition, most of the required RPV welds have been examined to the extent required by the Code. NMC performed all of these the examinations using Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) qualified equipment, personnel, and procedures. Based on the above, the NRC staff has determined that the examinations performed in these areas would have detected any significant patterns of degradation. Thus, NMC has provided reasonable assurance of continued structural integrity of the subject RPV welds.

3.2 Part B, Category B-D, "Full Penetration Welds of Nozzles in Vessels"

ASME Code, Section XI, Examination Category B-D, Item B3.90, requires 100 percent volumetric coverage of Class 1 RPV nozzle-to-shell welds N-1B, N-2A, N-2B, N-2K, and N-8B. Component geometry limits scanning from the nozzle side of the welds so that 100 percent of the required examination coverage is impractical. The NRC staff determined that NMC would have to redesign and modify RPV nozzle-to-shell welds N-1B, N-2A, N-2B, N-2K, and N-8B to obtain 100 percent volumetric coverage. Therefore, requiring NMC to perform the Code-required examinations would place a significant burden on it. NMC's proposed alternative to the Code requirements is that it performed the examinations to the extent practical. It obtained approximately 62.3 percent volumetric coverage of each of the subject welds. This aggregate coverage also includes greater than 90 percent of the examination volume using both 45 and 60 degree ultrasonic beam angles from the vessel side of the weld. NMC used EPRI PDI-qualified personnel, equipment, and procedures for ferritic pressure vessel welds to do the examinations. Based on the above, the NRC staff has determined that the examinations

performed in these areas would have detected any significant degradation that might have been present. Thus, NMC has provided reasonable assurance of continued structural integrity of the subject welds.

3.3 Part C, Category B-J, “Pressure Retaining Welds in Piping”

ASME Code, Section XI, Examination Category B-J, Item B9.11, requires 100 percent volumetric coverage of pipe-to-tee weld W-22 LSUD. Access restrictions due to the outside surface geometry permit scanning only from the pipe side of the weld. This makes the Code-required 100 percent volumetric examination from both sides of the weld impractical. NMC would have to completely redesign and modify the subject weld to achieve 100 percent volumetric coverage. This would place a significant burden on NMC.

As shown by the sketches and descriptions provided in its submittals, NMC obtained 50 percent of the Code-required volumetric coverage for weld W-22 LSUD. NMC used an ultrasonic inspection procedure that has been qualified through the EPRI PDI Program and accepted by NRC. The examination performed by NMC on this piping weld includes the following:

- 100 percent of the required volumetric coverage with a 45 degree longitudinal wave technique, applied in one direction oriented perpendicular to the weld axis from the pipe side of the weld.

- 50 percent coverage in clockwise and counterclockwise directions parallel to the weld applied from the pipe side.

NMC completed the Code-required surface examination for this weld and noted no indications. Furthermore, NMC examined other welds in the Code Examination Category to the full extent of Code requirements. NMC could not meet the Code-required, 100 percent volumetric examination requirement applied from both sides of this weld. However, the examinations performed in conjunction with complete examination of other similar piping welds should have detected any significant patterns of degradation that might have occurred. Thus, NMC has provided reasonable assurance of continued structural integrity of weld W-22 LSUD.

4.0 CONCLUSION

The NRC staff adopts the evaluations and recommendations for granting the subject reliefs contained in the attached PNNL Technical Letter Report. The NRC staff concludes that the Code examination coverage requirements are impractical for the subject components listed in Relief Request No. 16. Reasonable assurance of the structural integrity of the subject components has been provided by the examinations NMC performed. Accordingly, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10-year interval. All other requirements of the ASME Code, Section III and XI, for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector. Furthermore, the NRC staff has determined that granting relief pursuant to 10 CFR 50.55a(g)(6)(i) is authorized by law and will not endanger life or property, or the common defense and security and is otherwise in the public interest giving due consideration to the burden upon the licensee that could result if the requirements were imposed on the facility.

