UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 22, 2009

Mr. Mark B. Bezilla
Site Vice President
FirstEnergy Nuclear Operating Company
Perry Nuclear Power Plant
Mail Stop A-PY-A290
P.O. Box 97, 10 Center Road
Perry, OH 44081-0097

SUBJECT: PERRY NUCLEAR POWER PLANT - SAFETY EVALUATION OF RELIEF REQUESTS FOR THIRD 10-YEAR PUMP AND VALVE INSERVICE TESTING PROGRAM (TAC NOS. ME0191 THROUGH ME0198)

Dear Mr. Bezilla:

By letter dated November 18, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083370198), FirstEnergy Nuclear Operating Company (FENOC or the licensee), submitted Relief Requests PR-1, PR-2, VR-1, VR-2, VR-3, VR-4, VR-5 and VR-6 for the third 10-year interval inservice testing program at Perry Nuclear Power Plant. The licensee requested relief from certain inservice testing requirements specified in the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (OM Code).

By letter dated May 28, 2009 (ADAMS Accession No. ML091560034), the licensee submitted additional information pertaining to the relief requests and withdrew Relief Request VR-5. By letter dated August 3, 2009 (ADAMS Accession No. ML092230338), the licensee withdrew Relief Request VR-4. By letter dated September 15, 2009 (ADAMS Accession No. ML092650185), the licensee submitted additional information pertaining to Relief Request VR-1.

The Nuclear Regulatory Commission staff has completed its review of the relief requests and is providing the enclosed safety evaluation. Pursuant to *Title 10 of the Code of Federal Regulations* (10 CFR) 50.55a(a)(3)(i), Relief Requests PR-1, PR-2, VR-2 and VR-3 are authorized on the basis that the proposed alternatives provide an acceptable level of quality and safety. Pursuant to 10 CFR 50.55a(a)(3)(ii), Relief Request VR-6 is authorized on the basis that compliance with the Code 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(f)(6)(i) Relief Request VR-1 is granted on the basis that the code requirements have been deemed impractical and the alternative provides an acceptable level of quality and safety and will not endanger life or property or the common defense and security.

If you have any questions, please contact the Perry Project Manager, Mr. Stephen Sands, at 301-415-3154.

Sincerely,

Marshall Peck FOR

Stephen J. Campbell, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-440

Enclosure:
As stated

cc w/encl: Distribution via Listserv

UNITED STATES
NUCLEAR REGULATORY COMMISSION
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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

RELATED TO RELIEF REQUESTS FOR THE THIRD 10-YEAR INTERVAL

OF THE INSERVICE TESTING PROGRAM

FIRSTENERGY NUCLEAR OPERTING COMPANY

PERRY NUCLEAR POWER PLANT

DOCKET NO. 50-440

1.0 INTRODUCTION

By letter dated November 18, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML083370198), FirstEnergy Nuclear Operating Company (FENOC), the licensee, submitted Relief Requests PR-1, PR-2, VR-1, VR-2, VR-3, VR-4, VR-5 and VR-6 which proposed alternatives to certain requirements specified in the American Society of Mechanical Engineers (ASME) Code for Operation and Maintenance of Nuclear Power Plants (OM Code) for the inservice testing (IST) program at Perry Nuclear Power Plant (Perry).

By letter dated May 28, 2009 (ADAMS Accession No. ML091560034), the licensee submitted additional information pertaining to the relief requests and withdrew Relief Request VR-5. By letter dated August 3, 2009 (ADAMS Accession No. ML092230338), the licensee withdrew Relief Request VR-4. By letter dated September 15, 2009 (ADAMS Accession No. ML092650185), the licensee submitted additional information pertaining to Relief Request VR-1.

2.0 REGULATORY EVALUATION

Section 50.55a of *Title 10 of the Code of Federal Regulations* (10 CFR), requires that IST of certain ASME Code Class 1, 2, and 3 pumps and valves be performed at 120-month (10-year) IST program intervals in accordance with the specified ASME Boiler and Pressure Vessel Code (Code) and applicable addenda incorporated by reference in the regulations, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Nuclear Regulatory Commission (NRC) pursuant to paragraphs (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. In accordance with 10 CFR 50.55a(f)(4)(ii), licensees are required to comply with the requirements of the latest edition and addenda of the ASME Code incorporated by reference in the regulations 12 months prior to the start of each 120-month IST program interval. In accordance with 10 CFR 50.55a(f)(4)(iv), IST of pumps and valves may meet the

requirements set forth in subsequent editions and addenda that are incorporated by reference in 10 CFR 50.55a(b), subject to NRC approval. Portions of editions or addenda may be used provided that all related requirements of the respective editions and addenda are met.

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 authorizes the Commission to approve 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," provides alternatives to ASME Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, Revision 1, "Guidance for Inservice Testing at Nuclear Power Plants."
As discussed in the licensee's letter dated November 18, 2008, the third 10-year interval for the IST program at Perry began on May 18, 2009. The program is developed in accordance with the requirements in the ASME OM Code, 2001 Edition through 2003 Addenda.

