August 16, 2006

Mr. G. R. Peterson
Vice President
McGuire Nuclear Station
Duke Power Company LLC
12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION, UNIT 1, REQUEST FOR RELIEF 05-MN-01, FOR THIRD 10-YEAR INTERVAL INSERVICE INSPECTION PROGRAM PLAN (TAC NOS. MC8257, MD0154, MD0155, MD0156, MD0157, MD0158, MD0159, AND MD0160)

Dear Mr. Peterson:

By letter dated August 22, 2005, Duke Power Company LLC (the licensee), submitted Relief Request (RR) No. 05-MN-01, for its Third 10-Year Interval Inservice Inspection (ISI) Program Plan for McGuire Nuclear Station, Unit 1. The licensee requested relief from and proposed alternatives to the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code) 1995 edition with the 1996 addenda, for welds 1PZR-12, 1PZR-15, and 1PZR-16 associated with the reactor coolant system and welds 1RCPA-8-1, 1ASWINJF-1, 1ELDHX-HD-FLG, 1RCPA-10-1, and 1NVP888-1 associated with the chemical volume and control system. The licensee submitted the relief request as a result of limited weld coverage following ISI examinations during refueling outage 16. Table 1 in the enclosed safety evaluation provides a list of the welds and their associated systems.

The Nuclear Regulatory Commission (NRC) staff has reviewed the licensee's submittal and, based on the information provided, concludes that compliance with the specified Code requirements for welds 1PZR-12, 1PZR-15, 1PZR-16, 1RCPA-8-1, 1ASWINJF-1, 1ELDHX-HD-FLG, and 1RCPA-10-1 is impractical and that the volumetric examinations performed during refueling outage 16 provide reasonable assurance of structural integrity of the subject welds. Therefore, relief is granted pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g)(6)(i) for the third 10- year ISI interval at McGuire Nuclear Station, Unit 1. The 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.

For weld 1NVP888-1, the staff has reviewed the licensee's submittal and based on the information provided, concludes that compliance with the Code requirements would result in a significant hardship or unusual difficulty without a compensating increase in the level of quality and safety. Furthermore, the staff concludes that the examinations performed on weld 1NVP888-1 provide reasonable assurance of structural integrity of the subject weld. Therefore, the licensee’s proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year ISI interval at McGuire Nuclear Station, Unit 1.

The enclosed Safety Evaluation contains the NRC staff's evaluation and conclusions.

Sincerely,

/RA/

Evangelos C. Marinos, Chief
Plant Licensing Branch II-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-369

Enclosure:
Safety Evaluation

cc w/encl: See next page

The enclosed Safety Evaluation contains the NRC staff's evaluation and conclusions.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

OF THIRD 10-YEAR INTERVAL INSERVICE INSPECTION

REQUEST FOR RELIEF NO. 05-MN-01

DUKE POWER COMPANY, LLC

MCGUIRE NUCLEAR STATION, UNIT 1

DOCKET NO. 50-369

1.0 INTRODUCTION

By letter dated August 22, 2005 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML052440218), Duke Power Company LLC, the licensee, submitted Request for Relief 05-MN-001 from requirements of the American Society of Mechanical Engineers (ASME), *Boiler and Pressure Vessel Code* (Code), Section XI, *Rules for Inservice Inspection of Nuclear Power Plant Components* for McGuire Nuclear Station, Unit 1 (McGuire 1). The licensee submitted the relief request as a result of limited weld coverage following inservice inspection (ISI) examinations during refueling outage 16. Table 1 below provides a list of the welds and their associated systems. The Nuclear Regulatory Commission (NRC) staff, with technical assistance from its contractor, the Pacific Northwest National Laboratory (PNNL), has reviewed and evaluated the information provided by the licensee.