Attachment: Technical Letter Report

Principal Contributor: T. McLellan

Date: May 19, 2003

TECHNICAL LETTER REPORT
ON THE THIRD 10-YEAR INTERVAL INSERVICE INSPECTION
REQUEST FOR RELIEF 16, PARTS A, B, AND C
FOR
NUCLEAR MANAGEMENT COMPANY, LLC
MONTICELLO NUCLEAR GENERATING PLANT
DOCKET NUMBER: 50-263

1.0 INTRODUCTION

By letter dated May 30, 2002, the licensee, Nuclear Management Company, LLC, submitted Request for Relief Nos. 15 and 16, Parts A, B, and C seeking relief from requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components*. In response to an NRC Request for Additional Information (RAI), the licensee provided further information in a letter dated February 10, 2003. These requests are for the third 10-year inservice inspection (ISI) interval at Monticello Nuclear Generating Plant (Monticello). The Pacific Northwest National Laboratory (PNNL) has evaluated Request for Relief No. 16 in this report. Relief Request No. 15 is being addressed by NRC Staff in a separate report.

2.0 REGULATORY REQUIREMENTS

Inservice inspection of the ASME Code Class 1, 2, and 3 components is to be performed in accordance with Section XI of the ASME *Boiler and Pressure Vessel Code* (B&PV Code), and applicable addenda, as required by 10 CFR 50.55a(g), except where specific relief has been granted by the Commission pursuant to 10 CFR 50.55a(g)(6)(i). The regulation at 10 CFR 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the U.S. Nuclear Regulatory Commission (NRC), if the licensee demonstrates that (i) the proposed alternatives would provide an acceptable level of quality and safety or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Pursuant to 10 CFR 50.55a(g)(4), ASME Code Class 1, 2, and 3 components (including supports) shall meet the requirements, except the design and access provisions and the preservice examination requirements, set forth in the ASME Code, Section XI, "Rules for Inservice Inspection (ISI) of Nuclear Power Plant Components," to the extent practical within the limitations of design, geometry, and materials of construction of the components. The regulations require that inservice examination of components and system pressure tests conducted during the first 10-year interval and subsequent intervals comply with the requirements in the latest edition and addenda of Section XI of the ASME Code, which was incorporated by reference in 10 CFR 50.55a(b) 12 months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of Record for Monticello third 10-year interval inservice inspection program, which began on June 1, 1992, is the 1986 Edition of Section XI of the ASME Boiler and Pressure Vessel Code, with no addenda.

3.0 EVALUATION

The information provided by Nuclear Management Company, LLC in support of the request for relief from code requirements has been evaluated and the basis for disposition is documented below.

3.1 Request for Relief No. 16 (Part A), Examination Category B-A, Items B1.12 and B1.21, Pressure Retaining Welds in Reactor Vessel

Code Requirement: ASME Section XI, Examination Category B-A, Item B1.12, requires volumetric examination, as defined in Figure IWB-2500-2, of essentially 100% of the length of each reactor pressure vessel (RPV) longitudinal shell weld. Item B1.21 requires volumetric examination, as defined in Figure IWB-2500-3, of essentially 100% of the *accessible* length of each RPV circumferential head weld. "Essentially 100%," as clarified by ASME Code Case N-460, is greater than 90% coverage of the examination volume, or surface area, as applicable.

Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee has requested relief from 100% volumetric examination of the following RPV longitudinal shell and circumferential head welds:

Weld Number	**Weld Type**	**Volume Completed**
VCBB-1	Bottom head-to-shell	11%
VLAA-1	Longitudinal shell	80.1%
VLAA-2	Longitudinal shell	75.8%

Licensee's Basis: (as stated):

Monticello was designed and constructed prior to development of ASME XI, therefore, plant and component design and layout for inspection coverage required by ASME Section XI Code, in many cases, is not sufficient to permit satisfying the current code requirements. Inspection limitations are primarily due to obstructions and configuration interference.

