energy harbor

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September 20, 2021
L-21-217

10 CFR 50.55a

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject:
Davis-Besse Nuclear Power Station, Unit No. 1
Docket No. 50-346, License No. NPF-3
10 CFR 50.55a Requests RP-1, RP-2, RP-3, and RP-4 Regarding Inservice Pump and Valve Testing

In accordance with 10 CFR 50.55a, Energy Harbor Nuclear Corp. hereby requests Nuclear Regulatory Commission (NRC) approval of enclosed 10 CFR 50.55a requests RP-1, RP-2, RP-3, and RP-4 for the Davis-Besse Nuclear Power Station, Unit No. 1, fifth ten-year inservice testing program for pumps and valves.

Requests RP-1 and RP-2 propose the use of plant process computer points as digital instrumentation for inservice testing of certain pumps. Request RP-3 proposes to perform periodic functional testing and flow rate tests each cycle in lieu of vibration monitoring on certain inaccessible pumps. Request RP-4 proposes to perform the comprehensive test of high pressure injection pumps each refueling outage in lieu of biennially and reclassify the pumps from Group B to Group A in order to include vibration test requirements during the quarterly pump tests.

Energy Harbor Nuclear Corp. requests approval of the requests described above by September 21, 2022 to support the Davis-Besse Nuclear Power Station, Unit No. 1, fifth ten-year inservice testing program for pumps and valves.

There are no regulatory commitments contained in this submittal. If there are any questions or if additional information is required, please contact Mr. Phil H. Lashley, Manager, Fleet Licensing, at (330) 696-7208.

Sincerely,

Terry J. Brown

Enclosures:

A. 10 CFR 50.55a Request Number: RP-1
B. 10 CFR 50.55a Request Number: RP-2
C. 10 CFR 50.55a Request Number: RP-3
D. 10 CFR 50.55a Request Number: RP-4

cc: NRC Region III Administrator
NRC Resident Inspector
NRR Project Manager
Executive Director, Ohio Emergency Management Agency, State of Ohio (NRC Liaison)
Utility Radiological Safety Board

Enclosure A
L-21-217

10 CFR 50.55a Request RP-1

(2 pages follow)

10 CFR 50.55a Request Number RP-1
Proposed Alternative
in Accordance with 10 CFR 50.55a(z)(1)

Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Components Affected

P43-1, Component Cooling Water Pump, Class 3, Group A
P43-2, Component Cooling Water Pump, Class 3, Group A
P43-3, Component Cooling Water Pump, Class 3, Group A
P58-1, High Pressure Injection Pump, Class 2, Group B
P58-2, High Pressure Injection Pump, Class 2, Group B
P3-1, Service Water Pump, Class 3, Group A
P3-2, Service Water Pump, Class 3, Group A
P3-3, Service Water Pump, Class 3, Group A

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), 2017 Edition.

3. Applicable Code Requirement

Subparagraph ISTB-3510(b)(2) of the ASME OM Code, states in part that:

> Digital instruments shall be selected such that the reference value does not exceed 90 percent of the calibrated range of the instrument.

4. Reason for Request

Plant process computer points may be used as digital instrumentation for inservice testing of pumps. The computer points may be used in lieu of the associated analog indicators in order to meet the ASME OM Code instrument accuracy requirements. In addition to using computer points, temporary digital instruments are also used as measuring and test equipment for pump testing.

In some cases, the reference value exceeds 90 percent of the digital instruments calibrated range during comprehensive pump testing.

5. Proposed Alternative and Basis for Use

As an alternative to ISTB-3510(b)(2), digital instruments used to verify the required action levels of ASME OM Code Tables ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," and ISTB-5221-1, "Vertical Line Shaft Centrifugal Pump Test Acceptance Criteria," will be selected such that the reference value shall not exceed 94 percent of the calibrated range for comprehensive pump testing.

Plant process computer points or temporary digital instruments may be used for comprehensive pump testing. The computer points use permanent plant instrumentation as input, and by design, the ranges are selected to account for all expected operating and testing conditions. Surveillance tests are written such that the temporary instrumentation is not over-ranged. In addition, digital instrumentation is significantly less susceptible to damage from over-ranging, and the digital instrument is accurate throughout its full calibrated range.

