June 18, 2008

Mr. James A. Spina, Vice President
Calvert Cliffs Nuclear Power Plant, Inc.
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657-4702
Buchanan, NY 10511-0249

SUBJECT: CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2 – RELIEF REQUESTS FOR THE FOURTH 10-YEAR INTERVAL INSERVICE TESTING PROGRAM FOR PUMPS AND VALVES (TAC NOS. MD5998, MD5999, MD6000, MD6001, MD6002, MD6003, MD6004, MD6005, MD6006, MD6007, MD6008, MD6009, MD6010, AND MD6011)

Dear Mr. Spina:

By letter dated July 2, 2007, as supplemented on January 25 and March 14, 2008, Calvert Cliffs Nuclear Power Plant, Inc. (the licensee) submitted various relief requests for the fourth 10-year interval inservice testing program for pumps and valves at Calvert Cliffs Nuclear Power Plant, Unit Nos. 1 and 2 (Calvert Cliffs Units 1 and 2). Specifically, the licensee requested relief from the requirements of the American Society of Mechanical Engineers Code for Operation and Maintenance of Nuclear Power Plants (ASME OM Code) regarding the inservice testing requirements for various pumps and valves. In the relief requests, the licensee proposed the use of the 2004 Edition of the ASME OM Code in lieu of the 2001 Edition through 2003 Addenda as the code of record for the Units 1 and 2 fourth inservice testing intervals. The licensee also proposed alternative valve testing requirements in addition to the use of Code Case Nos. OMN-1 and OMN-8. Therefore, pursuant to 10 CFR 50.55a(a)(3)(i), the licensee has requested authorization to use these alternative testing techniques.

The Nuclear Regulatory Commission (NRC) staff has reviewed and evaluated information regarding the relief requests. The results are provided in the enclosed safety evaluation.

The NRC staff concludes that the proposed alternatives for the inservice testing program for pumps and valves provide an acceptable level of quality and safety and the use of Code Cases OMN-1 and OMN-8 are authorized until such time as the Code Cases are published in a future version of Regulatory Guide (RG) 1.192 and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue implementing these Code Cases, it must follow all provisions of Code Cases OMN-1 and OMN-8 with conditions as specified in RG 1.192 and limitations as specified in 50.55a(b)(4), (b)(5), and (b)(6), if any. Therefore, the proposed alternatives are authorized, pursuant to 10 CFR 50.55a(a)(3)(i), for Calvert Cliffs Units 1 and 2 for the fourth 10-year inservice testing interval, which begins on July 1, 2008.

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

Sincerely,

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
As stated

cc w/encl: See next page

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

Sincerely,

/RA/

Mark G. Kowal, Chief
Plant Licensing Branch I-1
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket Nos. 50-317 and 50-318

Enclosure:
As stated

cc w/encl: See next page

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REGARDING RELIEF REQUESTS FOR THE FOURTH 10-YEAR

INSERVICE TESTING INTERVAL FOR PUMPS AND VALVES

CALVERT CLIFFS NUCLEAR POWER PLANT, UNIT NOS. 1 AND 2

CALVERT CLIFFS NUCLEAR POWER PLANT, INC.

DOCKET NUMBERS 50-317 AND 50-318

1.0 INTRODUCTION

By application dated July 2, 2007 (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML071970194 and ML071990130 (Attachment)), as supplemented by letters dated January 25 (ADAMS Accession No. ML080300052), and March 14, 2008 (ADAMS Accession No. ML080780464), Calvert Cliffs Nuclear Power Plant, Inc., the licensee, requested relief for the fourth 10-year interval inservice testing (IST) program at Calvert Cliffs Nuclear Power Plant (CCNPP) Unit Nos. 1 and 2. The licensee requested relief from certain IST requirements of the American Society of Mechanical Engineers (ASME) *Code for Operation and Maintenance of Nuclear Power Plants* (OM Code). In its supplemental letter of January 25, 2008, the licensee withdrew Relief Request CVC-RR-01.

The CCNPP fourth 10-year interval IST program for pumps and valves is based on the requirements in the ASME OM Code 2004 Edition. The licensee requested relief for certain pumps and valves from certain IST requirements of the ASME OM Code. The CCNPP Units 1 and 2 fourth 10-year IST interval is scheduled to start on July 1, 2008.

