September 6, 2005

G. R. Peterson, Vice President
McGuire Nuclear Station
Duke Energy Corporation
12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION, UNITS 1AND 2 RE: RELIEF REQUESTS FOR THE THIRD 10-YEAR PUMP AND VALVE INSERVICE TESTING PROGRAM (TAC NOS. MC4507, MC4508, MC5573, MC5574, MC5575, MC5576, MC5577, AND MC5578)

Dear Mr. Peterson:

By letter dated August 12, 2004 (Agencywide Documents Access Management System (ADAMS) Accession No. ML042330588), Duke Energy Corporation, the licensee, submitted Relief Requests MC-GRP-01, MC-SRP-KC-01, MC-SRP-ND-01, MC-SRV-NS-01, and MC-SRP-NS-01, for its third 10-year inservice testing (IST) program interval at McGuire Nuclear Station, Units 1 and 2. The submitted IST program also contained Relief Request MC-SRV-CA-01, which the licensee withdrew by letter dated November 18, 2004 (ADAMS Accession No. ML043340166). In response to the Nuclear Regulatory Commission (NRC) staff's request for additional information, the licensee submitted additional information on February 24, May 3, and June 9, 2005 (ADAMS Accession Nos. ML050670395, ML051300364, and ML051720424), and withdrew Relief Request No. MC-SRV-NS-01 in a letter dated June 9, 2005. In a subsequent phone call on July 7, 2005, the licensee indicated that Relief Request MC-GRP-01 would be revised and will be resubmitted.

The NRC staff has completed its review of the subject relief requests and finds for Relief Requests MC-SRP-KC-01 and MC-SRP-ND-01, the licensee's proposed alternatives may be authorized pursuant to Title 10 of the Code of Federal Regulations (10 CFR) Section 50.55a(a)(3)(I) based on the alternative providing an acceptable level of quality and safety. For Relief Request MC-SRP-NS-01, the licensee's proposed alternative may be authorized pursuant to 10 CFR 50.55a(f)(6)(I) for an interim period until the end of refueling cycle No. 17 (Spring 2007) for McGuire, Unit 1 and until the end of refueling cycle No. 17 (Fall 2006) for McGuire, Unit 2. The finding with respect to MC-SRP-NS-01 is based on the determination that the Code-required test is impractical to perform without significant plant modification.

Relief Request MC-GRP-01 (TAC Nos. MC5571 and MC5572) will be evaluated under a separate letter. The enclosure contains the NRC staff's Safety Evaluation.

Sincerely,

/RA/

Evangelos C. Marinos, Chief, Section 1
Project Directorate II
Division of Licensing Project Management
Office of Nuclear Reactor Regulation

Docket Nos. 50-369 and 50-370

Enclosure: As stated

cc w/encl: See next page

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Summary of Relief Requests
McGuire Nuclear Station Units 1 and 2
Third 10-Year Interval Inservice Testing Program

Relief Request No.	10 CFR 50.55a; ASME OM Code 1998 Edition through 2000 Addenda	Proposed Alternative	NRC Action	Remarks
MC-GRP-01	Tables ISTB-5100-1 ISTB-5200-1, ISTB-5300-1, ISTB-5300-2	Generic use of smooth running pumps if vibration is # 0.075 in/sec.	Reviewed and suggested to revise relief request	Licensee is resubmitting this relief request, and will be evaluated separately
MC-SRP-KC-01	ISTB-3510(b)(1)	Use of existing gauges and accuracy, as supported by NUREG-1482, Section 5.5.1	authorized	10 CFR 50.55a(a)(3)(I)
MC-SRP-ND-01	ISTB-3510(b)(1)	Use of existing gauges and accuracy, as supported by NUREG-1482, Section 5.5.1	authorized	10 CFR 50.55a(a)(3)(I)
MC-SRV-NS-01	ISTC-3500	None	None	withdrawn
MC-SRP-NS-01	ISTB-3300(e)(1)	Use of exiting test loop (35 percent of design flow) for comprehensive pump test instead of design flow test	Interim relief authorized for Unit 1 until Refueling Cycle # 17 (Spring 2007), and for Unit 2 until Refueling Cycle # 17 (Fall 2006)	10 CFR 50.55a(f)(6)(I)

SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUESTS FOR THE THIRD 10-YEAR

PUMP AND VALVE INSERVICE TESTING PROGRAM

DUKE ENERGY CORPORATION

MCGUIRE NUCLEAR STATION, UNITS 1 AND 2

DOCKET NOS. 50-369 AND 50-370

1.0 INTRODUCTION

By letter dated August 12, 2004 (Agencywide Documents Access Management System (ADAMS) Accession No. ML042330588), Duke Energy Corporation, et al. (Duke, the licensee), submitted relief requests associated with its third 10-year inservice testing (IST) program interval for pumps and valves for its McGuire Nuclear Station (McGuire), Units 1 and 2. The licensee proposed several alternatives to the requirements of the American Society of Mechanical Engineers (ASME) Code for its McGuire Nuclear Station third 10-year interval IST program. The submitted IST program also contained Relief Request MC-SRV-CA-01, that Duke deleted by letter dated November 18, 2004 (ADAMS Accession No. ML043340166). In response to the Nuclear Regulatory Commission (NRC) staff's request for additional information, the licensee submitted additional information on February 24, May 3, and June 9, 2005 (ADAMS Accession Nos. ML050670395, ML051300364, and ML051720424), and withdrew Relief Request No. MC-SRV-NS-01 in the June 9, 2005, letter. In a subsequent phone call on July 7, 2005, the licensee indicated that Relief Request MC-GRP-01 would be revised and will be resubmitted. The NRC's evaluation of relief requests MC-GRP-01, MC-SRP-KC-01, MC-SRP-ND-01, and MC-SRP-NS-01 are contained herein.

These relief requests are applicable to the third 10-year interval IST program for the McGuire, Units 1 and 2. The McGuire, Units 1 and 2 third 10-year IST interval began on March 1, 2004.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.55a, requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) intervals in accordance with the ASME *Boiler and Pressure Vessel Code* (ASME Code), Section XI and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to paragraphs (a)(3)(I), (a)(3)(ii),or (f)(6)(I) of 10 CFR 50.55a. The Code of record for McGuire, Units 1 and 2 is the 1998 Edition of the ASME *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code). In proposing alternatives or requesting relief, the licensee must demonstrate that: (1) the proposed alternatives provide an acceptable level of quality and safety; (2) compliance would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety; or (3) conformance is impractical for the facility. Section 50.55a permits the Commission to authorize alternatives and to grant relief from ASME Code requirements upon

making necessary findings. NRC guidance contained in Generic Letter (GL) 89-04, "Guidance on Developing Acceptable Inservice Testing Programs," (Ref. 1) provides alternatives to Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants" (Ref. 2).

The McGuire, Units 1 and 2 third 10-year IST interval started on March 1, 2004. The third 10-year IST programs were developed to meet the requirements of the 1998 Edition through 2000 Addenda of the ASME OM Code pursuant to 10 CFR 50.55a(f)(4)(ii).

The NRC's findings with respect to authorizing alternatives and granting or denying the IST program relief requests are given below.

3.0 TECHNICAL EVALUATION

3.1 Relief Request MC-SRP-KC-01

3.1.1 Code Requirement

Paragraph ISTB-3510(b)(1) of the ASME OM Code states that the full-scale range of each analog instrument shall not be greater than three times the reference value.

3.1.2 Component Identification

The components affected by this relief request are component cooling water pumps as identified in Table 1.

Table 1

McGuire Nuclear Station	Pump Number	Description	Code Class	OM Code Category
Unit 1	1KCPU0001	1A1 Component Cooling Water Pump	3	Group A
	1KCPU0002	1A2 Component Cooling Water Pump	3	Group A
	1KCPU0003	1A3 Component Cooling Water Pump	3	Group A
	1KCPU0004	1A4 Component Cooling Water Pump	3	Group A
Unit 2	2KCPU0001	2A1 Component Cooling Water Pump	3	Group A
	2KCPU0002	2A2 Component Cooling Water Pump	3	Group A
	2KCPU0003	2A3 Component Cooling Water Pump	3	Group A
	2KCPU0004	2A4 Component Cooling Water Pump	3	Group A

3.1.3 Specific Relief Requested

The licensee requests relief from the Code requirements of paragraph ISTB-3510(b)(1) for the component cooling water pumps listed in Table 1. Specifically, this relief is requested for Group A testing.