Tables ISTB-5121-1 and ISTB-5221-1 of the ASME OM Code list the acceptance criteria for comprehensive testing and state that the maximum acceptable value of the measured parameter is 106 percent of the reference value (for flow and differential pressure).

The proposed alternative to ISTB-3510(b)(2) requires that the digital instruments used be selected such that the reference value shall not exceed 94 percent of the calibrated range. This ensures that when the digital instrument used during performance of comprehensive pump testing is reading the maximum action level of 106 percent of the reference value, the reading is within the calibrated range of the instrument.

Using the provisions of this relief request as an alternative to the requirements in ISTB-3510(b)(2), during the performance of comprehensive pump testing, provides a reasonable alternative to the Code requirements. The proposed method of monitoring the affected components for degradation provides an acceptable level of quality and safety, and assurance that the pumps are capable of performing their safety functions.

6. Duration of Proposed Alternative

The duration of the proposed alternative is the fifth 10-year inservice test interval that commences on September 21, 2022.

7. Precedent

A similar request was authorized by the Nuclear Regulatory Commission (NRC) staff for use during the fourth 10-year inservice test interval for Davis-Besse Nuclear Power Station. The letter authorizing the request (SER) is cited below.

"Davis-Besse Nuclear Power Station, Unit 1 – Safety Evaluation For Relief Requests RP-1 and RP-1A (TAC Nos. MF0758 and MF0760)," dated January 27, 2014, (Accession No. ML14003A266), for the Fourth 10-Year Pump and Valve IST Program.

Enclosure B
L-21-217

10 CFR 50.55a Request RP-2

(2 pages follow)

10 CFR 50.55a Request Number: RP-2
Proposed Alternative
in Accordance with 10 CFR 50.55a(z)(1)

Alternative Provides Acceptable Level of Quality and Safety

1. ASME Code Components Affected

P14-1, Auxiliary Feedwater Pump, Class 3, Group B
P14-2, Auxiliary Feedwater Pump, Class 3, Group B
P56-1, Containment Spray Pump, Class 2, Group B
P56-2, Containment Spray Pump, Class 2, Group B
P42-1, Decay Heat Removal Pump, Class 2, Group A
P42-2, Decay Heat Removal Pump, Class 2, Group A

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), 2017 Edition.

3. Applicable Code Requirement

Subparagraph ISTB-3510(b)(2) of the ASME OM Code, states in part that:

> Digital instruments shall be selected such that the reference value does not exceed 90 percent of the calibrated range of the instrument.

4. Reason for Request

Plant process computer points may be used as digital instrumentation for inservice testing of pumps. The computer points may be used in lieu of the associated analog indicators in order to meet the ASME OM Code instrument accuracy requirements. In addition to using computer points, temporary digital instruments are also used as measuring and test equipment for pump testing.

In some cases, the reference value could exceed 90 percent of the digital instruments calibrated range during pump testing in accordance with Subsection ISTB of the 2017 Edition of the OM Code (for pumps P14-1, P14-2, P56-1, P56-2, P42-1, and P42-2).

5. Proposed Alternative and Basis for Use

As an alternative to ISTB-3510(b)(2), digital instruments used to verify the required action levels of ISTB will be selected such that the reference value shall not exceed 94 percent of the calibrated range.

Plant process computer points or temporary digital instruments may be used for OM Code Subsection ISTB pump testing. The computer points use permanent plant

instrumentation as input, and by design, the ranges are selected to account for all expected operating and testing conditions. Surveillance tests are written such that the temporary instrumentation is not over-ranged. In addition, digital instrumentation is significantly less susceptible to damage from over-ranging, and the digital instrument is accurate throughout its full calibrated range.

The proposed alternative to ISTB-3510(b)(2) requires that the digital instruments used be selected such that the reference value shall not exceed 94 percent of the calibrated range. This ensures that when pump testing is performed OM Code Subsection ISTB and the digital instrument is reading the maximum action level of 106 percent of the reference value, the reading is within the calibrated range of the instrument.

Using the provisions of this relief request as an alternative to the requirements in ISTB-3510(b)(2), during the performance of comprehensive pump testing, provides a reasonable alternative to the Code requirements. The proposed method of monitoring the affected components for degradation provides an acceptable level of quality and safety, and assurance that the pumps are capable of performing their safety functions.

6. Duration of Proposed Alternative

The duration of the proposed alternative is the fifth 10-year inservice test interval that commences on September 21, 2022.