2.0 REGULATORY EVALUATION

Title 10 of the *Code of Federal Regulations*, 10 CFR 50.55a, "Code and standards," requires that IST of ASME Code Class 1, 2, and 3 pumps and valves be performed in accordance with the ASME OM Code and applicable addenda, except where alternatives have been authorized or relief has been requested by the licensee and granted by the Commission pursuant to Sections (a)(3)(i), (a)(3)(ii), or (f)(6)(i) of 10 CFR 50.55a. 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 OM 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 Code requirements which are acceptable. Further guidance is given in GL 89-04, Supplement 1, and NUREG-1482, "Guidance for Inservice Testing at Nuclear Power Plants."

The 2001 Edition through 2003 Addenda of the ASME OM Code is currently the latest edition and addenda of the ASME OM Code approved for use by the NRC subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi). The licensee is proposing to use the 2004 Edition of the ASME OM Code as the Code of Record for the Units 1 and 2 fourth IST program intervals instead of the 2001 Edition through 2003 Addenda of the ASME OM Code (see Relief Request GA-RR-01 for NRC approval).

3.0 TECHNICAL EVALUATION

The licensee's regulatory and technical analyses in support of its requests for relief from ASME OM Code IST requirements are described in the licensee's application dated July 2, 2007, and supplemental responses dated January 25 and March 14, 2008. A description of the relief requests and the staff evaluation follows.

3.1 Relief Request GA-RR-01

3.1.1 Regulatory and Code Requirements

10 CFR 50.55a(f)(4)(ii) requires that the IST program for each successive 120-month interval comply with the latest edition and addenda of the ASME OM Code incorporated by reference in 10 CFR 50.55a(b)(3) 12 months prior to the start of the next 120-month interval.

ISTA-3200(f)(3) requires that the test plan for each successive IST interval comply with the edition and addenda of the ASME Code adopted by the regulatory authority, or subsequent editions and addenda adopted by the regulatory authority, 12 months prior to the start of the IST interval.

The licensee requested relief from the above requirements. The licensee requested to use an edition of the ASME OM Code for the upcoming Units 1 and 2 fourth IST program intervals that is not incorporated by reference in 10 CFR 50.55a(b)(3).

3.1.2 Basis for Requesting Relief

The licensee is proposing to use an edition of the ASME OM Code that is not incorporated by reference in 10 CFR 50.55a(b)(3) for its fourth IST interval so that over the next several years, all the plants in the Constellation's fleet will be using the same edition of the ASME OM Code for their IST programs. Constellation's goal for uniformity and economic benefit is to have all their plants in their fleet use the same edition of the ASME OM Code for their IST programs. The licensee has evaluated the differences between the edition of the ASME OM Code that it is proposing to use and the edition and addenda of the ASME OM Code that would be required to be used and finds that differences between the Codes are not significant.

3.1.3 Proposed Alternative Testing

The licensee proposes to use the 2004 Edition in lieu of 2001 Edition through OMb-2003 Addenda of the ASME OM Code subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi) as the Code of Record for its CCNPP Units 1 and 2 fourth IST program intervals.

3.1.4 Safety Evaluation of Relief Request GA-RR-01

The 2001 Edition through 2003 Addenda of the ASME OM Code was incorporated by reference in 10 CFR 50.55a(b)(3) in a final rule dated October 1, 2004, in a *Federal Register* notice (69 FR 58804), and is currently the latest edition and addenda of the ASME OM Code approved for use by the NRC subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi). 10 CFR 50.55a(f)(4)(ii) and ISTA-3200(f)(3) require that the CCNPP Units 1 and 2 fourth IST program intervals comply with the 2001 Edition through 2003 Addenda of the ASME OM Code subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi).

The licensee is proposing to use the 2004 Edition of the ASME OM Code as the Code of Record for the CCNPP Units 1 and 2 fourth 10-year IST program intervals in lieu of the 2001 Edition through 2003 Addenda of the ASME OM Code. The NRC staff has reviewed the 2004 Edition of the ASME OM Code and the results of this review are described in a proposed rule dated April 5, 2007 (72 FR 16731). The NRC finds that the 2004 Edition of the ASME OM Code is acceptable for use subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi). Therefore, use of the 2004 Edition of the ASME OM Code subject to the modifications and limitations in 10 CFR 50.55a(b)(3)(i), (ii), (v), and (vi) as the Code of Record for the CCNPP Units 1 and 2 fourth 10-year IST program intervals provides an acceptable level of quality and safety.