3.1.4 Basis for Relief

In its "Basis for Relief," Duke states that the installed suction side process instrumentation on the component cooling water pump(s) is a pressure gauge with a range of 0-60 psig and ± 0.5 percent accuracy. Typical values for the suction pressure gauge(s) are 15-20 psig. Therefore, the process gauge range does not meet the three times criteria specified in ISTB-3510(b)(1) of the ASME OM Code.

The accuracy of the process gauge is ± 0.5 percent, which is well below the required accuracy of ± 2 percent as specified in Table ISTB-3500-1 for group A pumps.

The actual reading error at test pressure due to the process instrument accuracy is 2 percent (0.5 percent X 60/15). If a 0-45 psig test instrument is used (which meets the three times criteria of the Code), and it has an accuracy of 2 percent, then the reading error would be 6 percent (2.0 percent X 45/15). When the requirements of OMB-2000, ISTB-3500 and Table ISTB-3500-1 are combined, the actual instrument error introduced into the test is 2 percent, which is less than the Code allowable 6 percent. Using the process instrument for suction pressure data does not degrade the quality of the test and meets the intent of the instrumentation requirements of the Code; but not the specific range requirements of the Code.

Despite the fact that the instrumentation is outside of the Code allowable range, the gauge has an accuracy that is lower than the tolerance level of ± 2 percent. The licensee states that the data obtained using the currently installed process instrumentation will introduce less error than use of instrumentation required by the OM Code. Therefore, the licensee concludes that using the proposed existing process instrumentation will provide an acceptable level of quality and safety, and that the quality of tests performed using the instrumentation will meet the intent of the instrumentation requirements of the Code.

3.1.5 Alternative Examinations

Duke states that as an alternative to the instrument range requirements of the paragraph ISTB-3510(b)(1), component cooling water pumps 1A1, 1A2, 1B1, and 1B2 (2A1, 2A2, 2B1, 2B2) suction pressure will be measured with the currently installed instrumentation. This relief is requested only for Group A testing of the component cooling water pumps.

3.1.6 Evaluation of Pump Relief Request No. MC-SRP-KC-01

The licensee requests relief from the Code instrumentation requirements of paragraph ISTB-3510(b)(1) for pressure gauges, which are use to measure suction pressure of the component cooling water pumps. OM Code paragraph ISTB-3510(b)(1) requires that the full-

scale range of each instrument be no greater than three times the reference value. Duke proposes to use instrumentation which does not meet these Code requirements.
The installed suction pressure gauges for the component cooling water pumps have a range of 0-60 psig and an accuracy of ± 0.5 percent. The typical value for the suction pressure of the component cooling water pumps during testing is 15-20 psig. This request for relief applies only to Group A testing of the component cooling water pumps. Duke states that the suction instrumentation of the component cooling water pumps during comprehensive pump testing meets the Code requirement. Table MC-SRP-KC-01, below, contains details related to the component cooling water pumps' instrumentation as provided by the licensee, the Code requirements and its evaluation:

Table MC-SRP-KC-01

Items	Component Cooling Water Pumps: Suction	Remark
Pump No.	1A1, 1A2, 1B1, 1B2, 2A1, 2A2, 2B1, 2B2	
Type of Inservice Test	Group A Test	
Suction Pressure Gauge(s) Range (psig)	0-60	
Suction Reference Value Range (psig)	15-20	
Three times the reference value	(3 x 15) = 45 psig	Note 1
Effective gauge accuracy of installed instrument	(± 0.5 percent) of (60/15) = ± 2 percent	
Actual accuracy required by the Code	(± 2 percent) x (45/15) = ± 6 percent	
Acceptable alternative to the Code requirement	Yes	
Note 1: Actual value range is between 15 and 20 psig; 15 psig is used for conservative results.		

The use of the existing gauges is supported by NUREG-1482, Paragraph 5.5.1, when the combination of range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements. No alternative testing needs to be performed. Any change in the baseline reference values shall be determined to be acceptable provided the indicated accuracy of the new reference value does not exceed the range or indicated accuracy range of the OM Code. This authorization does not apply to digital instrumentation.

The suction pressure gauge instruments of component cooling water pumps yield readings at least equivalent to the readings achieved from instruments that meet Code requirements, and thus provide an acceptable level of quality and safety.