Category B-A, Item B1.21, Summary Number 102638, Component VCBB-1, Bottom Head to Reactor Vessel Weld: The volumetric examination, as required by Table IWB-2500-1, was limited to approximately 5.9% of total weld area. The volumetric examination is limited by the installation of permanent insulation between reactor vessel wall and biological shield. The only access to the weld is through the biological shield window for reactor vessel nozzle N1B (and N1A) which have a small area of insulation that is considered as a removable design. This limited access makes just 6 ft 8 inches of weld length available for examination from a single side of the weld only.

Previous examinations from the 1994 Refueling Outage indicate that 5 ft 10 in of weld VCBB-1 was accessible for examination through the N1A Nozzle Window, which equates to approximately 5.1 % of the total weld length. The examination coverage for Weld VCBB-1, combining the two examinations performed during the 3rd 10-Year Interval, totals approximately 11%.

Category B-A, Item B1.12, Summary Numbers 102642 and 102643, Components VLAA-1 and VLAA-2, Reactor Vessel Longitudinal Welds: The volumetric examinations, as required by Table IWB-2500-1, were limited to approximately 80.1% [VLAA-1] and 75.8% [VLAA-2] of weld length. The volumetric examinations (V-scan) were limited by available technology for in-vessel ultrasonic (UT) delivery tooling, the span distance between re-circulation jet pump diffusers and their proximity to the reactor vessel wall, and the interference of the jet pump instrumentation lines. The UT tool head is 5.5" in width and 9.5" in height. The UT instrument head rotates 90 degrees to obtain a V-scan across the weld. The span distance between re-circulation jet pump diffusers was less than the 9.5" UT instrument head, so [a portion of] the UT scan was not possible from the internal surface of reactor vessel. These longitudinal welds were not accessible from the outside diameter (OD) of the reactor vessel due to biological shielding and no nearby nozzle access windows being available. The reactor vessel has a total of eight longitudinal welds: six of these welds were examined "essentially 100%", while two welds (VLAA-1 and VLAA-2) had greater than 75% coverage. Cumulatively, (all eight longitudinal welds) greater than 90% of longitudinal weld length was examined.

In addition, functional pressure tests and visual examinations (VT-2) are performed during regular inspection intervals to ensure the piping system and vessel is capable of maintaining pressure integrity. Where required by code surface examinations have been performed. System integrity is monitored continuously during normal operation by routine operator rounds during shift and remote monitoring methods (e.g., containment radiation monitoring, containment air monitoring, containment leakage detection and monitoring, and containment temperature monitoring, etc.).

Alternative Proposed (as stated):

All in-service inspections on these components have been done to the greatest extent practical. No further alternative methods are proposed or recommended beyond the techniques already applied. The Monticello In-Service Inspection Program Plan will continue to document the limitations.

Evaluation: The Code requires 100% volumetric examination of the subject RPV circumferential head-to-shell and longitudinal shell welds, however, access limitations restrict volumetric coverages on these welds. For the licensee to achieve 100% volumetric coverage, the RPV, and it's appurtenances, would have to be redesigned and modified. This would place a significant burden on the licensee, thus the Code-required 100% volumetric examinations are impractical.

Ultrasonic examination of these welds was conducted using personnel, equipment and procedures qualified through the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Program for ferritic pressure vessel welds. The longitudinal weld examinations were performed from the inside of the vessel with a remote scanning device. The device was designed to be positioned over the longitudinal seams and rotated 90-degrees to enable ultrasonic scans in both parallel and perpendicular directions, respective to the weld axis. However, longitudinal welds VLAA-1 and VLAA-2 are located in the RPV shell course adjacent to jet pump diffuser assemblies, which have a conical shape toward their lower end. This change in shape (increased outside diameter) restricts the

movement of the ultrasonic inspection device over the portion of the longitudinal welds near these diffuser nozzles. As shown on the sketches and technical descriptions provided by the licensee[1], a significant amount (80.1% and 75.8%) of the required examination volume coverage was obtained for longitudinal shell welds VLAA-1 and VLAA-2, respectively. In order to get the inspection device over the remaining 20-25% of these longitudinal welds, the jet pump diffusers would have to be removed. This would require extensive modification to the RPV and the diffuser assemblies. There is no access to these longitudinal welds from the vessel outside diameter due to the biological shield wall and RPV insulation. The remaining six RPV longitudinal shell welds were examined to the extent required by the Code, and no indications were observed during any of the longitudinal weld examinations.

