



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

August 1, 2013

Mr. Ray Lieb  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Mail Stop A-DB-3080  
5501 North State, Route 2  
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1- SAFETY  
EVALUATION FOR RELIEF REQUESTS RP-6 AND RV-1 (TAC NOS. MF0754  
AND MF0755)(L-13-067)

Dear Mr. Lieb:

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A321), FirstEnergy Nuclear Operating Company (FENOC), the licensee, submitted requests RP-6 and RV-1 to the U.S. Nuclear Regulatory Commission (NRC). The licensee requested an alternative test plan in lieu of certain inservice test (IST) requirements of the 2004 Edition through 2006 Addenda of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code) for the IST program at Davis-Besse Nuclear Power Station (DBNPS) Unit 1. Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.55a(a)(3)(i), the licensee requested to use proposed alternatives RP-6 and RV-1 on the basis that the alternative provides an acceptable level of quality and safety.

Based on our review of your submittals, the NRC staff has concluded that the alternative proposed in RP-6 and RV-1 provide an acceptable level of quality and safety, and, therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(i). These reliefs are authorized for the remainder of the fourth 10-year IST interval at DBNPS, Unit 1, which began September 21, 2012, and ends September 20, 2022,

Sincerely,

A handwritten signature in black ink, appearing to read "Jeremy S. Bowen", written over a horizontal line.

Jeremy S. Bowen, Acting Chief  
Plant Licensing Branch III-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Safety Evaluation

cc w/encl: ListServ



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

INSERVICE TEST PROGRAM

RELIEF REQUESTS RP-6 AND RV-1

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter dated February 27, 2013 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML13059A321), First Energy Nuclear Operating Company (FENOC), the licensee, submitted requests RP-6 and RV-1 to the U.S. Nuclear Regulatory Commission (NRC). The licensee requested an alternative test plan, in lieu of certain inservice test (IST) requirements of the 2004 Edition through 2006 Addenda of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code), for the IST program at Davis-Besse Nuclear Power Station (DBNPS), Unit 1, for the fourth 10-year IST program interval which commenced on September 21, 2012, and is currently scheduled to conclude on September 20, 2022.

Specifically, pursuant to Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Section 50.55a(a)(3)(i), the licensee requested to use proposed alternatives RP-6 and RV-1 on the basis that the alternative provides an acceptable level of quality and safety.

2.0 REGULATORY REQUIREMENTS

Section 50.55a(f) to 10 CFR, "Inservice Testing Requirements," requires, in part, that IST of certain ASME Code Class 1, 2, and 3, components must meet the requirements of the ASME OM Code and applicable addenda, except where alternatives have been authorized pursuant to Paragraphs (a)(3)(i) or (a)(3)(ii).

Section 50.55a(a)(3) to 10 CFR states, in part, that alternatives to the requirements of paragraph (f) may be used when authorized by the NRC, if the applicant demonstrates that: (i) the proposed alternatives would provide an acceptable level of quality and safety, or (ii) compliance with the specified requirements would result in hardship or unusual difficulty without a compensating increase in the level of quality and safety.

Regulatory Guide (RG) 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," identifies the Code Cases that have been determined by the NRC to be acceptable alternatives to applicable parts. OM Code Cases not yet endorsed by the NRC may be

implemented through 10 CFR 50.55a(a)(3), which permits the use of alternatives to the Code requirements referenced in 10 CFR 50.55a provided the proposed alternatives result in an acceptable level of quality and safety, and provided the use is authorized by the Director of the Office of Nuclear Reactor Regulation.

NUREG-1482, "Guidelines for Inservice Testing at Nuclear Power Plants," is intended to assist in establishing a basic understanding of the regulatory basis for pump and valve IST programs, and dynamic restraint (snubbers) examination and testing programs. This NUREG also provides information regarding the NRC's involvement in the development of the ASME OM Code. This NUREG discusses OM Code inquiries, inservice examination and testing of snubbers, pump and valve IST, use of ASME code cases, conditions on the use of the OM Code, guidance for OM Code noncompliance, requests for alternatives to the OM Code at operating commercial nuclear power plants, and the development of IST programs for new reactors.