3.1.7 Conclusion

The proposed alternative to the Code requirements of paragraph ISTB-3510(b)(1) for component cooling water pumps is authorized pursuant to 10 CFR 50.55a(a)(3)(I) on the basis that the alternative provides an acceptable level of quality and safety. This authorization does not apply to digital instrumentation.

3.2 Relief Request MC-SRP-ND-01

3.2.1 Code Requirement

Paragraph ISTB-3510(b)(1) of the ASME OM Code requires that the full-scale range of each analog instrument shall not be greater than three times the reference value.

3.2.2 Component Identification

The components affected by this relief request are residual heat removal pumps as identified in Table 2.

Table 2

McGuire Nuclear Station	Pump Number	Description	Code Class	OM Code Category
Unit 1	1NDPU0001	1A Residual Heat Removal Pump	3	Group A
	1NDPU0002	1B Residual Heat Removal Pump	3	Group A
Unit 2	2NDPU0001	2A Residual Heat Removal Pump	3	Group A
	2NDPU0002	2B Residual Heat Removal Pump	3	Group A

3.2.3 Specific Relief Requested

The licensee requests relief from the Code requirements, of paragraph ISTB-3510(b)(1) for the component cooling water pumps listed in Table 2. Specifically, this relief is requested for Group A testing for residual heat removal (RHR) pumps.

3.2.4 Basis for Relief

In its “Basis for Relief,” Duke states that the RHR pumps have discharge process instrumentation installed. The discharge pressure gauge has a range of 0-1000 psig and an accuracy of ± 0.5 percent. Typical reference values for the RHR pump discharge pressure gauges(s) are 230-260 psig. Therefore, the process gauge range does not meet the three times criteria specified in ISTB-3510(b)(1) of the ASME OM Code. The installation and removal of a special discharge test gauge for the purpose of quarterly Group A testing is a hardship. The minimum code requirement for instrumentation accuracy for these pressure gauges for

Group A testing is ± 2 percent per Table ISTB-3500-1. Since the accuracy of the installed process instrumentation is ± 0.5 percent, it more than compensates for the use of the increased range of the process instrumentation. Therefore there is no compensating increase in the level of quality or safety associated with the hardship of installation and removal of test instrumentation for quarterly testing for each these four pumps.

The accuracy of the discharge process instrumentation (± 0.5 percent) is much greater than the requirements specified in Table ISTB-3500-1 for instrumentation accuracy (± 2 percent). The actual reading error at test pressure due to the process instrument accuracy is 2.2 percent (0.5 percent X 1000/230) for discharge pressures at the low end of this range. If a 0-690 psig gauge test instrument is used (which meets the three times criteria of the Code), and with Code minimum accuracy of 2 percent, then the reading error would be 6 percent (2 percent X 690/230). Therefore, the actual instrument error introduced into test of 2.2 percent is less than the Code allowable 6 percent. Therefore, the licensee concludes that using the proposed existing process instrumentation will provide an acceptable level of quality and safety, and that the quality of tests performed using the instrumentation will meet the intent of the instrumentation requirements of the Code.

3.2.5 Alternative Examinations

The licensee states that as an alternative to the instrument range requirements of paragraph ISTB-3510(b)(1), RHR pumps 1A, 1B, 2A, and 2B discharge pressure will be measured with the currently installed instrumentation. This request for relief applies only to Group A testing of the RHR pumps.

3.2.6 Evaluation of Pump Relief Request No. MC-SRP-ND-01

Duke requests relief from the Code instrumentation requirements of paragraph ISTB- 3510(b)(1) for pressure gauges which are use to measure discharge pressure of the RHR pumps. OM Code paragraph ISTB-3510(b)(1) requires that the full-range of each instrument be no greater than three times the reference value. The licensee proposes to use instrumentation which does not meet these Code requirements.

The installed suction pressure gauges for the RHR pumps have a range of 0-1000 psig and an accuracy of ± 0.5 percent. The typical value for the discharge pressure of the RHR pumps during testing is 230-260 psig. This request for relief applies only to Group A testing of the RHR pumps. The licensee states that the discharge instrumentation of the RHR pumps during comprehensive pump testing meets the Code requirement. Table MC-SRP-ND-01, below, contains details related to RHR pump instrumentation as provided by the licensee, the Code requirements and their evaluation.