2.0 REGULATORY REQUIREMENTS

Inservice inspection (ISI) of the Code, Class 1, 2, and 3 components is performed in accordance with Section XI of the Code and applicable addenda as required by Title 10 of the *Code of Federal Regulations* (10 CFR), Part 50, Section 50.55a(g), except where specific relief has been granted by the NRC pursuant to 10 CFR 50.55a(g)(6)(i). Section 50.55a(a)(3) states that alternatives to the requirements of paragraph (g) may be used, when authorized by the NRC, if (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), 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 Code, Section XI, "Rules for Inservice Inspection 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 Code incorporated by reference in 10 CFR 50.55a(b) twelve months prior to the start of the 120-month interval, subject to the limitations and modifications listed therein. The Code of record for the McGuire 1 Third 10-Year Interval ISI Program Plan, which began on December 1, 2001, and ends on December 1, 2011, is the 1995 edition through the 1996 addenda of Section XI of the Code.

3.0 EVALUATION

The Table below is a listing of the welds and their associated systems, the licensee is requesting relief from and proposing alternatives to the Code due to limited weld examination coverage.

TABLE 1

List Number	Limited Area/Weld I.D. Number	System/Component for Which Relief is Requested: Area or Weld to be Examined	Code Requirement from Which Relief is Requested: 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage
1.	1PZR-12	Reactor Coolant System (NC) Pressurizer Spray Nozzle to Upper Head	Exam Category B-D Item No. B03.110.002 Fig. IWB-2500-7(b) 73.6% Volume Coverage (COVERAGE LIMITATION)
2.	1PZR-15	NC System Pressurizer Spray Nozzle to Upper Head	Exam Category B-D Item No. B03.110.005 Fig. IWB-2500-7(b) 73.6% Volume Coverage (COVERAGE LIMITATION)
3.	1PZR-16	NC System Pressurizer Spray Nozzle to Upper Head	Exam Category B-D Item No. B03.110.006 Fig. IWB-2500-7(b) 73.6% Volume Coverage (COVERAGE LIMITATION)
4.	1RCPA-8-1	Chemical Volume and Control System (NV) Reciprocating Charging Pump Accumulator Flange to Shell	Exam Category C-A Item No. C01.10.090 Fig. IWC-2500-1 74.4% Volume Coverage (COVERAGE LIMITATION)
5.	1ASWINJF-1	NV System Seal Water Injection Filter 1A Shell to Upper Flange	Exam Category C-A Item No. C01.10.100 Fig. IWC-2500-1 64.4% Volume Coverage (COVERAGE LIMITATION)

List Number	Limited Area/Weld I.D. Number	System/Component for Which Relief is Requested: Area or Weld to be Examined	Code Requirement from Which Relief is Requested: 100% Exam Volume Coverage Exam Category Item No. Fig. No. Limitation Percentage
6.	1ELDHX-HD-FLG	NV System Excess Letdown Heat Exchanger Head to Flange	Exam Category C-A Item No. C01.20.021 Fig. IWC-2500-1 79.8% Volume Coverage (COVERAGE LIMITATION)
7.	1RCPA-10-1	NV System Reciprocating Charging Pump Accumulator Shell to Head	Exam Category C-A Item No. C01.20.080 Fig. IWC-2500-1 71.1% Volume Coverage (COVERAGE LIMITATION)
8.	1NVP888-1	NV System Reducer to Pipe	Exam Category R-A* (Table 4.1-1) Item No. R01.11.150 Fig. IWB-2500-8(c) & Note 1 35.6% Volume Coverage (COVERAGE LIMITATION)

Licensee's Basis for Relief Request

Reactor Coolant System Welds 1PZR-12, 1PZR-15, and 1PZR-16

The pressurizer spray, safety and relief nozzles of the reactor coolant system (NC) are carbon steel. The diameter of the spray nozzle is 12.750 inches with a wall thickness of 1.900 inches. The diameter of the Safety and Relief Nozzles is 15.00 inches with a wall thickness of 1.900 inches. During the ultrasonic examination of these welds 1PZR-12, 1PZR-15, and 1PZR-16, 100% coverage of the required examination volume could not be obtained. Coverage was limited because of the proximity of the nozzle blend radius to the weld, which prevented axial scanning from the nozzle side. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree and 60-degree shear waves and straight beam longitudinal waves. The 45-degree beam covered 88% of the weld and 62% of the base material; the 60-degree beam covered 78% of the weld and 54% of the base material; and, the straight beam covered 100% of the weld and 58% of the base material. In order to achieve more coverage, the welds would have to be redesigned to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of these welds.