### 3.0 TECHNICAL REVIEW

#### 3.1 Licensee's Alternative Request RP-6

##### 3.1.1 Applicable Code Edition and Addenda

In Attachment E to the letter dated February 27, 2013, the licensee identified that the applicable ASME OM Code edition and addenda is the 2004 Edition through the 2006 Addenda.

##### 3.1.2 Applicable Code Requirements

ISTB-2000, "Supplemental Definitions," defines the uniform criteria for designating Group A and Group B pumps.

ISTB-3000, "General Testing Requirements," and Table ISTB-3000-1, "Inservice Test Parameters," define and compare parameters (e.g., pressure, flow rate, vibration) measured during Group A, Group B, and comprehensive pump tests.

ISTB-3400, "Frequency of Inservice Tests," states that, "An inservice test shall be run on each pump as specified in Table ISTB-3400-1."

Table ISTB-3400-1, "Inservice Test Frequency," notes that Group A and Group B tests shall be performed quarterly, and comprehensive pump tests shall be performed biennially.

Table ISTB-3510-1, "Required Instrument Accuracy," defines the required instrument accuracies for Group A, Group B, and comprehensive pump tests.

ISTB-5000, "Specific Testing Requirements," states, in part, that "When a Group B test is required, a Group A or comprehensive test may be substituted."

Table ISTB-5121-1, "Centrifugal Pump Test Acceptance Criteria," defines the required acceptance criteria for centrifugal pumps for Group A, Group B, and comprehensive tests.

ISTB-5123, "Comprehensive Test Procedure," provides the specific requirements for the comprehensive test for centrifugal pumps (except vertical line shaft centrifugal pumps).

### 3.1.3 ASME Code Components Affected

ASME OM Code Case OMN-18, "Alternative Testing Requirements for Pumps Tested Quarterly Within  $\pm$  20% of Design Flow" provides an alternative testing approach for group A pumps normally tested quarterly within 20 percent of the pump design flow rate.

Alternative testing in accordance with ASME OM Code Case OMN-18 is requested for the following pumps:

Table 1

Pump Number	System	Class	ISTB Group
P14-1	Auxiliary Feedwater Pump	3	AB
P14-2	Auxiliary Feedwater Pump	3	AB
P56-1	Containment Spray Pump	2	AB
P56-2	Containment Spray Pump	2	AB
P42-1	Decay Heat Removal Pump	2	A
P42-2	Decay Heat Removal Pump	2	A

### 3.1.4 Reason For Request (as stated)

The ASME Code committees have approved ASME OM Code Case OMN-18, "Alternative Testing Requirements for Pumps Tested Quarterly Within  $\pm$  20% [plus or minus 20 percent] of Design Flow." This Code Case has not been approved for use in Regulatory Guide 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," June 2003.

Code Case OMN-18, of the ASME OM Code, allows the owner to not perform the Comprehensive Pump Test (CPT) with the associated acceptance criteria if the quarterly test is performed at plus or minus 20 percent of design flow and the instrumentation meets the accuracy requirements of Table ISTB-3510-1, "Required Instrument Accuracy," for the comprehensive and preservice tests.

Further, paragraph ISTB-5000, "Specific Testing Requirements," of the ASME OM Code, states in part that when a Group B test is required, a Group A or comprehensive test may be substituted. As such, an Owner could categorize a pump that otherwise meets the requirements of Group B, as a Group A pump for testing. An affected Group B pump that is categorized as a Group A pump for testing purposes is referred to herein as a Group AB pump.

### 3.1.5 Proposed Alternative (as stated)

As an alternative to the applicable ASME OM Code requirements listed above, pump testing will be performed in accordance with the provisions of ASME OM Code Case OMN-18. Quarterly Group A tests will be performed with pump flow within plus or minus 20 percent of pump design flow in lieu of performing a biennial CPT. The pressure instrumentation utilized during the tests will have an accuracy of at least 0.5 percent. This alternative testing is applicable to only those pumps with full flow testing capability.