Table MC-SRP-ND-01

Items	Residual Heat Removal Pumps: Discharge	Remark
Pump No.	1A, 1B, and 2A, 2B	
Type of Inservice Test	Group A Test	
Discharge Pressure Gauge(s) Range (psig)	0-1000	
Discharge Reference Value Range (psig)	230-260	
Three times the reference value	(3 x 230) = 690 psig	Note 1
Effective gauge accuracy of installed instrument	(± 0.5 percent) of (1000/230) = ± 2.2 percent	
Actual accuracy required by the Code	(± 2 percent) x (690/230) = ± 6 percent	
Acceptable alternative to the Code requirement	Yes	
Note 1: Actual value range is between 230 and 260 psig; 230 psig is used for conservative results.		

NUREG-1482, Paragraph 5.5.1 supports the use of the existing gauges when the combination of range and accuracy yields a reading at least equivalent to the reading achieved from instruments that meet the Code requirements. No alternate testing needs to be performed. Any change in the baseline reference values shall be determine acceptable provided the indicated accuracy of new reference value does not exceed the range or indicated accuracy range of the OM Code. This authorization does not apply to digital instrumentation.

The discharge pressure gauge instruments of residual heat removal pumps yield readings at least equivalent to the readings achieved from instruments that meet Code requirements, and thus provide an acceptable level of quality and safety.

3.2.7 Conclusion

The proposed alternative to the Code requirements of paragraph ISTB-3510(b)(1) for RHR pumps is authorized pursuant to 10 CFR 50.55a(a)(3)(I) on the basis that the alternative provides an acceptable level of quality and safety. This authorization does not apply to digital instrumentation.

3.3 Relief Request MC-SRP-NS-01

3.3.1 Code Requirement

Paragraph ISTB-3300(e)(1) of the ASME OM Code requires that reference values be established within ± 20 percent of the design flow rate for the comprehensive pump test. Duke requested relief for the containment spray pumps identified below in Table 3.

3.3.2 Specific Relief Requested

The licensee requests relief from paragraph ISTB-3300(e)(1) of the ASME OM Code, that requires reference values to be established within ± 20 percent of the design flow rate for the comprehensive pump test for the containment spray pumps.

3.3.3 Component Identification

The components affected by this relief request are containment spray pumps, as identified in Table 3. The containment spray system is designed to remove the energy discharged to the containment following a loss-of-coolant accident (LOCA) or main steam line break to prevent containment pressure from exceeding the design pressure and to reduce and maintain containment temperature and pressure within acceptable limits.

Table 3

McGuire Nuclear Station	Pump Number	Pump Description	Code Class	Pump Code Category
Unit 1	1NSPU0001	1A Containment Spray Pump	2	Group B
	1NSPU0002	1B Containment Spray Pump	2	Group B
Unit 2	2NSPU0001	2A Containment Spray Pump	2	Group B
	2NSPU0002	2B Containment Spray Pump	2	Group B

3.3.4 Licensee's Basis for Requesting Relief

In its "Basis for Relief," Duke states that containment spray pump testing is limited by a 4 inch test line that will pass no more than 1200 gpm, or approximately 35 percent of design flow. For the containment spray pumps, the design flow is 3200 - 3400 gpm. To meet the Code requirement of 80 percent of design flow, the system would have to achieve approximately 2560 -2720 gpm during the comprehensive pump test (CPT). Previously, these pumps were tested at 1000 gpm through the 4 inch test line.

The licensee recognizes that design flow is important for pumps with characteristic head-flow curves that are flat or gently sloping in the low flow region. In the low flow region, increasing internal flows that are typically due to degradation are difficult to detect.

Pumps with flat curves at low flows should be tested at or near design conditions to determine if increasing internal recirculation flows have degraded pump performance to the point where design requirements cannot by met.

Duke states that the containment spray pump curves at McGuire are not flat or gently sloping at low flow conditions. The pump curves are well-sloped from shutoff to well beyond the flow at which the pumps are currently tested quarterly at 1000 gpm. At flows beyond 2000 gpm, the slope diminishes and levels out at flow rates between 2000 and 2750 gpm. The flow then becomes more developed closer to and beyond the design flow. Hence, the licensee states that the 80 percent design flow requirement would not be expected to give any better indication of the pump condition than the current quarterly test at approximately 1100 - 1200 gpm (about 35 percent). The licensee states that testing at 80 percent of the design flow, where the curve is flat, could potentially mask pump degradation.