For RPV bottom head-to-shell weld VCBB-1, partial access to the outside surface is available though the biological shield wall in only two areas - the windows for access to main recirculation nozzles N1A and N1B. This affords a one-side only examination of weld VCBB-1 for approximately 6 feet of weld length inside these access windows. No access is available to this weld from the vessel inside diameter because it is located just above the core shroud shelf and supports, which eliminates the opportunity to access the area through a removed fuel assembly. In addition, the radial feedwater and core spray spargers, jet pump nozzles, and instrumentation lines restrict access to the weld from the annulus outside the core shroud. The licensee was able to obtain volumetric coverage for approximately 11% of the length of weld VCBB-1 through the N1A and N1B bio-wall access windows. The licensee also examined another circumferentially oriented weld, the vessel-to-flange weld VCBC-5, to the extent required by the Code, and no indications were observed. (Other shell-to-shell welds were not examined as the licensee was authorized to use the alternative established in BWRVIP-05 by SERs issued in July 1998 and March 2000.)

All the examinations were performed using EPRI PDI qualified equipment, personnel and procedures. In addition, most of the required RPV welds have been examined to the extent required by the Code. Therefore, it is concluded that any significant patterns of degradation would have been detected by the examinations in the areas that were completed, providing reasonable assurance of continued structural integrity of the RPV. Based on the impracticality of examining 100% of the subject welds, and the examination coverages obtained, it is recommended that relief be granted pursuant to 10 CFR 50.55a(g)(6)(i).

3.2 Request for Relief No. 16 (Part B), Examination Category B-D, Item B3.90, Full Penetration Welds of Nozzles in Vessels

Code Requirement: ASME Section XI, Examination Category B-D, Item B3.90, requires essentially 100% volumetric examination, as defined in Figure IWB-2500-7, a through d, as applicable, of Class 1 reactor pressure vessel (RPV) full penetration nozzle-to-shell welds. “Essentially 100%,” as clarified by ASME Code Case N-460, is greater than 90% coverage of the examination volume, or surface area, as applicable.

1. Drawings, descriptions and reports of examinations provided as part of the licensee’s submittal are not included in this report.

Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee has requested relief from 100% volumetric examination of RPV nozzle-to-shell welds N-1B, N-2A, N-2B, N-2K, and N-8B.

Licensee's Basis: (as stated):

Monticello was designed and constructed prior to development of ASME XI, therefore, plant and component design and layout for inspection coverage required by ASME Section XI Code, in many cases, is not sufficient to permit satisfying the current code requirements. Inspection limitations are primarily due to obstructions and configuration interference.

Category B-D, Item B3.90, Summary numbers 102654 (N-1B NV), 102656 (N-2A NV), 102658 (N-2B NV), 102674 (N-2K NV) and 102698 (N-8B NV), Reactor Vessel Nozzle Welds: Each weld was limited to approximately 62.3% volumetric UT coverage due to vessel-to-nozzle weld configuration which physically precludes application of the required scan angles on the nozzle side of the weld. No additional alternative examinations are currently available to achieve the required volumetric coverage.

In addition, functional pressure tests and visual examinations (VT-2) are performed during regular inspection intervals to ensure the piping system and vessel is capable of maintaining pressure integrity. Where required by code surface examinations have been performed. System integrity is monitored continuously during normal operation by routine operator rounds during shift and remote monitoring methods (e.g., containment radiation monitoring, containment air monitoring, containment leakage detection and monitoring, and containment temperature monitoring, etc.).