3.1.5 Conclusion

Based on a review of the information provided by the licensee and the above evaluation, the alternative to the requirements of 10 CFR 50.55a(f)(4)(ii) and ISTA-3200(f)(3) of the ASME OM Code is authorized pursuant to 10 CFR 50.55a(a)(3)(i) because the alternative provides an acceptable level of quality and safety. This relief request is authorized for the CCNPP Unit 1 and Unit 2 fourth 10-year IST program intervals. The licensee's proposed alternative provides reasonable assurance of the operational readiness of the IST program components.

3.2 Valve Relief Request GV-RR-01

3.2.1 Code Requirements

Appendix I of ASME OM Code specifies lift setpoint test requirements for safety and relief valves. Appendix I, Paragraphs I-8110(h), I-8120(h), and I-8130(g) require that a minimum of 5 minutes shall elapse between successive openings.

The licensee requested relief from the above ASME OM Code 5-minute wait period requirement when using water or nitrogen as the test medium for the Class 2 and 3 safety and relief valves listed below.

0-CC-6501-RV	0-CC-6503-RV	0-CC-6512-RV	0-CC-6530-RV
0-CC-6533-RV	1-CC-3823-RV	1-CC-3825-RV	1-CC-3827-RV
1-CC-3829-RV	1-CC-3831-RV	1-CC-3843-RV	1-CC-6450A-RV
1-CC-6471-RV	1-CC-6472-RV	1-CVC-125-RV	1-CVC-132-RV
1-CVC-133-RV	1-CVC-141-RV	1-CVC-149-RV	1-CVC-150-RV
1-CVC-157-RV	1-CVC-160-RV	1-CVC-171-RV	1-CVC-311-RV
1-CVC-315-RV	1-CVC-318-RV	1-CVC-321-RV	1-CVC-324-RV
1-CVC-325-RV	1-CVC-326-RV	1-RV-10243	1-RV-10246
1-RV-10273	1-RV-10276	1-SI-211-RV	1-SI-221-RV

1-SI-231-RV	1-SI-241-RV	1-SI-409-RV	1-SI-417-RV
1-SI-430-RV	1-SI-431-RV	1-SI-439-RV	1-SI-446-RV
1-SI-468-RV	1-SI-469-RV	1-SI-6302-RV	1-SRW-1575-RV
1-SRW-1576-RV	1-SRW-1577-RV	1-SRW-1578-RV	1-SRW-1582-RV
1-SRW-1585-RV	1-SRW-1588-RV	1-SRW-1590-RV	1-SRW-1593-RV
1-SRW-1596-RV	1-SRW-4084-RV	1-SW-5205-RV	1-SW-5206-RV
1-SW-5207-RV	1-SW-5208-RV	1-SW-5209-RV	1-SW-5210-RV
1-SW-5211-RV	1-SW-5212-RV	2-CC-3823-RV	2-CC-3825-RV
2-CC-3827-RV	2-CC-3829-RV	2-CC-3831-RV	2-CC-6450A-RV
2-CC-6471-RV	2-CC-6472-RV	2-CVC-125-RV	2-CVC-132-RV
2-CVC-133-RV	2-CVC-141-RV	2-CVC-149-RV	2-CVC-150-RV
2-CVC-157-RV	2-CVC-160-RV	2-CVC-171-RV	2-CVC-311-RV
2-CVC-315-RV	2-CVC-318-RV	2-CVC-321-RV	2-CVC-324-RV
2-CVC-325-RV	2-CVC-326-RV	2-SI-211-RV	2-SI-221-RV
2-SI-231-RV	2-SI-241-RV	2-SI-409-RV	2-SI-417-RV
2-SI-430-RV	2-SI-431-RV	2-SI-439-RV	2-SI-446-RV
2-SI-468-RV	2-SI-469-RV	2-SI-6302-RV	2-SRW-1575-RV
2-SRW-1576-RV	2-SRW-1577-RV	2-SRW-1578-RV	2-SRW-1582-RV
2-SRW-1585-RV	2-SRW-1587-RV	2-SRW-1588-RV	2-SRW-1590-RV
2-SRW-1593-RV	2-SRW-1598-RV	2-SRW-4084-RV	2-SW-5205-RV
2-SW-5206-RV	2-SW-5207-RV	2-SW-5208-RV	2-SW-5209-RV
2-SW-5210-RV	2-SW-5211-RV	2-SW-5212-RV	

3.2.2 Basis for Requesting Relief

The ASME OM Code requires a minimum of two consecutive valve actuations to establish the lift setpoint of safety and relief valves and that a minimum of 5 minutes elapse between successive tests. The licensee stated that for the valves listed above, the requirement for verifying temperature stability by waiting 5 minutes between successive lift setpoint tests is inappropriate and adds no value. Lift setpoint testing is conducted using water or nitrogen as the test medium, and the tests are performed when the valve and the test medium are at the same temperature. Therefore, there is no effect on lift setpoint due to temperature deviations.