Duke also states that modification of the current test loop for testing at a higher flow rate would require it to “dike” the spray nozzles from each of the spray headers with plugs and direct the flow back to the containment sump. This would require extensive piping to be installed to provide an 8 inch crossover loop to accommodate the higher flows. A dam would also have to be constructed around the containment sump to simulate water level in the containment which would be expected during an accident and therefore provide the necessary suction from the sumps. The licensee states that this would not be a practicable modification for the frequency and duration of the test. The spray headers are inaccessible without a significant amount of scaffolding. Even if the nozzles were accessible, the plugging of spray nozzles, running the full flow test and returning the system to its operable configuration present substantial challenges in terms of both the complexity of the temporary modifications and the labor-intensive nature of the modifications, controls, and post modification testing needed to ensure the system is returned to the original configuration.

3.3.5 Proposed Alternative to Code Testing Requirement

As an alternative to the Code-required testing within 80 to 120 percent of the design flow, the licensee proposes to test at 35 percent (1200 gpm) of design flow for the CPT. Duke would take care to ensure pump run time is limited and flow rate maintained within an optimal range. If the measured parameters are outside the normal operating ranges or are determined by analysis to be trending toward an unacceptably degraded state, appropriate actions would be taken as required in ISTB-6200. Also, the Containment Spray Pumps would be included in the licensee’s predictive maintenance program. Additional monitoring would include advanced vibration monitoring techniques and diagnostic analysis beyond the requirements of ISTB, along with the latest industry techniques in oil sampling and analysis.

3.3.6 Staff Evaluation of Relief Request MC-SRP-NS-01

The McGuire, Units 1 and 2 containment spray systems each contain two trains with the centrifugal pumps operating in parallel. A train is defined as one spray pump with its associated piping and spray heat exchanger. Each train provides 100 percent backup for the other. The primary purpose of the containment spray system is to spray cool water into the containment atmosphere, when appropriate, in the event of a LOCA, thereby, ensuring that containment pressure does not exceed its design pressure. A second purpose of the containment spray system is to remove elemental iodine from the containment atmosphere, should it be released

during a LOCA. The system is designed to limit offsite thyroid dose to within 10 CFR Part 100 limits following a LOCA.

As the containment spray pumps are activated during accidents and remain in standby during normal operations, they fall into the scope of the ASME OM Code as Group B pumps, and are subject to the requirements of the ASME OM Code IST program. The Code-required IST program requires Group B pumps to have routine quarterly tests and a biennial CPT. Pump speed, as well as differential pressure or flow rate, are required to be monitored for the Group B test. The reference point for the Group B test is required to be established at the highest practical flow rate. This can be achieved by the test loop. Differential pressure, discharge pressure, flow rate and vibration monitoring are required for a CPT. OM Code paragraph ISTB-3300(e)(1) requires reference values to be established within ± 20 percent of the pump design flow for the CPT. The intent of the Code Subsection ISTB, as stated in paragraph ISTB-2000 for IST, is a test to determine the operational readiness of a component system. Operational readiness is defined as ability of a component to perform its intended function when required.

Currently at McGuire, the containment spray pumps can only be tested using a 4 inch test loop that circulates water back to the refueling water storage tank. This flow path produces a flow rate of approximately 35 percent of the pump design flow, which is approximately 1100 - 1200 gpm. The Code-required design flow range is 3200-3400 gpm.