*Piping Welds examined under the RI-ISI Program developed in accordance with methodology contained in the Westinghouse Owner's Group (WOG) Topical Report, WCAP-14572, Revision 1-NPA and Request for Relief 01-005 approved by NRC Safety Evaluation (SE), dated June 12, 2002.

Chemical Volume and Control System Welds 1RCPA-8-1, 1ASWINJF-1, 1ELDHX-HD-FLG, 1RCPA-10-1, and 1NVP888-1

Weld 1RCPA-8-1

The Reciprocating Charging Pump Accumulator Flange to Shell weld 1RCPA-8-1 of the Chemical and Volume and Control System (NV) is stainless steel. The diameter of this weld is 6.660 inches with a wall thickness of .495 inches. During the ultrasonic examination of the shell to flange weld 1RCPA-8-1, 100% coverage of the required examination volume could not be obtained. Coverage was limited because of the proximity of the flange taper to the weld, which prevented scanning from four directions. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree shear waves supplemented by 60-degree longitudinal waves. The 45-degree beam covered 72% of the required examination volume in four orthogonal directions. The 60-degree beam covered 8% from one axial direction. In order to achieve more coverage, the weld would have to be redesigned to eliminate the flange taper, which is impractical. There were no recordable indications found during the inspection of this weld.

Weld 1ASWINJF-1

The Seal Water Injection Filter 1A Shell to Upper Flange weld of the NV system is stainless steel. The diameter of weld 1ASWINJF-1 is 4.000 inches with a wall thickness of .438 inches. During the ultrasonic examination of shell to flange weld 1ASWINJF-1, 100% coverage of the required examination volume could not be obtained. Coverage was limited because of the proximity of the flange taper to the weld, which prevented scanning from four directions. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree shear waves supplemented by 60-degree longitudinal waves. The 45-degree beam covered 63% of the required examination volume in four orthogonal directions. The 60-degree beam covered 3% from one axial direction. In order to achieve more coverage, the weld would have to be redesigned to eliminate the flange taper, which is impractical. There were no recordable indications found during the inspection of this weld.

Weld 1ELDHX-HD-FLG

The Excess Letdown Heat Exchanger Head to Flange weld of the NV system is stainless steel-carbon steel. The diameter of weld 1ELDHX-HD-FLG is 9.500 inches with a wall thickness of .750 inches. During the ultrasonic examination of head to flange weld 1ELDHX-HD-FLG, 100% coverage could not be obtained. Coverage was limited because of the proximity of the flange taper to the weld, which prevented scanning from four directions. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree shear waves supplemented by 45-degree longitudinal waves. The 45-degree shear wave covered 51% of the required examination volume in four orthogonal directions. The 45-degree longitudinal wave covered 28% from one axial direction. In order to achieve more coverage, the weld would have to be redesigned to eliminate the flange taper, which is impractical. There were no recordable indications found during the inspection of this weld.

Weld 1RCPA-10-1

The Reciprocating Charging Pump Accumulator Shell to Head Weld of the NV system is stainless steel. The diameter of the weld is 6.660 inches with a wall thickness of .495 inches. During the ultrasonic examination of shell to head weld 1RCPA-10-1, 100% coverage of the required examination volume could not be obtained. Coverage was limited because of the proximity of the flange taper to the weld, which prevented scanning from four directions. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The weld volume was scanned using 45-degree shear waves supplemented by 60-degree longitudinal waves. The 45-degree shear wave covered 67% of the required examination volume in four orthogonal directions. The 60-degree longitudinal wave covered 12% from one axial direction. In order to achieve more coverage, the weld would have to be redesigned to eliminate the head taper, which is impractical. There were no recordable indications found during the inspection of this weld.