3.0 TECHNICAL EVALUATION

The NRC's evaluation of Relief Requests PR-1, PR-2, VR-1, VR-2, VR-3, and VR-6, is provided in Safety Evaluation Sections 3.1, 3.2, 3.3, 3.4, 3.5, and 3.6 respectively. By letter dated May 28, 2009, Relief Request VR-5 was withdrawn by the licensee. By letter dated August 3, 2009, Relief Request VR-4 was withdrawn by the licensee.

3.1 Pump Relief Request PR-1

3.1.1 Affected Components

The licensee requested relief from the requirements of ISTB-3400, "Frequency of Inservice Tests" and ISTB-3300(e)(2), "Reference Values" for the following pumps:

1E12-C003, Residual Heat Removal System (RHR) Waterleg Pump (Class 2)
1E21-C002, Low Pressure Core Spray (LPCS) Waterleg Pump (Class 2)
1E22-C003, High Pressure Core Spray (HPCS) Waterleg Pump (Class 2)
1E51-C003, Reactor Core Isolation Cooling (RCIC) Waterleg Pump (Class 2)

3.1.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ISTB-3400 requires that an inservice test shall be run on each pump as specified in Table ISTB-3400-1. Table ISTB-3400-1 specifies that a Group A pump test shall be performed quarterly.

ISTB-3300(e)(2) states that reference values shall be established within ± 20 percent of pump design flow for the Group A test, if practicable. If not practicable, the reference point flow rate shall be established at the highest practical flow rate.

3.1.3 Licensee's Basis for Requesting Relief

The licensee states:

> The waterleg pumps are designed to remain in service during operation at power to ensure the emergency standby systems are maintained pressurized to reduce the likelihood of water hammer. The waterleg pumps run continuously, with flow established through a recirculation line, in order to provide enough head to keep the applicable system's discharge piping full to the highest elevation. During safety-related pump testing, the waterleg pump normal discharge path must be redirected through drain lines to provide enough flow to establish the selected Code reference values. This requires taking the system out of service and racking out safety-related pump breakers for the RHR system, the LPCS system, and the HPCS system, or isolating the RCIC system pump to prevent system damage due to water hammer or cavitation upon receipt of an auto actuation signal.
>
> The waterleg pumps have a rated flow of 40 gallons per minute (gpm) at 75 feet of head. During normal operation (keepfill application) the flow rates are approximately 10 gpm at a discharge pressure ranging between approximately 45 to 69 pounds per square inch gauge. The pumps can only obtain full flow during a cold shutdown.

3.1.4 Licensee's Proposed Alternative Testing

The licensee states:

> The waterleg pumps shall be monitored on a quarterly basis by observing pump discharge pressure and bearing vibration. These parameters will be evaluated to adequately assess the pump's performance. The pumps will be full flow tested each refueling outage in conjunction with the comprehensive pump test performed in accordance with the requirements specified in ISTB-5123, "Comprehensive Pump Test Procedure."

3.1.5 NRC Staff Evaluation

The RHR, LPCS, HPCS, and RCIC waterleg pumps are continuously operating pumps. Their safety function is to keep their respective discharge header piping in a filled condition to prevent water hammer upon the start of a main pump. The actual output and hydraulic performance of the waterleg pumps are not critical to the safety function, as long as the pumps are capable of maintaining the piping full of water.

In lieu of a Code-required Group A test and flow measurement, the licensee proposes to monitor the pump discharge header pressures and bearing vibrations on a quarterly basis. In addition to this, there is an annunciator that alarms in the control room to alert reactor operators of a low pressure condition indicative of a waterleg pump malfunction or any other condition that allows pressure to degrade (e.g., excessive leakage beyond waterleg pump make-up capabilities). The low pressure alarm will provide an early detection of a low header pressure. The licensee has stated that operator actions following receipt of low pressure alarms include alarm validation, verifying whether the waterleg pumps are running, and initiating a system fill and vent, as necessary. Also, Perry Technical Specification (TS) Surveillance Requirements 3.5.2.3 and 3.5.3.1 require verification every 31 days that the respective HR/LPCS/HPCS/RCIC

headers are filled with water from the main pump discharge valve to the injection valve. The continuous monitoring of discharge header pressure in the control room and monthly (more frequent than quarterly) verification that the headers are filled with water will provide reasonable assurance that the waterleg pumps are operable, or that the system leakage has not exceeded the capacity of the waterleg pumps. In addition, the quarterly vibration measurement of the pump bearings meets the Code requirements and will provide the required test results reflecting the mechanical condition of the pumps. The proposed alternative would therefore provide reasonable assurance of the operational readiness of the RHR/LPCS/HPCS/RCIC waterleg pumps 1E12-C003, 1E21-C002, 1E22-C003, and 1E51-C003.

3.1.6 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative to the Code Group A testing requirements for the waterleg pumps 1E12-C003, 1E21-C002, 1E22-C003, and 1E51-C003 are authorized pursuant to 10 CFR 50.55a(a)(3)(i), on the basis that the alternative provides an acceptable level of quality and safety. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the pumps. This alternative is authorized for the third 10-year IST program interval.