As an alternative to Table ISTB-5121-1 acceptance criteria associated with the Group A test, a maximum of 1.06 of reference flow or differential pressure will be applied as the high end of the acceptable range in lieu of the required 1.10. Values above 1.06 would be considered to be in the required action range. Vibration acceptance criteria of Table ISTB-5121-1 will continue to be applied.

By testing Group AB pumps in accordance with ASME OM Code Case OMN-18, vibration data is obtained quarterly, rather than once every two years, and this allows better trending of pump performance data. As a result of the increased instrumentation accuracy requirements of ASME OM Code Case OMN-18, imposed during applicable quarterly tests, there is no added value in performing the biennial comprehensive test on the affected pumps.

Using the narrowed acceptance range for Group A pump test acceptance criteria, in conjunction with using more accurate pressure instruments during testing, provides more consistent trend results when comparing subsequent tests. The elimination of the CPT, with its more limiting required action range upper bound of 103 percent of the reference value, is compensated for by using more accurate pressure gauges on every quarterly test. Due to the improved accuracy, consistent testing methodology, and the addition of quarterly vibration monitoring on Group AB pumps, deviations in actual pump performance indicative of impending degradation are more easily identified during quarterly performance trending activities. Additionally, declaring pumps inoperable for reasons other than actual equipment degradation can be avoided.

As an alternative to the requirements in Table ISTB-3400-1 and Table ISTB-5121-1 of the ASME OM Code, 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.

The duration of the proposed alternative is for the fourth 10-Year IST interval that commenced on September 21, 2012.

### 3.1.6 NRC Staff Evaluation of Alternative Request RP-6

The licensee is proposing to perform a quarterly IST for all pumps listed in Table 1 in accordance with a modified Group A test procedure, in lieu of quarterly Group A tests, and a CPT every two years.

The ASME OM Code requires that for Group A pumps, a Group A test be performed every quarter, and a CPT be performed biennially. The Group A test is performed within  $\pm 20$  percent of the pump design flow rate and the pressure instrument accuracy is  $\pm 2$  percent, and the upper limit for the "Acceptable Range" and "Required Action Range" for flow rate and differential pressure is 110 percent of the reference values. The CPT is performed within  $\pm 20$  percent of the pump design flow rate, the pressure instrument accuracy is  $\pm 1/2$  percent, and the upper limit of the "Acceptable Range" and "Required Action Range" for flow rate and differential pressure is 103 percent of the reference values. Vibration monitoring is performed during both the Group A tests and the CPTs. The licensee proposes that for the pumps listed in Table 1, a modified Group A quarterly test, will be performed using ASME OM Code Case OMN-18, with modified "Acceptable" and "Required Action" ranges, and the biennial comprehensive test will not be performed. The modified Group A quarterly test would be performed within  $\pm 20$  percent of the pump design flow rate, using more accurate pressure instrumentation than is required for a comprehensive test ( $\pm 1/2$  percent instead of  $\pm 2$  percent). The licensee will use a more limiting upper bound differential pressure ( $\Delta P$ ) value of 106 percent for the "Acceptable Range," in lieu of 110 percent, that is normally required by the ASME OM Code for Group A tests. However, the upper bound 106 percent is greater than the upper bound value of 103 percent for the biennial CPT. Using more accurate pressure gauges and a more limiting "Acceptable Range" during modified quarterly Group A test compensates for the elimination of the CPT with its more limiting "Acceptable Range" upper bound value of 103 percent.

OMN-18 was published in the 2009 Edition of the ASME OM Code. This edition of the ASME OM Code has not been incorporated by reference into 10 CFR 50.55a, and OMN-18 has not been incorporated into RG 1.192. However, the NRC staff has reviewed OMN-18, and currently has no concerns with its usage, providing that the upper end values of the Group A test "Acceptable Ranges" for flow ( $Q$ ) and differential pressure ( $\Delta P$ ) are 106 percent  $Q_r$  and 106 percent  $\Delta P_r$ , respectively, and that the high values of the "Required Action Ranges" for flow and differential pressure are greater than 106 percent  $Q_r$  and 106 percent  $\Delta P_r$ , respectively. The NRC staff considers the proposed alternative acceptable because all of the tests will be performed with pressure gauges with  $\pm 1/2$  percent accuracy. The elimination of the CPT, with its more limiting "Acceptable Range" upper bound of 103 percent  $\Delta P_r$ , is compensated for by using more accurate pressure gauges on every quarterly test.