The licensee stated that eliminating the 5-minute wait time will minimize system outage times and radiation exposure. Special precautions apply to valves installed in contaminated systems to prevent the spread of contamination. For, example, personnel conducting the test must be dressed in anti-contamination clothing and may be exposed to radiation during valve testing. It normally takes two people to test a safety/relief valve.

3.2.3 Proposed Alternative Testing

The licensee proposed to eliminate the 5-minute wait time for the Class 2 and 3 safety and relief valves listed above when using water or nitrogen as the test medium during lift setpoint tests.

3.2.4 Safety Evaluation of Relief Request GV-RR-01

ASME OM Code, Appendix I, “Inservice Testing of Pressure Relief Devices in Light-water Reactor Nuclear Power Plants,” specifies lift setpoint test requirements for safety and relief valves. Appendix I, Paragraphs I-8110(h), I-8120(h), and I-8130(g) require that a minimum of 5 minutes elapse between successive openings.

The NRC staff believes that the 5-minute wait time requirement is based on the assumption that the temperature of the test medium is different than the temperature of the valve. Lift setpoint testing with different valve and test medium temperatures would cause the temperature of the valve to change once the valve opens; therefore, the setpoint would be affected. The staff finds that the setpoint is unaffected when ASME Code Class 2 and 3 safety and relief valves are tested when the test medium and valve temperatures are the same. Thermal stabilization is achieved with no wait period between tests; consequently, the setpoint is unaffected.

At Calvert Cliffs, the Class 2 and 3 safety and relief valves are bench-tested in the hot shop located in the Auxiliary Building. According to the licensee, these tests are performed under ambient conditions using a test medium at ambient conditions. As a result, there is no source of thermal imbalance that might affect the test results. Thus, the staff finds that elimination of the 5-minute wait period between lift setpoint tests of the ASME Class 2 and 3 safety and relief valves listed above provides an adequate method of accurately and repeatedly determining setpoints when using water or nitrogen as the test medium. Therefore, the staff finds that the licensee's proposed alternative test provides an acceptable alternative to the 5-minute wait period requirement in Appendix I, Paragraphs I-8110(h), I-8120(h), and I-8130(g).

3.2.5 Conclusion

The licensee's proposed alternative to the ASME OM Code testing requirement for Code Class 2 and 3 safety and relief valves in GV-RR-01 is authorized pursuant to 10 CFR 50.55a(a)(3)(i) on the basis that the proposed alternative testing provides an acceptable level of quality and safety. The elimination of the 5-minute wait between consecutive setpoint tests should not impair the valves' operational readiness.

3.3 Valve Relief Request GV-RR-02

3.3.1 Code Requirements

The following Code requirements are stated in the licensee's July 2, 2007, submittal:

> ISTA-3130(b) states: "Code Cases shall be applicable to the edition and addenda specified in the test plan." The edition and addenda specified in the test plan for the fourth Ten-Year interval for the Calvert Cliffs Nuclear Power Plant is the ASME OM Code 2004 Edition.

The licensee requested relief from the requirements of ASME OM Code ISTA-3130(b) for certain safety-related motor-operated valves (MOVs).

3.3.2 Basis for Requesting Relief

The following basis for the GV-RR-02 relief request is stated in the licensee's July 2, 2007, submittal:

> Code Case OMN-1 contains no applicability statement. In the latest edition/addenda incorporated by reference in 10 CFR 50.55a(b)(3) (i.e., the 2001 Edition with Addenda through the OMb-2003), the expiration date given for OMN-1 is March 30, 2004. OMN-1 is included in the 2006 Addenda to the 2004 Edition of the OM Code with a new expiration date of November 29, 2008; however, neither the 2004 Edition of the OM Code nor any Addenda have been

> incorporated by reference in 10 CFR 50.55a(b)(3). Paragraph 10 CFR 50.55a(b)(6) references Regulatory Guide (RG) 1.192, which conditionally approves the use of Code Case OMN-1 "in lieu of provisions for stroke-time testing in Subsection ISTC of the 1995 Edition up to and including the 2000 Addenda of the ASME OM Code."