Weld 1NVP888-1

The reducer to pipe weld material of the NV system is stainless steel. The diameter of this weld is 2.000 inches with a wall thickness of .344 inches. During the ultrasonic examination of weld 1NVP888-1, 100% coverage of the required examination volume could not be obtained. Coverage was limited because of the proximity of a reducer and its taper to a socket weld at a valve, which prevented scanning from four directions. The amount of coverage reported presents the aggregate coverage from all scans performed on the weld and base material. The required volume was scanned using 45-degree, 60-degree shear waves and 70-degree shear waves. The 45-degree beam covered 50% of the volume in two circumferential directions. The 60-degree beam covered 42% of the volume in one axial direction from the reducer side of the weld. The 70-degree shear wave covered 17.4% of the volume from one axial direction from the reducer side of the weld but was not included in the percent of coverage because of the requirements in 10 CFR 50.55a(b)(2)(xv)(A)(*2*). In order to achieve more coverage, the weld would have to be redesigned to allow scanning from both sides of the weld, which is impractical. There were no recordable indications found during the inspection of this weld.

Licensee's Proposed Alternative Examinations

The scheduled 10-year ISI interval Code examination was performed on the referenced areas/welds and it resulted in the noted limited coverage of the required ultrasonic volumes. No additional examinations are planned for the areas/welds during the current inspection interval.

Implementation Schedule and Duration

No additional examinations are planned for the areas/welds during the current inspection interval.

Licensee's Justification for Requesting Relief

Reactor Coolant System Welds 1PZR-12, 1PZR-15, and 1PZR-16

Ultrasonic examination of welds 1PZR-12, 1PZR-15, and 1PZR-16 for item B03.110 was conducted using personnel, qualified in accordance with the Code, Section XI, Appendix VII.

The examinations were also performed in accordance with the requirements of the Code, Section V, Article 4 with the additional requirements of Section XI, Appendix I.

The Pressurizer Nozzle to Upper Head Welds are limited due to single-sided access caused by their nozzle geometry. In order to achieve more coverage, the nozzles would have to be redesigned to allow access from both sides. Therefore, the 100% volumetric examination is impractical for this weld. During the examination of these welds, techniques were utilized to obtain maximum possible coverage.

These welds are located on the upper head of the pressurizer and are not part of the reactor pressure vessel. These welds are not exposed to significant neutron fluence and are not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. The McGuire 1 Pressurizer was fabricated by Westinghouse and is free from unacceptable fabrication defects. Westinghouse performed rigorous state-of-the-art inspections following fabrication to ensure no significant flaws existed. If a leak were to occur at any of the welds in question, there are methods by which the leak could be identified for prompt engineering evaluation. A leak at any of these welds would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and this is monitored periodically by Operations and also by the Containment Ventilation System Engineer.

b) Increased pressurizer enclosure temperature. This parameter is continuously monitored by Operations via an Operator Aid Computer (OAC) alarm, and this is periodically monitored by the System Engineer.

c) Increased input into the Ventilation Unit Condensate Drain Tank (VUCDT). This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

d) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm [gallon per minute].

e) Other indicators such as containment radiation monitors EMF-38, 39, and 40, monitor the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the pressurizer enclosure or containment, but could not specifically identify the exact source of the leakage. A containment entry would be required to identify the exact source of the leakage. Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature/pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

No additional B03.110 welds were examined during refueling outage 16. No additional surface or volumetric nondestructive examinations (NDEs) were performed on these welds.

Chemical Volume and Control System Welds 1RCPA-8-1, 1ASWINJF-1, 1ELDHX-HD-FLG, 1RCPA-10-1, and 1NVP888-1

Weld 1RCPA-8-1

An ultrasonic examination of weld 1RCPA-8-1 for item C01.010 was conducted using personnel qualified in accordance with the Code, Section XI, Appendix VII. The examination was also performed in accordance with the requirements of the Code, Section XI, Appendix III with the additional requirements of, Section XI, Appendix I. This weld is located on the NV System Reciprocating Charging Pump Accumulator. It is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt engineering evaluation. A leak at this weld would result in the following:

a) Abnormal Volume Control Tank (VCT) level trends and/or unexpected auto make-ups.

b) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

c) Increase in ND/NS [Residual Heat Removal System/Containment Spray System] Sump inputs. This parameter is monitored periodically by the Liquid Radwaste System Engineer.