Regular testing with more accurate instrumentation and tighter acceptance criteria will provide for better trending of pump performance. Therefore, the NRC staff finds that the proposed alternative provides an acceptable level of quality and safety for testing and acceptance criteria for the pumps listed in Table 1.

### 3.2 Licensee's Alternative Request RV-1

#### 3.2.1 Applicable Code Edition and Addenda

In Attachment F to the letter dated February 27, 2013, the licensee identified that the applicable ASME OM Code edition and addenda is the 2004 Edition through the 2006 Addenda.

#### 3.2.2 Applicable Code Requirements

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

ISTC-3100 "Preservice Testing", (a), states that "Any valve that has undergone maintenance that could affect its performance after the preservice test shall be tested in accordance with ISTC-3310."

ISTC-3310 "Effects of Valve Repair, Replacement, or Maintenance on Reference Values", states, in part, that "When a valve or its control system has been replaced, repaired, or has undergone maintenance that could affect the valve's performance, a new reference value shall be determined or the previous reference value be reconfirmed by an inservice test run before it is returned to service or immediately if not removed from service."

ISTC-3510 "Exercising Test Frequency" states, in part, that "Active Category A, Category B, and Category C check valves shall be exercised nominally every 3 months."

ISTC-3521 "Category A and Category B Valves" states, in part, 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 is not practicable to exercise the valves during cold shutdowns.

ISTC-3700 "Position Verification Testing" states, in part, that "Valves with remote position indicators shall be observed locally at least once every 2 years to verify that valve operation is accurately indicated."

ISTC-5121 "Valve Stroke Testing", (a), states that "Active valves shall have their stroke times measured when exercised in accordance with ISTC-3500."

#### 3.2.3 ASME Code Components Affected

ASME OM Code Case OMN-1, "Alternative Rules for Preservice and Inservice Testing of Active Electric Motor-Operated Valve [MOV] Assemblies in Light-Water Reactor (LWR) Power Plants," (2006 Addenda) provides periodic exercising and diagnostic testing for use in assessing the operational readiness of MOVs. Regulatory Guide (RG) 1.192 allows licensees to implement ASME Code Case OMN-1, Revision 0, in accordance with the provisions in the RG as an alternative to the ASME OM Code provisions for MOV stroke time testing in the ASME OM Code 1995 Edition through 2000 Addenda.

Alternative testing in accordance with ASME Code Case OMN-1 (2006 Addenda) is requested for MOV assemblies included in the DBNPS MOV program listed on page 4 of Attachment F to the letter dated February 27, 2013.

#### 3.2.4 Reason for Request (as stated)

[Regulatory Guide] ... 1.192, "Operation and Maintenance Code Case Acceptability, ASME OM Code," June 2003, allows licensees to implement ASME Code Case OMN-1, Revision 0, (in accordance with the provisions in the regulatory guide) as an alternative to the Code provisions for MOV stroke-time testing in the ASME OM Code 1995 Edition through 2000 Addenda. The applicable Code for OMN-1, as stated in RG 1.192, was only reaffirmed through the 1999 Addenda. Therefore, RG 1.192 does not authorize use of ASME Code Case OMN-1 for plants like Davis-Besse Nuclear Power Station that test in accordance with ASME OM Code 2004 Edition through 2006 Addenda.

#### 3.2.5 Proposed Alternative (as stated)

As an alternative to the applicable ASME OM Code requirements listed above, valve testing will be performed in accordance with the provisions of Code Case OMN-1 from the ASME OM Code 2006 Addenda. These Code Case OMN-1 provisions will be used instead of MOV stroke-time provisions specified in ISTC-5121(a), preservice testing provisions of ISTC-3100(a), reference value provisions of ISTC-3310, exercising test frequency provisions of ISTC-3510, and exercising provisions of ISTC-3521(e). The conditions specified for the use of Code Case OMN-1 in RG 1.192, June 2003, will be met. With this alternative to the provisions of ISTC-3130(b), Code Case OMN-1 from the ASME OM Code, 2006 Addenda, will be considered acceptable for use with ASME OM Code 2004 Edition through 2006 Addenda identified as the Code of record.