3.3.3 Proposed Alternative Testing

The following alternate testing proposal is stated in the licensee's July 2, 2007 submittal:

> Calvert Cliffs Nuclear Power Plant will apply the requirements of OMN-1 "Alternative Rules for Preservice and Inservice Testing of Certain Electric Motor-Operated Valve Assemblies in Light-Water Reactor Power Plants," including the conditions specified in Table 2 of RG 1.192, in lieu of the provisions for motor-operated valve testing in Subsection ISTC of the 2004 Edition of the ASME OM Code.

3.3.4 Safety Evaluation of Relief Request GV-RR-02

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 the IST program. RG 1.192, Table 2, conditionally approves the use of Code Case OMN-1 and the Code Case is applicable to the 2000 Addenda and certain earlier editions and addenda of the Code. There is no technical reason for prohibiting the use of Code Case OMN-1 with the 2004 Edition. Although the current expiration date for OMN-1 is March 30, 2004, this Code Case is included in the 2006 Addenda to the 2004 Edition of the OM Code, and approved for use with a new expiration date of November 29, 2008. Therefore, use of Code Case OMN-1 is consistent with RG 1.192 and the ASME OM Code, and provides an acceptable level of quality and safety for testing of MOVs.

3.3.5 Conclusion

Based on the above evaluation, 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 alternative provides an acceptable level of quality and safety. In addition, the use of Code Case OMN-1 is authorized until such time as the Code Case is published in a future version of RG 1.192 and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue implementing this Code Case, it must follow all provisions of Code Case OMN-1 with conditions as specified in RG 1.192 and limitations as specified in 50.55a(b)(4), (b)(5), and (b)(6), if any.

3.4 <u>Valve Relief Request GV-RR-03</u>

3.4.1 Code Requirements

The following ASME OM code requirements are stated in the licensee's July 2, 2007, submittal:

> ISTA-3130(b) states: "Code Cases shall be applicable to the edition and addenda specified in the test plan." The edition and addenda specified in the test plan for the fourth Ten-Year interval for the Calvert Cliffs Nuclear Power Plant is the ASME OM code 2004 Edition."

The licensee requested relief from the requirements of ASME OM Code ISTA-3130(b) for certain safety-related control valves.

3.4.2 Basis for Requesting Relief

The following basis for the GV-RR-03 relief request is stated in the licensee's July 2, 2007 submittal:

> Code Case OMN-8 contains no applicability statement. In the latest edition/addenda incorporated by reference in 10 CFR 50.55a(b)(3) (i.e., the 2001 Edition with Addenda through the OMb-2003), the expiration date given for OMN-8 is November 20, 2006. OMN-8 is included in the 2006 Addenda to the 2004 Edition of the OM Code with a new expiration date of November 20, 2009; however, neither the 2004 Edition of the OM Code nor any subsequent Addenda have been incorporated by reference in 10 CFR 50.55a(b)(3). Paragraph 10 CFR 50.55a(b)(6) references RG 1.192, which approves the use of Code Case OMN-8. Code Case OMN-8 provides an alternative to stroke time testing power-operated control valves that have only a fail safe safety function.

3.4.3 Proposed Alternative Testing

The following alternate testing proposal is stated in the licensee's July 2, 2007 submittal:

> Calvert Cliffs Nuclear Power Plant will apply the requirements of OMN-8 "Alternative Rules for Preservice and Inservice Testing of Power-Operated Valves That Are Used for System Control and Have a Safety Function per OM-10," in lieu of the provisions for power-operated control valve testing specified in paragraphs ISTC-5131, ISTC-5132, ISTC-5133(b), ISTC-5141, ISTC-5142 and ISTC-5143(b), in Subsection ISTC of the 2004 Edition of the ASME OM Code.