7. Precedent

A similar request was authorized by the Nuclear Regulatory Commission (NRC) staff for use during the fourth 10-year inservice test interval for Davis-Besse Nuclear Power Station. The letter authorizing the request (SER) is cited below.

"Davis-Besse Nuclear Power Station, Unit 1 – Safety Evaluation For Relief Requests RP-1 and RP-1A (TAC Nos. MF0758 and MF0760)," dated January 27, 2014, (Accession No. ML14003A266), for the Fourth 10-Year Pump and Valve IST Program.

Enclosure C
L-21-217

10 CFR 50.55a Request RP-3

(4 pages follow)

10 CFR 50.55a Request Number: RP-3
Proposed Alternative
in Accordance with 10 CFR 50.55a(f)(5)(iii)

Inservice Testing Impracticality

1. ASME Code Components Affected

P195-1, Emergency Diesel Generator Fuel Oil Transfer Pump, Class 3, Group A
P195-2, Emergency Diesel Generator Fuel Oil Transfer Pump, Class 3, Group A

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), 2017 Edition.

3. Applicable Code Requirement

Table ISTB-3400-1, "Inservice Test Frequency," of the ASME OM Code, specifies a frequency of quarterly for the Group A test, and biennially for the comprehensive test.

Subparagraphs ISTB-5121(b) and ISTB-5123(b) of the ASME OM Code, applicable to the Group A and comprehensive test procedures, respectively, state in part that the resistance of the system shall be varied until the flow rate is as close as practical to the reference point with the variance not to exceed +2% or −1% of the reference point. The differential pressure shall then be determined and compared to its reference value.

Subparagraphs ISTB-5121(c) and ISTB-5123(c) of the ASME OM Code, applicable to the Group A and comprehensive test procedures, respectively, state that:

> Where it is not practical to vary system resistance, flow rate and pressure shall be determined and compared to their respective reference values.

Subparagraphs ISTB-5121(d) and ISTB-5123(d) of the ASME OM Code, applicable to the Group A and comprehensive test procedures, respectively, state in part that vibration (displacement or velocity) shall be determined and compared with the reference values.

Subparagraphs ISTB-5121(e) and ISTB-5123(e) of the ASME OM Code, applicable to the Group A and comprehensive test procedures, respectively, state in part that all deviations from the reference values shall be compared with the ranges of Table ISTB-5121-1 ["Centrifugal Pump Test Acceptance Criteria"] and corrective action taken as specified in para. ISTB-6200 ["Corrective Action"]. Vibration measurements shall be compared to both the relative and absolute criteria shown in the alert and required action ranges of Table ISTB-5121-1.

Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," of the ASME OM Code, provides Group A and Comprehensive pump test acceptance criteria.

4. Impracticality of Compliance

10 CFR 50.55a(f)(2) requires that ASME Code Class 1 and 2 components be designed and provided with access to enable the performance of inservice tests if the construction permit was issued on or after January 1, 1971, but before July 1, 1974. The Davis-Besse Nuclear Power Station construction permit was issued on March 24, 1971; however, the EDG fuel oil transfer pumps are Class 3. The EDG fuel oil transfer pumps and motors are submerged inside the EDG fuel oil storage tank and are not accessible for vibration measurements. There are no installed flow instrumentation, pressure instrumentation, valve test connections, or accessible recirculation lines. The pumps transfer diesel fuel oil from the EDG fuel oil storage tanks to the EDG day tanks.

The EDG fuel oil transfer pumps do not have installed instrumentation to measure either flow or discharge pressure. The only possible flow measurement is by measuring EDG day tank volume change over time. Error in measuring this volume is dependent on fuel oil temperature and a limited change in level indication because the EDG day tank has a large upper circular section. Flow rate is dependent upon EDG fuel oil storage tank level and fuel oil viscosity, which varies with environmental temperature conditions. There are no accessible recirculation pathways nor designed drainage pathways in the pipe line that are used to transfer fuel oil from the EDG fuel oil storage tank to the EDG day tank.

5. Burden Caused by Compliance

Code compliance would require modification of the fuel oil transfer system to accommodate Code-required flow, differential pressure, and vibration measurements. This modification would involve replacement of the existing pumps and their relocation external to the tanks, installation of flow test loops, and installation of flow and pressure instrumentation. A modification of this magnitude is unwarranted considering the reduced safety significance of the Davis-Besse Nuclear Power Station fuel oil transfer system as compared to typical designs.