Also, operators perform surveillance once per shift during daily rounds of the room containing the Reciprocating Charging Pump Accumulator. This surveillance should identify any leak at the weld in question.

No additional C01.010 welds were examined during refueling outage 16. No additional surface or volumetric NDE were performed on this weld.

Weld 1ASWINJF-1

Ultrasonic examination of weld 1ASWINJF-1 for item C01.010 was conducted using personnel qualified in accordance with the Code, Section XI, Appendix VII. The examination was also performed in accordance with the requirements of the Code, Section XI, Appendix III with the additional requirements of Section XI, Appendix I. This weld is located on the Seal Water Injection Filter, and is not exposed to significant neutron fluence and it is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt engineering evaluation. A leak at this weld would result in the following:

a) Abnormal VCT level trends and/or unexpected auto make-ups.

b) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

c) Increase in ND/NS Sump inputs. This parameter is monitored periodically by the Liquid Radwaste System Engineer.

One additional NDE ultrasonic examination was performed on the Seal Water Injection Filter 1A, Item Number C01.010.101 shell to lower flange weld. The results from this examination were acceptable with 90.10% coverage. No additional surface or volumetric NDE were performed on weld 1ASWINJF-1.

Weld 1ELDHX-HD-FLG

The ultrasonic examination of weld 1ELDHX-HD-FLG for item C01.020 was conducted using personnel, qualified in accordance with the Code, Section XI, Appendix VII. The examination was performed in accordance with the requirements of the Code, Section XI, Appendix III with the additional requirements of Section XI, Appendix I. This weld is located on the Excess Letdown Heat Exchanger and is not exposed to significant neutron fluence, and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt engineering evaluation. A leak at this weld would result in the following:

a) Increased containment humidity. This parameter is indicated in the control room and it is monitored periodically by Operations and by the Containment Ventilation System Engineer.

b) Increased input into the VUCDT. This parameter is monitored continuously by Operations via an OAC alarm and also periodically by the Liquid Radwaste System Engineer and Reactor Coolant System Engineer.

c) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of reactor coolant leakage calculation, which is required by the Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

d) Other indicators such as containment radiation monitors EMF-38, 39, and 40 monitor the containment floor and equipment sump levels.

Note: The above parameters would be used to identify a leak in the containment, but could not specifically identify this weld as the source of leakage. A containment entry would be required to identify the exact source of the leak. Also, a containment walkdown is performed when the unit reaches Mode 3 (full temperature/pressure) during the unit shutdown and startup for each refueling outage. This walkdown should identify any leak at the weld in question.

One additional NDE ultrasonic examination was performed on the Excess Letdown Heat Exchanger, Item Number C01.020.020 shell to head weld. The results from this examination were acceptable with 100% coverage. No additional surface or volumetric NDEs were performed on weld 1ELDHX-HD-FLG.

Weld 1RCPA-10-1

The ultrasonic examination of weld 1RCPA-10-1 for item C01.020 was conducted using personnel qualified in accordance with the Code, Section XI, Appendix VII. The examinations were performed in accordance with the requirements of the Code, Section XI, Appendix III with the additional requirements of Section XI, Appendix I. This weld is located on the NV System Reciprocating Charging Pump Accumulator and is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e. embrittlement) associated with neutron bombardment. If a leak were to occur at the weld in question, there are methods by which the leak could be identified for prompt engineering evaluation. A leak at this weld would result in the following:

a) Abnormal VCT level trends and/or unexpected auto make-ups.

b) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specification 3.4.13.1 is 1 gpm.

c) Increase in ND/NS Sump inputs. This parameter is monitored periodically by the Liquid Radwaste System Engineer.

Also, operators perform surveillance once per shift during daily rounds of the room containing the Reciprocating Charging Pump Accumulator. This surveillance should identify any leak at the weld in question.

No additional C01.020 welds were examined during refueling outage 16. No additional surface or volumetric NDEs were performed on this weld.