3.2 Pump Relief Request PR-2

3.2.1 Affected Components

1C41-C001A & B, Standby Liquid Control Pumps (Class 2)
1E12-C002A, B & C, Residual Heat Removal Pumps (Class 2)
1E12-C003, RHR Waterleg Pump (Class 2)
1E21-C001, Low Pressure Core Spray Pump (Class 2)
1E21-C002, LPCS Waterleg Pump (Class 2)
1E22-C001, High Pressure Core Spray Pump (Class 2)
1E22-C003, HPCS Waterleg Pump (Class 2)
1E51-C001, Reactor Core Isolation Cooling Pump (Class 2)
1E51-C003, RCIC Waterleg Pump (Class 2)
G41-C003A & B, Fuel Pool Cooling and Cleanup Pumps (Class 3)
1P42-C001A & B, Emergency Closed Cooling Pumps (Class 3)
1P45-C001A & B and C002, Emergency Service Water Pumps (Class 3)
P47-C001A & B, Control Complex Chilled Water Pumps (Class 3)
1R45-C001A, B & C, Standby Diesel Generator Fuel Oil Pumps (Class 3)

3.2.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ISTA-3130 "Application of Code Cases", paragraph (b) requires that Code Cases shall be applicable to the edition and addenda specified in the test plan.

ISTB-3510 "Data Collection, General," paragraph (b)(2) requires that digital instruments shall be selected such that the reference value does not exceed 70 percent of the calibrated range of the instrument.

3.2.3 Licensee's Basis for Requesting Relief

The licensee states:

> The ASME Code committees have approved Code Case OMN-6, "Alternative Rules for Digital Instruments," which was included in the OMa-1999 Addenda. The NRC has unconditionally approved the use of this code case as reflected in Regulatory Guide (RG) 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," June 2003. This code case allows owners to use digital instruments such that the reference value does not exceed 90 percent of the calibrated range of the instrument. The Code of record for the third ten-year IST interval is OM Code-2001 Edition with Addenda through OMb-2003. As stated in RG 1.192, the applicable Code for Code Case OMN-6 is OMa-1999. The licensee is requesting the use of Code Case OMN-6 because the applicable edition of the OM Code is other than the code edition/addenda specified as the code of record for the third ten-year interval.

3.2.4 Licensee's Proposed Alternative Testing

The licensee states:

> In lieu of the digital instruments requirements specified in ISTB-3510(b)(2), the licensee proposes to utilize the alternative rules for digital instruments specified in Code Case OMN-6. Whereas, digital instruments shall be selected such that the reference value does not exceed 90 percent of the calibrated range of the instrument.

3.2.5 NRC Staff Evaluation

In accordance with the recommendations of NUREG-1482, Revision 1, Section 5.5, the licensee desires to apply Code Case OMN-6 in lieu of the ISTB 3510(b)(2) Code requirements.

Paragraph ISTB 3510(b)(2) requires that the reference value of digital instruments not exceed 70 percent of the calibrated range of the instrument. The ASME OM Code Case OMN-6 allows licensees to use digital instruments such that the reference value does not exceed 90 percent of the calibrated range of the instrument.

Application of ASME OM Code cases is addressed in 10 CFR 50.55a(b)(6) through reference to RG 1.192, which lists acceptable and conditionally acceptable Code Cases for implementation in IST programs. RG 1.192 (June 2003), Table 1, approves the use of Code Case OMN-6, and references the version of the Code Case that was issued with the 1999 Addenda of the Code. The version of Code Case OMN-6 issued with the 1999 Code Addenda states that it is applicable to ASME OM Code – 1990 Edition through ASME OMB – 1997 Addenda. It also states that the Code Case shall expire on September 28, 2001, unless previously annulled or reaffirmed.

Paragraph ISTA-3130 (Application of Code Cases) of the ASME OM Code, 2003 Addenda delineates two requirements that cannot be met by the licensee and therefore require relief or an alternative. Specifically, paragraphs ISTA-3130(b) and (c) require that Code Cases be applicable to the edition and addenda specified in the test plan and that Code Cases be in effect

at the time the test plan is filed. As stated above, the approved Code Case version is not applicable to the ASME OM Code, 2001 Edition through 2003 Addenda and is expired.

In accordance with 10 CFR 50.55a(a)(3), proposed alternatives to the stated code requirements may be authorized provided the applicant demonstrates that the proposed alternative provides an acceptable level of quality and safety. The provisions and requirements of Code Case OMN-6 provide an acceptable level of quality and safety because the requirements from the ASME OM Code -1990 Edition, paragraph ISTB 4.6.1 (b)(2), through OMB 1997, paragraph ISTB 4.7.1(b)(2) have no material difference as compared to OM Code, 2001 Edition through 2003 Addenda paragraph ISTB 3510(b)(2). Furthermore, Code Case OMN-6 was amended and issued with the ASME OM Code 2006 Addenda. This version of the Code Case expanded the applicability to include the ASME OM Code – 1990 and later editions and addenda through the OMa 2005 Addenda, and it was given a new expiration date of March 30, 2007. While this version of the code case is not approved by inclusion in RG 1.192 and is expired, the technical content has not changed from that approved in RG 1.192; and it does, therefore, support the technical basis for accepting the proposed change.