Alternate Proposed (as stated):

All in-service inspections on these components have been done to the greatest extent practical. No further alternative methods are proposed or recommended beyond the techniques already applied. The Monticello In-Service Inspection Program Plan will continue to document the limitations.

Evaluation: The Code requires 100% volumetric coverage of all Class 1 RPV nozzle-to-shell welds, however, component geometry limits scanning from the nozzle side of the weld so that 100% of the required examination coverage cannot be completed. For the licensee to achieve 100% volumetric coverage, the subject nozzles would have to be redesigned and modified. This would place a significant burden on the licensee, thus the Code-required 100% volumetric examination, performed from both sides of the weld, is impractical.

Ultrasonic examination of these welds was conducted using personnel, equipment and procedures qualified through the Electric Power Research Institute (EPRI) Performance Demonstration Initiative (PDI) Program for ferritic pressure vessel welds. As shown on the sketches and technical descriptions provided by the licensee[2], a significant amount (approximately 62.3%) of the required volumetric coverage was obtained for nozzle-to-shell

2. Drawings, descriptions and reports of examinations provided as part of the licensee's submittal are not included in this report.

welds N-1B, N-2A, N-2B, N-2K, and N-8B. This aggregate coverage includes greater than 90% of the examination volume using both 45 and 60 degree ultrasonic beam angles from the vessel side of the weld. The welds are carbon steel-to-carbon steel with a “set-in” nozzle configuration having a short radius of curvature on the nozzle side. This makes complete ultrasonic access from the nozzle side of the weld impractical.

Round robin tests, as reported in NUREG/CR-5068, have demonstrated that ultrasonic examinations of ferritic material from a single side provide high probabilities of detection (usually 90% or greater) for both near- and far-side cracks in blind inspection trials. While the licensee may not have achieved complete examination coverage (from both sides) as required by the ASME code, the ultrasonic examinations performed by the licensee from the vessel side of the carbon steel weld meet the inspection guidelines documented in NUREG/CR-5068. Additionally, these examinations were performed with personnel, equipment and procedures that have been demonstrated to meet EPRI PDI Program qualification requirements. For these reasons, the examinations performed are expected to detect any significant degradation that might have been present, providing reasonable assurance of the continued structural integrity of this weld. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that relief be granted.

3.3 Request for Relief No. 16 (Part C), Examination Category B-J, Item B9.11, Pressure Retaining Welds in Piping

Code Requirement: Examination Category B-J, Item B 9.11, requires essentially 100% volumetric and surface examination of the weld length, as defined by Figure IWB-2500-8, of Class 1 full penetration piping welds. “Essentially 100%,” as clarified by ASME Code Case N-460, is greater than 90% coverage of the examination volume, or surface area, as applicable.

Relief Request: In accordance with 10 CFR 50.55a(g)(5)(iii), the licensee requested relief from the Code requirement to examine 100% of pipe-to-tee weld W-22 LSUD from both sides of the weld.

Licensee's Basis (as stated):

Monticello was designed and constructed prior to development of ASME XI, therefore, plant and component design and layout for inspection coverage required by ASME Section XI Code, in many cases, is not sufficient to permit satisfying the current code requirements. Inspection limitations are primarily due to obstructions and configuration interference.

Category B-J, Item B9.10, Summary Number 102161, W-22 (LSUD): This weld on Recirculation Manifold B was limited to a single sided examination due to the pipe-to-tee configuration. The material type for this weld is austenitic stainless steel. Performance Demonstration Initiative (PDI) examination techniques are only qualified for the accessible side of the weld on a single side examination of austenitic stainless steel. Regulations included in 10 CFR 50.55a(b)(2)(xv)(A), 10 CFR 50.55a(b)(2)(xv)G and 10 CFR 50.55a(b)(2Xxvi), define new requirements for coverage and qualification demonstration of UT methods. These requirements affect both piping and reactor pressure vessel examinations. The PDI UT methodology is in agreement with the Federal Code [Code of Federal Regulations] regarding single side access for piping. The Federal Code [Code of