Weld 1NVP888-1

The ultrasonic examination of weld 1NVP888-1 for item R01.011 was conducted using personnel, procedures and equipment qualified in accordance with the Code, Section XI, Appendix VIII, Supplement 2. This weld is located on the outlet side of the 1A Seal Water Injection Filter Outlet Isolation Valve (1NV-494), is not exposed to significant neutron fluence and is not prone to negative material property changes (i.e., embrittlement) associated with neutron bombardment. A leak at this weld would result in the following:

a) Abnormal VCT level trends and/or unexpected auto make-ups.

b) Increase in unidentified reactor coolant leakage. This parameter would be exhibited during performance of the reactor coolant leakage calculation, which is required by Technical Specifications to be performed every 72 hours. The unidentified leakage specification in Technical Specifications 3.4.13.1 is 1 gpm.

c) Increase in ND/NS Sump inputs. This parameter is monitored periodically by the Liquid Radwaste System Engineer.

Two additional NDE ultrasonic examinations were performed on 2.00" diameter, .344-inch wall thickness welds in the NV System. The results from these examinations were acceptable with 100% coverage.

NRC Staff's Evaluation:

Reactor Coolant System Welds 1PZR-12,1PZR-15, and 1PZR-1

Section XI, Table IWA-2500-1, Examination Category B-D, Item 3.110, figure IWB-2500-7(b) of the Code requires 100% volumetric examination of the subject pressurizer spray, safety and relief nozzle welds 1PZR-12, 1PZR-15, and 1PZR-16. The subject nozzles are made of carbon steel. The diameter of the spray nozzle is 12.750 inches with wall thickness of 1.900 inches. The diameter of the safety and relief nozzles is 15.00 inches with wall thicknesses of 1.900 inches.

The licensee was unable to obtain 100% volumetric coverage because of the proximity of the nozzle blend radius to welds 1PZR-12, 1PZR-15, and 1PZR-16 which prevented axial scanning from the nozzle side. The NRC staff determined that in order for the licensee to obtain the Code-required volumetric coverage the subject nozzles would have to be re-designed to allow scanning from both sides of the weld. Furthermore, requiring the licensee to perform the Code-required examination would cause a significant burden on the licensee. Therefore, the staff determined that the ASME Code-required volumetric examinations are impractical to perform, based on the description of the component and the drawings submitted with the licensee's August 22, 2005, letter.

The licensee scanned the weld volumes using 45-degree and 60-degree shear waves and straight beam longitudinal waves. With the 45-degree beam, the licensee obtained 88% of the weld and 62% of the base material. With the 60-degree beam, the licensee obtained 78% of the weld and 54% of the base material. The straight beam covered 100% of the weld and 58% of the base material. The licensee obtained an aggregate coverage from all scans of 73.6% volumetric coverage for each of the subject nozzles. The licensee found no recordable indications during the volumetric examination of the subject welds.

Furthermore, round robin tests, as reported in NUREG/CR-5068, "A Comparison of Three Round Robin Studies on ISI Reliability on Wrought Stainless Piping," 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 Code, the ultrasonic examinations performed by the licensee from the vessel side of the carbon steel weld meet the inspection procedure guidelines documented in NUREG/CR-5068. Therefore, the NRC staff determined that the volumetric coverages obtained provide reasonable assurance of the structural integrity of the subject nozzles and that these examinations would have detected any significant patterns of degradation, if any had occurred.

Chemical Volume and Control System Welds 1ASWINJF-1, 1ELDHX-HD-FLG, 1RCPA-10-1, and 1RCPA-8-1

The Code, Section XI, IWC-2500-1, Examination Category C-A Pressure Retaining Welds In Pressure Vessels, Items 1.10 and 1.20 require an essentially 100% volumetric examination of the shell circumferential and head circumferential weld length respectively.

The licensee has requested relief from the Code requirement of essentially 100% volumetric examination for the reciprocating charging pump accumulator flange to shell weld 1RCPA-8-1, seal water injection filter 1A shell to upper flange weld 1ASWINJF-1, excess letdown heat exchanger head to flange weld 1ELDHX-HD-FLG, and reciprocating charging pump accumulator shell to head weld 1RCPA-10-1.