Code Case OMN-6 provides an acceptable level of quality and safety for pump testing and is an acceptable alternative for use in the licensee's IST program. The NRC staff finds that the criteria in Code Case OMN-6 are technically adequate and provide reasonable assurance of the operational readiness of the pumps.

3.2.6 Conclusion

The NRC staff concludes that the licensee's proposed alternative is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. This alternative is authorized for the third 10-year IST program interval.

3.3 Valve Relief Request VR-1

3.3.1 Affected Components

Category B Valves
1C11-126, Scram Inlet Valve (Class 2)
1C11-127, Scram Exhaust Valve (Class 2)

Category C Valves
1C11-114, Scram Discharge Header Check Valve (Class 2)
1C11-115, Charging Water Check Valve (Class 2)

3.3.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ISTC-3521 – requires that active Category A and B valves be exercised during operation at power or during cold shutdowns if not practicable at power. If exercising is not practicable during operation at power or cold shutdowns, it may be limited to refueling outages.

ISTC-3522 – requires that Category C check valves be exercised during operation at power or during cold shutdowns if not practicable at power. If exercising is not practicable during operation at power or cold shutdowns, it may be limited to refueling outages.

ISTC-5131 - requires that active valves shall have their stroke times measured when exercised in accordance with ISTC-3500.

ISTC-5220 – requires that check valves that have a safety function in both the open and closed directions shall be exercised by initiating flow and observing that the obturator has traveled to the proper position.

3.3.3 Licensee's Basis for Requesting Relief

The licensee is requesting relief from the requirements of ASME OM Code, 2001 Edition with Addenda through OMb-2003, paragraph ISTC-5131 and paragraph ISTC-5221 for the Control Rod Drive (CRD) Hydraulic Control Unit (HCU) scram valves, 1C11-126 and 1C11-127, and scram discharge header and accumulator supply check valves, 1C11-114 and 1C11-115 (Open direction only) associated with the 177 HCUs.

The licensee states:

> These valves are not provided with position indication; therefore, measuring their full stroke time in accordance with the code is impractical.
>
> Exercising these valves at a frequency other than that specified by Technical Specifications (TSs) could result in a plant trip, which is burdensome without a compensating increase in the level of quality and safety. Additionally, since the power operated valves are not provided with position indication, special test methods or test equipment would be required to determine valve position, which is also burdensome without a compensating increase in the level of quality and safety.

3.3.4 Licensee's Proposed Alternative Testing

The licensee states:

> As discussed in NUREG-1482, Rev.1, Section 4.4.6, the rod scram test frequency identified in the plant TSs may be used as the valve testing frequency to minimize rapid reactivity transients and unnecessary wear of the CRD mechanisms. Verifying that the associated control rod meets the scram insertion time limits defined in the TSs can be an acceptable alternative method of detecting degradation of these valves in lieu of valve stroke measurement.
>
> TS Surveillance Requirement (SR) 3.1.4.1 requires the scram time for all control rods to be verified within limits prior to thermal power exceeding 40 percent of rated thermal power after each reactor shutdown ≥120 days. In addition, TS SR 3.1.4.2 requires testing of a representative sample of the control rods at least once per 120 days of operation in Mode 1. The TS SRs assure the necessary quality of the system and components are maintained, and that facility operation will be within the Safety Limits and the Limiting Condition of Operation will be met. Therefore, scram insertion timing per TS SR 3.1.4.1 shall be substituted for individual valve testing.

3.3.5 NRC Staff Evaluation

The subject pneumatically-operated valves have a safety function in ensuring control rod insertion during a reactor scram. Valve 1C11-126, Scram Exhaust Valve, opens to vent the control rod drive piston to the scram discharge volume allowing control rod movement. Valve 1C11-127, Scram Inlet Valve, opens to supply pressurized water to the bottom of the control rod drive piston which rapidly inserts the control rod into the reactor core. These valves are classified as Category B valves in accordance with the ASME OM Code.

ASME OM Code, 2001 Edition with Addenda through OMb-2003, paragraph ISTC-3521 requires full-stroke exercising of Category B valves during operation at power to the position required to fulfill its function. It also states that if exercising is not practicable during operation at power or cold shutdowns, it may be limited to full-stroke during refueling outages. Paragraph ISTC-5131 requires that active valves shall have their stroke times measured when exercised in accordance with ISTC-3500.

The subject check valves also have a safety function in ensuring control rod insertion during a reactor scram. Valve 1C11-114, Scram Discharge Header Check Valve, opens to allow water to pass from the control rod drive pistons to the scram discharge header. Valve 1C11-115, Scram Accumulator Check Valve, closes to prevent loss of water pressure in the event supply pressure to the Scram Accumulator is lost. These valves are classified as Category C valves in accordance with the ASME OM Code.

ASME OM Code, 2001 Edition with Addenda through OMb-2003, paragraph ISTC-3522 requires that Category C check valves be exercised during operation at power in a manner that verifies obturator travel by using the methods in ISTC-5221. It also states that if exercising is not practicable during operation at power or cold shutdowns, it shall be performed during refueling outages. ISTC-5221 states the necessary valve obturator movement during exercise testing shall be demonstrated by performing both an open and a close test.