Federal Regulations] requires that, if access is available, the weld shall be scanned in each of the four directions (parallel and perpendicular to the weld) where required. Additionally, 100% coverage credit may be taken for single side exams on ferritic piping. However, for austenitic piping, a procedure must be qualified with flaws on the inaccessible side of the weld. The final rule requires that single side access examinations must demonstrate "equivalency to two sided examinations." Current technology is not fully capable of reliably detecting or sizing flaws on the inaccessible side of an austenitic weld for configurations common to US Nuclear applications. Instead of a full coverage, single side qualification, PDI offers a best effort approach, which demonstrates that the best available technology is applied. This best effort approach does not meet the requirements of the Federal Code [Code of Federal Regulations]. PDI Performance Demonstration Qualification Summary (PDQS) austenitic piping certificates acknowledges the limitation that single side examination is performed on a best effort basis. This requires the inaccessible side of the weld to be listed as an area of no coverage. It should be noted that the surface examination for this weld had no limitations and was completed with 100% coverage.

In addition, functional pressure tests and visual examinations (VT-2) are performed during regular inspection intervals to ensure the piping system and vessel is capable of maintaining pressure integrity. Where required by code surface examinations have been performed. System integrity is monitored continuously during normal operation by routine operator rounds during shift and remote monitoring methods (e.g., containment radiation monitoring, containment air monitoring, containment leakage detection and monitoring, and containment temperature monitoring, etc.).

Alternate Proposed (as stated):

All in-service inspections on these components have been done to the greatest extent practical. No further alternative methods are proposed or recommended beyond the techniques already applied. The Monticello In-Service Inspection Program Plan will continue to document the limitations.

Evaluation: The Code requires 100% volumetric coverage of Examination Category B-J pressure retaining welds in piping applied from both sides of the weld. However, pipe-to-tee weld W-22 LSUD has access restrictions due to the outside surface geometry that permits scanning from the pipe side of the weld only. For the licensee to achieve 100% volumetric coverage of this weld would require that the weld be completely redesigned and modified. This would place a significant burden on the licensee; therefore, the Code-required 100% volumetric examination from both sides of the weld is impractical.

As shown by the sketches and descriptions provided by the licensee[3], 50% of the Code-required volumetric coverage for weld W-22 LSUD has been obtained. The licensee used an ultrasonic inspection procedure that has been qualified under the performance demonstration protocol developed by the EPRI PDI and accepted by NRC. The examination performed by the licensee on this piping weld includes 100% of the required volumetric coverage with a 45 degree longitudinal wave technique, applied in one direction oriented perpendicular to the

3. Drawings, descriptions and reports of examinations provided as part of the licensee's submittal are not included in this report.

weld axis from the pipe side of the weld, and 50% coverage in clockwise and counterclockwise directions parallel to the weld applied from the pipe side. The Code-required surface examination for this weld was completed and no indications were noted. Further, other welds in the Code Examination Category are examined to the full extent of Code requirements. While the licensee cannot meet the Code-required 100% volumetric examination requirement applied from both sides of this weld, the examinations completed, performed in conjunction with complete examination of other similar piping welds, should have detected any significant patterns of degradation that might have occurred, providing reasonable assurance of the continued integrity of weld W-22 LSUD. Therefore, pursuant to 10CFR50.55a(g)(6)(i), it is recommended that relief be granted.

4.0 CONCLUSIONS

The PNNL staff has reviewed the licensee's submittal and concludes that the Code examination coverage requirements are impractical for the subject welds listed in Request for Relief No. 16, Parts A through C. Further, reasonable assurance of the structural integrity of the subject components has been provided by the examinations that were performed. Therefore, pursuant to 10 CFR 50.55a(g)(6)(i), it is recommended that Request for Relief No. 16 be granted for the third 10-year interval at Monticello Nuclear Generating Plant, which is scheduled to conclude on May 31, 2003. All other requirements of the ASME Code, Section III and XI for which relief has not been specifically requested and approved remain applicable, including third party review by the Authorized Nuclear Inservice Inspector.