The reciprocating charging pump accumulator flange to shell weld 1RCPA-8-1 is made of stainless steel and the diameter of this weld is 6.660 inches with a wall thickness of 0.495 inches. The licensee was unable to obtained essentially 100% coverage from four directions during the examination of the shell to flange weld length because it was limited due to the proximity of the flange taper to the welds. In order for the licensee to obtain the Code-required essentially 100% volumetric coverage, the subject welds would have to be redesigned to eliminate the flange taper and would cause a significant burden on the licensee. Therefore, the NRC staff determined that the Code requirements are impractical, based on the description and drawings provided in the licensee's August 22, 2005, letter.

The licensee scanned the welds using a 45° shear wave supplemented by 60° longitudinal wave. The licensee obtained an aggregate coverage of 74.4% for weld 1RCPA-8-1, 64.4% for weld 1ASWINJF-1, 79.8% for weld 1ELDHX-HD-FLG, and 71.1% for weld 1RCPA-10-1. The licensee found no recordable indications during the volumetric examination of the subject welds. The staff determined that the volumetric coverages obtained by the licensee provide reasonable assurance of structural integrity of the subject welds and that these examinations would have detected any significant patterns of degradation, if any had occurred.

Chemical Volume and Control System Weld 1NVP888-1

The licensee was unable to obtain 100% coverage of NV system weld 1NVP888-1 because of the proximity of a reducer and its taper to a socket weld at a valve. The reducer to pipe material is stainless steel and the diameter of this weld is 2.00 inches with a wall thickness of .344 inches. In order for the licensee to perform the Code-required volumetric examination, the subject component would have to be redesigned which would cause a significant hardship without a compensating increase in quality and safety.

The volumetric examination was conducted using personnel, procedures and equipment qualified in accordance with the Code, Section XI, Appendix VIII, Supplement 2. The licensee scanned the subject weld using 45° longitudinal, 60° longitudinal, and 70° shear waves. With the 45° beam, the licensee obtained 50% of the weld volume in two circumferential directions. The 60° beam covered 42% of the volume in one axial direction from the reducer side of the weld. With the 70° shear wave scan, the licensee obtained 17.4% of the weld volume from one axial direction from the reducer side of the weld. However, the licensee did not include the 17.4% coverage in its aggregate volumetric coverage of 35.6% because of the requirements in 10 CFR 50.55a(b)(2)(xv)(A)(*2*). As an alternative, the licensee performed two additional

volumetric examinations on 2.00-inch diameter, 0.344-inch wall thickness welds in the NV System. The licensee obtained 100% volumetric coverage on these two welds. The licensee found no recordable indications during the volumetric examination of the subject welds. Therefore, the volumetric coverage obtained on the subject welds provides reasonable assurance of structural integrity of the subject welds and these examinations would have detected any significant patterns of degradation, if any had occurred.

4.0 CONCLUSIONS

For Code, Examination Category B-D, Item 3.110, welds 1PZR-12,1PZR-15, and 1PZR-16 and Examination Category C-A, Items 1.10 and 1.20 welds 1RCPA-8-1, 1ASWINJF-1, 1ELDHX-HD-FLG, and 1RCPA-10-1, the staff has reviewed the licensee's submittal and, based on the information provided, the staff concludes that compliance with the specified Code requirements is impractical and that the volumetric examinations performed provide reasonable assurance of structural integrity of the subject welds. Therefore, relief is granted pursuant to 10 CFR 50.55a(g)(6)(i) for the third 10- year ISI interval at McGuire 1. The 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.

For weld 1NVP888-1, the staff has reviewed the licensee's submittal and based on the information provided, concludes that compliance with the Code requirements would result in a significant hardship or unusual difficulty without a compensating increase in the level of quality and safety. Furthermore, the staff concludes that the examinations performed on weld 1NVP888-1 and two other NV system welds provide reasonable assurance of structural integrity of the subject welds. Therefore, the licensee’s proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) for the third 10-year ISI interval at McGuire 1.

All other requirements of Code, Section XI for which relief has not been specifically requested remain applicable, including third-party review by the Authorized Nuclear Inservice Inspector.

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