NUREG-1482, Revision 1, Section 4.4.6, states that for CRD system valves (which includes the four subject valves) for which testing could result in rapid insertion of one or more control rods, the rod scram test frequency identified in the facility's TSs may be used as the valve testing frequency to minimize rapid reactivity transients and wear of the CRD mechanisms. It also states that the scram inlet and outlet valves are power-operated valves that full-stroke in milliseconds and are not equipped with indication for both positions and therefore, it may be impractical to measure their full-stroke time as required by the Code. Furthermore, it states that verifying that the associated control rod meets the scram insertion time limits defined in the plant's TSs can be an acceptable alternative method of detecting degradation of these valves.

The NRC staff finds that the proposed alternative is consistent with the staff position in NUREG-1482, Revision 1 and would therefore, provide reasonable assurance of the operational readiness of the CRD valves.

3.3.6 Conclusion

Based on a review of the information provided by the licensee, the NRC staff concludes that the licensee's proposed use of the TS CRD test in accordance with NUREG-1482, Revision 1, Section 4.4.6, in place of the requirements of ASME OM Code paragraphs ISTC-5131, and

ISTC-5221 for CRD valves, is granted pursuant to 10 CFR 50.55a(f)(6)(i) for the third 10-year IST program interval, on the basis that the code requirements have been deemed impractical and the alternative provides an acceptable level of quality and safety 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.

3.4 Valve Relief Request VR-2

3.4.1 Affected Components

Relief was requested for the following safety relief valves (SRVs):

1B21-F041A, Dikkers Valve (Automatic Depressurization System (ADS))
1B21-F041B, Dikkers Valve (ADS)
1B21-F041C, Dikkers Valve
1B21-F041D, Dikkers Valve
1B21-F041E, Dikkers Valve (ADS)
1B21-F041F, Dikkers Valve (ADS)
1B21-F041G, Dikkers Valve
1B21-F041K, Dikkers Valve
1B21-F047B, Dikkers Valve
1B21-F047C, Dikkers Valve
1B21-F047D, Dikkers Valve (ADS)
1B21-F047F, Dikkers Valve (Low Level Setpoint (LLS))
1B21-F047G, Dikkers Valve
1B21-F047H, Dikkers Valve (ADS)
1B21-F051A, Dikkers Valve (LLS)
1B21-F051B, Dikkers Valve (LLS)
1B21-F051C, Dikkers Valve (ADS/LLS)
1B21-F051D, Dikkers Valve (LLS)
1B21-F051G, Dikkers Valve (ADS/LLS)

3.4.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ASME OM Code, Appendix I, Section 3410(d), requires that each valve that has been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled, shall be remotely actuated at reduced or normal system pressure to verify open and close capability of the valve before resumption of electric power generation. Set pressure verification is not required.

3.4.3 Licensee's Basis for Requesting Relief

The licensee states:

> The nuclear industry experience as a whole has shown that repeated manual actuation of the SRVs and automatic depressurization system (ADS) valves can lead to valve seat

leakage during plant operation. This experience is substantiated within NUREG-0628, "Generic Evaluation of Feedwater Transients and Small Break Loss-of Coolant Accidents in GE-Designed Operating Plants and Near Term Operating License Applications," and NUREG-0123, "Standard Technical Specifications for GE Boiling Water Reactors (BWR/5)," which recommended reducing the number of challenges to the ADS valves.

This relief request will allow testing of the SRVs to be performed in two separate stages. Stage 1 will be manual actuation of the valves at the qualified test facility. This will verify the open and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the SRV disk from the seat. Stage 2 will be manual actuation of the SRV actuators following installation into the plant with the actuator uncoupled from the valve stem. The plant-installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. Therefore, all components associated with the SRVs will continue to be tested.

This uncoupled test may also be performed following any maintenance activity that could affect the relief mode of the associated SRV.

With this relief request, the existing test method will also remain acceptable, i.e., full stroke exercise from the control room at adequate reactor steam pressure and flow.

The proposed test alternative provides verification of proper control connections by requiring the pneumatic and electrical controls to cycle the actuator on each SRV following installation, without stroking the SRV disk. The plant-installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. In addition, the test population of SRVs removed each refueling outage for setpoint testing would also be tested in the relief mode during bench testing. This setpoint testing provides assurance that the SRV would perform as expected when control air pressure is applied to the actuator assembly.

The proposed test alternative continues to demonstrate full functionality of the SRVs while minimizing the potential for creating valve seat leakage caused by cycling the valve unnecessarily. Therefore, the proposed test alternative provides an acceptable level of quality and safety. Manual actuation of the valves at the qualified test facility will verify the open and close function of the valve with the actuator coupled to the valve stem. This actuation includes both solenoids, and the air block valve, with each solenoid being energized, one at a time, and results in two separate lifts of the SRV disk from the seat.

Upon re-installation, uncoupled manual actuation will verify the appropriate function of the electric circuit, both solenoid valves, air block valve, and the valve actuator. This actuation includes both solenoids by lifting of the actuator with the first solenoid and maintaining the actuator open using the second solenoid, thereby, only lifting the actuator once.