Performing Code-required testing without a major plant hardware modification is impractical.

6. Proposed Alternative and Basis for Use

Since the EDG fuel oil transfer pumps are inaccessible, no vibration monitoring will be performed. The following testing will be performed in lieu of the inservice test requirements (paragraphs ISTB-5121 and ISTB-5123), test acceptance criteria (Table ISTB-5121-1), and test frequency requirements (Table ISTB-3400-1) described above in the applicable code requirements section.

Fuel oil transfer system functional testing is performed every 92 days as required by Technical Specification Surveillance Requirement 3.8.1.7. This surveillance requirement verifies that the fuel oil transfer system operates to transfer fuel oil from the fuel oil storage tank to the day tank. Periodic operation of the EDGs for testing purposes requires automatic operation of the EDG fuel oil transfer pumps in order to maintain the required level in the EDG day tanks.

Pump flow rate tests are performed each cycle. Fuel oil is added to the EDG fuel oil storage tank, if necessary, to ensure a specified minimum fuel oil level is established above the EDG fuel oil transfer pump prior to testing. The minimum fuel oil level ensures pump suction pressure is consistent for repeatable system flow characteristics.

The pump flow rate is calculated by measuring the change in EDG day tank level over time. An EDG day tank level change of approximately 150 gallons or more is timed to determine flow rate. As described above, consistent EDG fuel oil transfer pump suction pressure is established prior to the test. Based upon these conditions, pump flow rates are repeatable and capable of predicting pump degradation.

The EDG fuel oil transfer pumps are rated at 10 gallons per minute (gpm). A conservative minimum flow value, with respect to design basis, will be used in lieu of ASME OM Code Table ISTB-5121-1. This minimum flow value will ensure the EDG fuel oil transfer pumps do not degrade below required design system flow requirements. Pump flow rates will be trended for degradation. In lieu of alert levels being specified, required actions will be performed if pump flow rate is determined to be outside the acceptable range.

Periodically, the EDG fuel oil storage tanks are drained, cleaned, and filled with fresh oil. The EDG day tanks are also drained, cleaned and inspected. At these times, a long term pump duration test is possible. The transfer pump will be required to continuously pump 1000 gallons of fuel from the EDG fuel oil storage tank to the EDG day tank. Flow rate will be calculated and evaluated for degradation.

The EDG fuel oil storage tank configuration consists of a safety-related 40,000 gallon, seven-day capacity storage tank for each EDG. Each of the seven-day storage tanks have an internally mounted, submerged EDG fuel oil transfer pump normally supplying the corresponding 6,000 gallon gross capacity day tank. There is sufficient fuel oil in each day tank to operate its associated diesel generator for more than 19 hours at the continuous rated load. In addition, the supply lines from the EDG day tanks can be cross-connected, which permits either EDG to be supplied with fuel oil from either storage tank in an emergency. Each EDG day tank has a safety-related fill connection and the capability of emergency fill from the non-safety-related 100,000 gallon diesel fuel oil storage tank using a flexible hose. Because of the large capacity of the day tanks, and the three diverse methods of replenishing the day tanks during EDG operation (100,000 gallon tank, 40,000 gallon tanks, and

safety-related fill connection), the Davis-Besse Nuclear Power Station EDG fuel oil transfer pumps are of lower safety significance than in a fuel oil transfer system with relatively small day tanks.

The EDG fuel oil transfer pumps are low flow pumps, rated at 10 gpm. They automatically start on a low EDG day tank level of approximately seven feet (approximately 5,050 gallons), then automatically shut off at approximately seven and one-half feet; this corresponds to approximately 250 gallons pumped. This safety feature maintains a minimum day tank level as required by Technical Specification Surveillance Requirement 3.8.1.4, which verifies each day-tank contains greater than or equal to 4,000 gallons of fuel oil.

The EDG day tanks are elevated so that gravity will cause flow to the suction of the diesel fuel oil pumps for the EDG engines. Periodic verification of the fuel oil level in the EDG day tanks is sufficient to allow time to replenish the tanks.