3.4.4 Safety Evaluation of Relief Request GV-RR-03

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 the IST program. RG 1.192, Table 1, approves the use of Code Case OMN-8 and the Code Case is applicable to the 2000 Addenda and certain earlier editions and addenda of the Code. There is no technical reason for prohibiting the use of Code Case OMN-8 with the 2004 Edition. Although the current expiration date for OMN-8 is November 20, 2006, this Code Case is included in the 2006 Addenda to the 2004 Edition of the OM Code, and approved for use with a new expiration date of November 20, 2009. Therefore, use of Code Case OMN-8 is consistent with RG 1.192 and the ASME OM Code, and provides an acceptable level of quality and safety for testing of certain safety-related control valves.

3.4.5 Conclusion

Based on the above evaluation, 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 alternative provides an acceptable level of quality and safety. In addition, the use of Code Case OMN-8 is authorized until such time as the Code Case is published in a future version of RG 1.192 and incorporated by reference in 10 CFR 50.55a(b). At that time, if the licensee intends to continue implementing

this Code Case, it must follow all provisions of Code Case OMN-8 with conditions as specified in RG 1.192 and limitations as specified in 50.55a(b)(4), (b)(5), and (b)(6), if any.

3.5 Valve Relief Request RC-RR-01

3.5.1 Code Requirements

Appendix I, Paragraph I-8000 of the ASME OM Code contains test methods for safety and relief valves. Appendix I, Paragraph I-8110(d) of the ASME OM Code requires that valves insulated in service be insulated in a like manner during lift setpoint tests.

The licensee requested relief from the ASME OM Code requirement to insulate a valve during lift setpoint testing for pressurizer safety valves (PSVs) 1-RC-200-RV, 1-RC-201-RV, 2-RC-200-RV, and 2-RC-201-RV.

3.5.2 Basis for Requesting Relief

The licensee stated that the normal operating temperature profile for the PSVs was determined by instrumenting each valve body at several locations and recording temperatures during normal plant operation. PSV lift setpoint tests were conducted at a test facility with insulation installed (using the actual insulation from the plant normally installed on each valve) and with the insulation removed. The PSV body was instrumented similarly to when installed in the plant and temperature of the PSV body was monitored during the tests conducted at the test facility. The temperature profile obtained during normal plant operation could not be recreated at the test facility with the insulation installed. The licensee stated the temperatures at all the points monitored, most notably the upper and lower bonnet, were higher than the temperatures obtained during normal plant operation. The overall impact of the higher temperature profile is that the lift pressure is lower when the PSV is at a higher temperature. This is a nonconservative error because, if the PSV was adjusted to lift under these conditions, it would then be set to lift by as much as approximately 2% higher than the setpoint when installed in the plant. The licensee stated that the higher temperature profile for the insulated PSV at the test facility occurred because, when installed in the plant, the PSV is attached to a long run of piping with numerous piping supports which serve as heat sinks, but the long runs of piping are not part of the test facility. In the plant, these heat sinks allow the PSVs to stabilize at a lower temperature profile even when insulated, as compared to the temperature profiles when insulated at the test facility. The temperature profile for the PSVs obtained during normal plant operation could only be recreated at the test facility when the insulation was removed.

3.5.3 Proposed Alternative Testing

The licensee proposes to lift setpoint test the PSVs with the insulation removed when testing the valves at a test facility.

3.5.4 Safety Evaluation of Relief Request RC-RR-01

ASME OM, Appendix I, Paragraph I-8110(d) requires that valves that are insulated in service be insulated in a like manner during lift setpoint tests. The licensee proposes to lift setpoint test the PSVs with the insulation removed when testing the valves at a test facility.

The NRC staff finds that changes in PSV body temperature can change the lift setpoint of a PSV. Changes in temperature affect critical clearances and dimensions within the PSV and any

change to a critical clearance or dimension would affect the lift setpoint. The purpose of Paragraph I-8110(d) of the ASME OM Code is to ensure that the temperature profile of the PSV during normal plant operation is maintained at the test facility. Test summary results provided by the licensee demonstrate that it is appropriate to not insulate PSVs at the test facility because the configuration at the test facility with the insulation removed creates a temperature profile that is consistent with the valves' temperature during normal plant operation.

Therefore, the proposed alternative to the insulation requirement in Paragraph I-8110(d) of the ASME OM Code during lift setpoint testing of the PSVs provides an acceptable level of quality and safety.