Using the provisions of this relief request as an alternative to the ASME Code, Appendix I, Section 3410(d), provides a reasonable alternative to the ASME Code requirements, based on the determination that the proposed alternative provides an acceptable level of quality and safety. In addition, the method of uncoupled exercising is recognized as acceptable per ASME Code-2004, I-3410(d) whereas main disk movement is not required subsequent to installation after maintenance.

3.4.4 Licensee's Proposed Alternative Testing

The licensee states:

> This relief request will allow testing of the SRVs to be performed in two separate stages. Stage 1 will be manual actuation of the valves at the qualified test facility. This will verify the open and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the SRV disk from the seat. Stage 2 will be manual actuation of the SRV actuators following installation into the plant with the actuator uncoupled from the valve stem. The plant-installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator.

3.4.5 NRC Staff Evaluation

ASME OM Code, Appendix I, Section 3410(d), requires that each valve that has been maintained or refurbished in place, removed for maintenance and testing, or both, and reinstalled, shall be remotely actuated at reduced or normal system pressure to verify open and close capability of the valve before resumption of electric power generation. Set pressure verification is not required. In lieu of the ASME Code-required test, the licensee proposes to perform the testing of the SRVs in two separate stages. Stage 1 will be manual actuation of the valves at the qualified test facility. This will verify the open and close function of the valve with the actuator coupled to the valve stem, and includes both solenoids and the air block valve. Each solenoid is energized, one at a time, resulting in two separate lifts of the SRV disk from the seat. Stage 2 will be manual actuation of the SRV actuators following installation into the plant with the actuator uncoupled from the valve stem. The plant-installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. Therefore, all components associated with the SRVs will continue to be tested.

The proposed test alternative provides verification of proper control connections by requiring the pneumatic and electrical controls to cycle the actuator on each SRV following installation, without stroking the SRV disk. The plant-installed testing will verify full operation of the electrical circuitry, manual actuation solenoid valve, block valve, and the actuator. In addition, the test population of SRVs removed each refueling outage for setpoint testing will be tested in the relief mode during bench testing. This setpoint testing provides assurance that the SRV will perform as expected when control air pressure is applied to the actuator assembly. The proposed alternative is consistent with the TS-required surveillance testing requirements for valve operability and the 2004 Edition of the ASME Code, which does not require main disc movement for valves with auxiliary actuating devices.

Based on the above evaluation, the NRC staff finds that the proposed alternative to test the SRVs in two separate stages is acceptable. The licensee's proposed alternative provides reasonable assurance of valve operational readiness.

3.4.6 Conclusion

Based on the above evaluation, the proposed alternative to test the SRVs in two separate stages, is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative provides an acceptable level of quality and safety. This alternative is authorized for the third 10-year IST program interval.

3.5 Valve Relief Request VR-3

3.5.1 Affected Components

This relief request is applicable to certain motor-operated valve assemblies currently included in the Perry Motor-Operated Valve (MOV) Program.

3.5.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ISTA-3130(b) states that code cases be applicable to the edition and addenda specified in the test plan.

ISTC-3100 states that any valve that has undergone maintenance that could affect its performance after the preservice test be tested in accordance with ISTC-3310.

ISTC-3310 states that a new reference value be determined, or the previous reference value be reconfirmed by an IST after a valve has been replaced, repaired, or has undergone maintenance that could affect the valve's performance. ISTC-3510 states that active Category A and B valves be exercised nominally every 3 months.

ISTC-3521 states that active Category A and B valves be exercised during cold shutdowns if it is not practicable to exercise the valves at power, or that active Category A and B valves be exercised during refueling outages if it not practicable to exercise the valves during cold shutdowns.

ISTC-5120 states that MOVs be stroke-time tested when exercised in accordance with ISTC-3500.

ISTC-3700 states that valves with remote position indicators be observed locally at least once every 2 years to verify that valve operation is accurately indicated.

3.5.3 Licensee's Basis for Requesting Relief

The licensee states:

> Code Case OMN-1 has been determined by the NRC to provide an acceptable level of quality and safety when implemented in conjunction with the conditions imposed in RG 1.192.
>
> Since the NRC staff recommends licensees implement ASME OM Code Case OMN-1, Perry proposes to implement Code Case OMN-1, as adopted by the OMb-2006 Addenda of the Code, in lieu of the stroke-time provisions specified in ISTC-5120 for MOVs as well as the position verification testing in ISTC-3700.
>
> NUREG-1482, Revision 1, Section 4.2.5, "Alternatives to Stroke-Time Testing," states in part, that as an alternative to MOV stroke-time testing, ASME developed Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in LWR Power Plants," which provides periodic exercising and diagnostic testing for use in assessing the operational readiness of MOVs. Section 4.2.5 further states that the NRC staff recommends licensees implement ASME Code Case OMN-1, as accepted by the NRC (with certain conditions) in the regulations, or RG 1.192, Revision 0, "Operation and Maintenance Code Case Acceptability, ASME OM Code," as alternatives to the stroke-time testing provisions in the ASME OM Code for MOVs.
>
> RG 1.192 allows licensees with an applicable code of record to implement ASME OM Code Case OMN-1 (in accordance with the provisions in the RG) as an alternative to the code provisions for MOV stroke-time testing, without submitting request for relief from their code of record. The code of record for Perry third 10-year IST interval is OM Code 2001 Edition with Addenda through OMb-2003.