Provisions of ISTC-3700 (that verify valve operation is accurately indicated) will be implemented at the MOV test frequency determined in accordance with Section 6.4.4 of Code Case OMN-1, instead of the ISTC-3700 test frequency of once every two years. High safety significant valves may be full stroke exercised, in accordance with ISTC-3521, during cold shutdowns or refueling outages if supported by a deferred test justification demonstrating that quarterly exercising may have an adverse effect on plant safety and the potential increase in core damage frequency and risk associated with the extension is small.

The duration of the proposed alternative is the fourth 10-year IST interval that commenced on September 21, 2012.



### 3.2.6 NRC Staff Evaluation of Alternative Request RV-1

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. Table 2 of RG 1.192, conditionally approves the use of Code Case OMN-1 and states that the code is applicable to the 2000 Addenda and earlier editions and addenda of the Code. Code Case OMN-1 was revised in the 2006 Addenda to the ASME OM Code. The revision included enhancements such as clarification of valve remote position indication requirements, ball/plug/diaphragm valve test requirements, and the expansion of risk-informed provisions. The NRC staff has reviewed ASME OM Code 2006 Addenda Code Case OMN-1 and determined that there are no significant technical differences between the 2000 Addenda of the OM Code version that is currently approved in RG 1.192. There is no technical reason for prohibiting the use of ASME OM Code 2006 Addenda Code Case OMN-1. This is consistent with the NRC staff position in NUREG-1482, Revision 1, and RG 1.192.

The NRC staff finds that the ASME OM Code 2006 Addenda Code Case OMN-1, with the conditions specified in RG 1.192, provides an acceptable level of quality and safety for testing of MOVs and is an acceptable alternative for use in DBNPS, Unit 1, IST program.

## 4.0 CONCLUSION

As set forth above, the NRC staff finds that the proposed alternative described in alternative request RP-6 provides an acceptable level of quality and safety for pumps noted in Table 1 of this evaluation. In addition, the NRC staff has concluded that the proposed alternative RV-1 to implement ASME OM Code 2006 Addenda Code Case OMN-1, with the conditions specified in RG 1.192 for MOV assemblies listed on page 4 of Attachment F to the letter dated February 27, 2013, provides an acceptable level of quality and safety. Accordingly, the NRC staff concludes that the licensee has adequately addressed all of the regulatory requirements set forth in 10 CFR 50.55a(a)(3)(i), and is in compliance with the ASME OM Code's requirements. Therefore, the NRC staff authorizes the proposed alternatives in requests RP-6 and RV-1 for the fourth IST interval at DBNPS, Unit 1, which commenced on September 21, 2012, and currently is scheduled to end September 20, 2022.

All other ASME OM Code requirements for which relief was not specifically requested and approved in the subject requests for relief remain applicable.

Principle Contributor: Michael Farnan, NRR

Date of issuance: August 1, 2013

August 1, 2013

Mr. Ray Lieb  
Site Vice President  
FirstEnergy Nuclear Operating Company  
Mail Stop A-DB-3080  
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SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1- SAFETY  
EVALUATION FOR RELIEF REQUESTS RP-6 AND RV-1 (TAC NOS. MF0754  
AND MF0755)(L-13-067)

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Based on our review of your submittals, the NRC staff has concluded that the alternative proposed in RP-6 and RV-1 provide an acceptable level of quality and safety, and, therefore, it is authorized pursuant to 10 CFR 50.55a(a)(3)(i). These reliefs are authorized for the remainder of the fourth 10-year IST interval at DBNPS, Unit 1, which began September 21, 2012, and ends September 20, 2022,

Sincerely,  
/ RA /  
Jeremy S. Bowen, Acting Chief  
Plant Licensing Branch II-2  
Division of Operating Reactor Licensing  
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosure: Safety Evaluation

cc w/encl: ListServ

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