Using the provisions of this relief request as an alternative to the requirements of the ASME OM Code for Group A and comprehensive pump testing provides a reasonable assurance of pump operational readiness. Compliance with ASME OM Code requirements for measurement of flow rate, differential pressure, and vibration at the reference value is impractical due to the fuel oil transfer system design. Compliance would require a major modification of the fuel oil transfer system.

7. Duration of Proposed Alternative

The duration of the proposed alternative is the fifth 10-year inservice test interval that commences on September 21, 2022.

8. Precedent

A similar request was authorized by the Nuclear Regulatory Commission (NRC) staff for use during the fourth 10-year inservice test interval for Davis-Besse Nuclear Power Station. The letter authorizing the request (SER) is cited below.

"Davis-Besse Nuclear Power Station, Unit 1 – Safety Evaluation For Relief Request RP-3 (TAC NO. MF0757) (L-13-067)," dated February 5, 2014, (Accession No. ML14002A444).

Enclosure D
L-21-217

10 CFR 50.55a Request RP-4

(2 pages follow)

10 CFR 50.55a Request Number: RP-4
Proposed Alternative
in Accordance with 10 CFR 50.55a(z)(2)

Hardship or Unusual Difficulty
Without a Compensating Increase in Level of Quality and Safety

1. ASME Code Components Affected

P58-1, High Pressure Injection Pump, Class 2, Group AB
P58-2, High Pressure Injection Pump, Class 2, Group AB

2. Applicable Code Edition and Addenda

American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code), 2017 Edition.

3. Applicable Code Requirement

Table ISTB-3400-1, "Inservice Test Frequency," of the ASME OM Code, requires a Group A and Group B test to be performed quarterly and a comprehensive test to be performed biennially.

4. Reason for Request

The high pressure injection pumps inject water into the reactor coolant system to mitigate the consequences of a loss-of-coolant accident. These pumps were originally categorized as Group B pumps since they are in a standby system that is not operated routinely except for testing. The ASME OM Code required testing for these high pressure injection pumps at a quarterly frequency for Group B pump test and a biennial comprehensive pump test. In order to achieve the necessary flow rate, without creating low temperature overpressure concerns, the high pressure injection pumps are lined up to discharge into the reactor coolant system with the reactor head removed and with water in the refueling canal. These plant conditions are established only during an outage in which a refueling occurs and are not typically established during a maintenance outage. These same plant conditions will be used to satisfy the Periodic Pump Verification Test requirements of Appendix V.

Table ISTB-3400-1 of the ASME OM Code, requires the comprehensive pump test to be performed biennially. Since the plant is on a 24-month fuel cycle, compliance with this requirement is normally achievable. However, if the plant experiences maintenance shutdowns, the added time between refueling outages could jeopardize compliance with this testing requirement.

Removal of the reactor head solely to perform the comprehensive pump test is a hardship since it would substantially increase the scope and duration of a maintenance shutdown and result in associated radiation exposure.

5. Proposed Alternative and Basis for Use

Comprehensive testing of the high pressure injection pumps will be performed each refueling outage instead of biennially. The classification for high pressure injection pumps will be changed from Group B to Group A in order to include, in addition to other provisions, vibration test requirements of ASME OM Code Paragraph ISTB-5121, "Group A Test Procedure," subparagraphs (d) and (e), with vibration acceptance criteria of ASME OM Code Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," during the quarterly pump test. A Group B pump that is classified as a Group A pump for testing purposes is referred to herein as a Group AB pump.

Using the provisions of this relief request as an alternative to the requirements of ASME OM Code Table ISTB-3400-1, including the performance of comprehensive tests during refueling outages and Group A pump tests quarterly between refueling outages, provides reasonable assurance that the high pressure injection pumps are operationally ready. Removal of the reactor head solely to perform the comprehensive pump test is a hardship since it would substantially increase the scope and duration of a maintenance shutdown and result in associated radiation exposure.

6. Duration of Proposed Alternative

The duration of the proposed alternative is the fifth 10-year inservice test interval that commences on September 21, 2022.

7. Precedent

A similar request was authorized by the Nuclear Regulatory Commission (NRC) staff for use during the fourth 10-year inservice test interval for Davis-Besse Nuclear Power Station. The letter authorizing the requests is cited below.

"Davis-Besse Nuclear Power Station, Unit 1 – Safety Evaluation Concerning Comprehensive Pump Testing Relief Request (TAC NO. MF0756) (L-13-067)," dated March 31, 2014, (Accession No. ML14030A574).