3.5.4 Licensee's Proposed Alternative Testing

The licensee states:

> Using the provisions of this relief request as an alternative to the MOV stroke-time testing requirements of ISTC-5120 and position indication verification of ISTC-3700 provides an acceptable level of quality for the determination of valve operational readiness. Code Case OMN-1, as adopted by the OMb-2006 Addenda of the Code, should be considered acceptable for use with OM Code-2001 with OMb-2003 Addenda as the code of record.

3.5.5 NRC Staff Evaluation

The NRC staff considered Section 4.2.5, "Alternatives to Stroke-Testing," of NUREG-1482, Revision 1, in its review of the licensee's proposed alternative. Section 4.2.5 states in part that as an alternative to MOV stroke-time testing, ASME developed Code Case OMN-1, which provides periodic exercising and diagnostic testing for use in assessing the operational readiness of MOVs, may be used. Section 4.2.5 recommends that licensees implement ASME Code Case OMN-1 as an alternative to the MOV stroke-time testing. The periodic exercising

and diagnostic testing requirements in OMN-1 provide an improved method for assessing the operational readiness of MOVs.

Application of code cases is addressed in 10 CFR 50.55a(b)(6) through references to RG 1.192, which lists acceptable and conditionally acceptable code cases for implementation in IST programs. RG 1.192, Table 2, conditionally approves the use of Code Case OMN-1 and states that the code case is applicable to the 2000 Addenda and earlier editions and addenda of the Code. There is no technical reason for prohibiting the use of Code Case OMN-1, as adopted by the OMb-2006 Addenda of the Code. Code Case OMN-1 provides an acceptable level of quality and safety for testing of MOVs and is an acceptable alternative for use in the licensee's IST program. This conclusion is consistent with the NRC staff position in NUREG-1482, Revision 1, and RG 1.192.

3.5.6 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative to the Code MOV exercising, stroke-time testing, and remote position verification requirements 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 alternative is authorized for the third 10-year IST program interval.

3.6 Valve Relief Request VR-6

3.6.1 Affected Components

Relief was requested for the following safety relief valves (SRVs):

1B21-F041A, Dikkers Valve (ADS) (Class 1)
1B21-F041B, Dikkers Valve (ADS) (Class 1)
1B21-F041C, Dikkers Valve (Class 1)
1B21-F041D, Dikkers Valve (Class 1)
1B21-F041E, Dikkers Valve (ADS) (Class 1)
1B21-F041F, Dikkers Valve (ADS) (Class 1)
1B21-F041G, Dikkers Valve (Class 1)
1B21-F041K, Dikkers Valve (Class 1)
1B21-F047B, Dikkers Valve (Class 1)
1B21-F047C, Dikkers Valve (Class 1)
1B21-F047D, Dikkers Valve (ADS) (Class 1)
1B21-F047F, Dikkers Valve (LLS) (Class 1)
1B21-F047G, Dikkers Valve (Class 1)
1B21-F047H, Dikkers Valve (ADS) (Class 1)
1B21-F051A, Dikkers Valve (LLS) (Class 1)
1B21-F051B, Dikkers Valve (LLS) (Class 1)
1B21-F051C, Dikkers Valve (ADS/LLS) (Class 1)
1B21-F051D, Dikkers Valve (LLS) (Class 1)
1B21-F051G, Dikkers Valve (ADS/LLS) (Class 1)

3.6.2 Applicable Code

The applicable ASME OM Code edition and addenda for Perry is the 2001 Edition with Addenda through OMb-2003.

ASME OM Code, Appendix I, Section I-1320(a), "5-Year Test Interval", specifies that Class 1 pressure relief valves be tested at least once every 5 years with a minimum of 20 percent of the valves from each valve group tested within any 24 month interval. This 20 percent shall consist of valves that have not been tested during the current 5-year interval, if they exist. The test interval for any individual valve shall not exceed 5 years.

3.6.3 Licensee's Basis for Requesting Relief

Perry has implemented a 24 month fuel cycle. When the fuel cycle was 18 months, it was possible to replace approximately one-third of the relief valves each refueling outage and meet the 5-year period requirements and the 20 percent in 24 months requirement. With the 24 month fuel cycle, one-half of the relief valves typically must be replaced each refueling outage to meet the 5-year period requirements.

The removal of half of the 19 valves versus a third of the valves each outage requires the removal of additional insulation, instrumentation, and other interferences. The additional work also results in an undesirable increase in radiation exposure to maintenance personnel. A review of the setpoint testing results for the time period from initial operation to the present (approximately 20 years), which comprises 150 data points, shows that the average setpoint change is 0.91 percent and the calculated standard deviation from the average is 0.72 of the nominal setpoint values.