Duke stated in its relief request that in order to test the containment spray pumps to obtain the pump flow required by the Code, a test loop for testing at higher flow (design flow) would be required. The licensee would need to “dike” the spray nozzles from each of the spray headers with plugs and direct the flow back to the containment. In addition, extensive 8 inch piping would have to be installed to provide a crossover loop to accommodate the higher (design) flows. A dam would have to be constructed around the containment sump to simulate water levels in containment which would be expected during accident, and to maintain sufficient pump head to provide adequate net positive suction head (NPSH) to the pump. Duke states that this would not be a practicable modification for the frequency and duration of the test. The spray headers are inaccessible without a significant amount of scaffolding. Even if the nozzles were accessible, the plugging of spray nozzles, and running the full flow test and returning the system to its operable configuration, would present substantial challenges in terms of the complexity of the temporary modification, as well as the labor-intensive nature of the modifications, controls, and post modification testing needed to ensure the system is returned to the original configuration

The CPT required by the OM Code produces a more accurate evaluation of pump operability and performance characteristics at a reduced frequency of every 2 years. The test is intended to be conducted at or near the pump’s design flow rate because this area of the pump curve is considered to be most representative of the intended pump design performance characteristics. During a CPT, the vibration is measured when the pump is running at intended design flows. The pump vibration data measured at 35 percent of the pump design flow cannot be compared to or substituted for the vibration data at the pump design flow.

Based on licensee provided information in its relief requests and its response to the request for additional information, the NRC staff finds that containment spray pump testing using the

bypass line does not provide adequate information when compared to pump testing at design flow rates. Therefore, the NRC staff does not find that an adequate basis exists to authorize the alternative as proposed by the licensee. However, the Code-required test cannot be performed without a substantial design modification that would require time and planning, as well as a plant shutdown. Further, an evaluation of the containment spray pumps' current testing shows repeatable results using a flow test loop which allows pump testing at 35 percent flow rates. In addition, Duke has not identified any recent maintenance or testing issues with these pumps. Also, the containment spray pumps will be included in the licensee's predictive maintenance program, and additional monitoring will include advanced vibration monitoring techniques and diagnostic analysis beyond the requirements of ISTB along with the latest industry techniques in oil sampling and analysis. The NRC staff, therefore, finds that the licensee's alternative provides sufficient assurance of operational readiness of the pumps to authorize the alternative for an interim period as follows:

(1) For McGuire, Unit 1, until the end of refueling cycle No. 17 (Spring 2007), and
(2) For McGuire, Unit 2, until the end of refueling cycle No. 17 (Fall 2006).

During the period of interim authorization, the licensee may wish to explore other possibilities for flow-rate testing through alternative flow paths in order to achieve a flow at conditions nearing the design point and/or to perform the required design changes.

3.3.7 Conclusion

The proposed alternative, as stated in Relief Request MC-SRP-NS-01 to the Code reference value requirements of ISTB 4.3.e(1) for the containment spray pumps, is denied on the basis that it does not provide an acceptable level of quality and safety, and compliance with Code requirements would not result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

However, the alternative method identified in Relief Request MC-SRP-NS-01 provides sufficient assurance of operational readiness of the pumps to authorize the alternative for an interim period until the end of refueling cycle No. 17 (Spring 2007) for McGuire, Unit 1 and the end of refueling cycle No. 17 (Fall 2006) for McGuire, Unit 2 to allow time for the licensee to reevaluate its proposed alternative testing and/or to perform the required design changes pursuant to 10 CFR 50.55a(f)(6)(I).

4.0 CONCLUSION

For Relief Requests MC-SRP-KC-01 and MC-SRP-ND-01, the licensee's proposed alternatives are authorized pursuant to 10 CFR 50.55a(a)(3)(I) based on the alternatives providing an acceptable level of quality and safety.

For Relief Request MC-SRP-NS-01, the licensee's proposed alternative for the containment spray pumps is denied on the basis that it does not provide an acceptable level of quality and safety, and compliance with Code requirements would not result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. However, the alternative method identified in Relief Request MC-SRP-NS-01 provides sufficient assurance of operational readiness of the pumps to authorize the alternative for an interim period until the end of refueling cycle No. 17 (Spring 2007) for McGuire, Unit 1 and until the end of refueling

cycle No. 17 (Fall 2006) for McGuire, Unit 2, to allow time for the licensee to reevaluate its proposed alternative testing and/or to perform the required design changes pursuant to 10 CFR 50.55a(f)(6)(I).

5.0 REFERENCES

1. U.S. Nuclear Regulatory Commission, “Guidance on Developing Acceptable Inservice Testing Programs, “ Generic Letter 89-04, through Supplement 1, April 4, 1995.

2. U.S. Nuclear Regulatory Commission, “Guidance for Inservice Testing at Nuclear Power Plants,” NUREG-1482, April 1995.

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