As part of the evaluation of the setpoint testing data, it was identified that 4 tests exceeded the ASME Code limit of plus or minus 3 percent. Two of the failed tests had no as-found setpoint data obtained, due to severe seat leakage. The test data indicates a slight tendency towards higher as-found setpoints, but this tendency is well within the plus or minus 3 percent limit.

The proposed alternative of increasing the test interval for the subject Class 1 pressure relief valves from 5 years to three fuel cycles (approximately 6 years) would continue to provide an acceptable level of quality and safety while restoring the operational and maintenance flexibility that was lost when the 24-month fuel cycle created the unintended consequence of more frequent testing. The proposed alternative will continue to provide assurance of the valves' operational readiness.

3.6.4 Licensee's Proposed Alternative Testing

The licensee states:

> The subject Class 1 pressure relief valves will be tested at least once every three refueling cycles (approximately 6 years) with a minimum of 20 percent of the valves tested within any 24 month interval. This 20 percent would consist of valves that have not been tested during the current three cycle interval, if they exist. The test interval for any individual valve would not exceed three refueling cycles.

3.6.5 NRC Staff Evaluation

Perry has implemented a 24 month fuel cycle. When the fuel cycle was 18 months, it was possible to replace approximately one-third of the relief valves each refueling outage and meet the 5-year period requirement and the 20 percent in 24 months requirement. With the 24 month fuel cycle, one-half of the relief valves typically must be replaced each refueling outage to meet the 5-year period requirements. The removal of half of the 19 valves versus a third of the valves each outage requires the removal of additional insulation, instrumentation, and other interferences. The additional work also results in increased radiation exposure to maintenance personnel.

The NRC staff has reviewed the relief valve test results from March 1999, to May 2009, to determine if it is acceptable to extend the test interval beyond the 5-year interval specified in the ASME Code. During this time interval, the licensee tested more than 50 valves. The test results indicate that all the relief valves tested passed the ASME Code lift acceptance criterion of plus or minus 3 percent of set pressure. The setpoint data provided demonstrated that the relief valves have performed acceptably and provided adequate overpressure protection.

The relief valve testing and maintenance cycle at Perry consists of as-found testing and maintenance activities performed on the valves and subsequent post maintenance recertification testing. Subsequent to completion of as-found testing, each valve in the removed complement is disassembled to perform inspection and maintenance activities, including inspection of internal surfaces and parts for wear, damage, or erosion. During this process, anomalies or damage are identified and dispositioned for resolution. Damaged or worn parts, and gaskets and seals are replaced as necessary. The valves are lubricated and the valve seats relapped, if necessary. Each valve is then recertified for service. Although the ASME Code does not require maintenance to be routinely performed on relief valves, maintenance prior to installation provides reasonable assurance that set pressure drift will be minimized.

The ASME developed Code Case OMN-17, "Alternative Rules for Testing ASME Class 1 Pressure Relief/Safety Valves." The ASME plans to publish OMN-17 in the upcoming edition/addenda of the ASME Code. Code Case OMN-17 allows licensees to extend the test frequency for safety valves from 60 months to 72 months plus a 6 month grace period. The code case imposes a special maintenance requirement to disassemble and inspect each safety and relief valve to verify that parts are free from defects resulting from time-related degradation or maintenance-induced wear prior to the start of the extended test frequency. The purpose of this maintenance requirement is to reduce the potential for set pressure drift. The licensee stated that each SRV removed will be refurbished prior to the start of each test interval consistent with the special maintenance requirement in Code Case OMN-17.

The ASME Code 5-year test frequency requires that a minimum of 9 of the 19 SRVs be tested one refueling outage (24 month cycle) and 10 of the SRVs be tested the following refueling outage. Extending the test frequency to three refueling cycles (approximately 6 years) would reduce the minimum number of SRVs that are required to be tested over a period of 3 refueling outages by at least 9 valves. Extending the test frequency would result in a significant reduction of the expected cumulative radiation exposure to maintenance personnel. The NRC staff finds that the extension of the ASME Code 5-year test frequency to three refueling outages (approximately 6 years) is acceptable. Refurbishment prior to the start of each test interval

provides reasonable assurance that set pressure drift will be minimized. Past performance demonstrates good performance because the SRV as-found set pressure test results passed the current ASME Code and TS acceptance criterion of plus or minus 3 percent of set pressure. Therefore, the additional time beyond that required by the ASME Code should not impair operational readiness. Compliance with the ASME Code requirements would result in hardship or unusual difficulty without a compensating increase in quality and safety due to increased personnel radiation exposure.

3.6.6 Conclusion

Based on the above evaluation, the proposed alternative to extend the 5-year test interval for the identified SRVs is authorized pursuant to 10 CFR 50.55a(a)(3)(ii) on the basis that compliance with the Code requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety. The additional time beyond that required by the ASME Code should not impair valve operational readiness. This alternative is authorized for the third 10-year IST interval.

Principal Contributor: R. Lake, NRR

Date: October 22, 2009

If you have any questions, please contact the Perry Project Manager, Mr. Stephen Sands, at 301-415-3154.

Sincerely,

/RA by M David for S. Campbell/

Stephen J. Campbell, Chief
Plant Licensing Branch III-2
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Docket No. 50-440

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