3.5.5 Conclusion

Based on a review of the information provided by the licensee and the above evaluation, the alternative to the requirements of I-8110(d) of the ASME OM Code is authorized pursuant to 10 CFR 50.55a(a)(3)(i) because the alternative provides an acceptable level of quality and safety. This relief request is authorized for CCNPP PSVs 1-RC-200-RV, 1-RC-201-RV, 2-RC-200-RV, and 2-RC-201-RV when conducting lift setpoint testing at a test facility. The licensee's proposed alternatives provide reasonable assurance of the operational readiness of the PSVs.

3.6 Pump Relief Request No. SI-RR-01

3.6.1 Code Requirements

Pump Categories

Subsection ISTB, Paragraph ISTB-1300 requires that all IST pumps shall be categorized as either a Group A or Group B pump.

The following ASME OM Code requirements are stated in the licensee's July 2, 2007, submittal:

> Subsection ISTB Paragraph ISTB-2000 defines group A pumps as; "pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations," and group B pumps as; "pumps in standby systems that are not operated routinely except for testing."
>
> Subsection Paragraph ISTB-1400(b) states: "A pump that meets both Group A and Group B pump definitions shall be categorized as a group A pump."

The licensee requested relief from the above ASME OM Code Pump Categories requirements for the Low-Pressure Safety Injection (LPSI) pumps listed below:

Pump No.	Description	Class	Group A or Group B
11 LPSI	Low Pressure Safety Injection Pump 11	2	A/B
12 LPSI	Low Pressure Safety Injection Pump 12	2	A/B
21 LPSI	Low Pressure Safety Injection Pump 21	2	A/B
22 LPSI	Low Pressure Safety Injection Pump 22	2	A/B

3.6.2 Basis for Requesting Relief

The following basis for the GV-RR-03 relief request is stated in the licensee's July 2, 2007, submittal:

> The Low Pressure Safety Injection (LPSI) Pumps are tested quarterly using the minimum recirculation flow path from each pump through the minimum recirculation flow common header and back to the refueling water tank. The common header is instrumented with an ultrasonic flow meter. However, flow is not throttled during the quarterly test to eliminate the potential for pump overheating and damage should flow inadvertently be throttled below that required to ensure adequate pump cooling.
>
> The LPSI pumps are also tested at a substantial flow rate (approximately 3500 gpm) during every refueling outage, as well as during planned and unplanned cold shutdown periods when plant conditions and circumstances permit. These tests are the Code comprehensive pump tests (formerly known at CCNPP as "Large Flow Rate" tests.)
>
> Differential Pressure Measurements
>
> Calvert Cliffs' current quarterly group A pump test program requires differential pressure to be measured. Group A quarterly ECCS [emergency core cooling system] pump tests must be performed using very accurate (±1/2%) test pressure gauges. These pressure gauges would be installed prior to, and removed after, each test (an annual total of 32 gauge installation/removal evolutions). These very accurate gauges are not required by the OM Code 2004; however, they are necessary because the hydraulic margin available, based on design calculations, is less than the amount of degradation allowed by ISTB. Using less accurate permanently installed pressure gauges could result in a pump being unnecessarily declared inoperable solely due to pressure gauge uncertainty.
>
> Installation and removal of these test pressure gauges for each LPSI pump every quarter would require significant dedication of manpower, results in significant cumulative annual radiation dose, increased radioactive waste, increased wear on fittings, and additional challenges for possible personnel contamination. Calvert Cliffs' estimates that eliminating the test pressure gauge installation and removal evolutions will save at least 1/8 man-rem per year and almost 100 man-hours per year.
>
> Quarterly LPSI pump tests are performed using the minimum recirculation flow path under low-flow conditions. In this region, the pumps are operating at or near shut-off head, the pump curves are flat or nearly flat, and pump differential pressure is not very sensitive to pump degradation. Flow rate alone is an adequate indication of possible pump degradation or flow blockage since the minimum recirculation flow path is a fixed-resistance flow path. The conclusion that measurement of pump differential pressure is of minimal value is supported by our historical test data.
>
> As group B pumps, the operational readiness is reasonably assured without requiring quarterly differential pressure measurements. This will allow Calvert

Cliffs Nuclear Power Plant (CCNPP) to cease these gauge installation and removal evolutions every quarter, while maintaining an acceptable level of quality and safety.

Vibration Measurements

Calvert Cliffs' current quarterly group A pump test program requires pump vibration measurements. The overall vibration readings recorded during quarterly low-flow testing have always been relatively "high." These vibration readings have been subject to spectral analysis under our Rotating Machinery Condition Monitoring Program, which is separate from the IST Program. The spectral analyses have consistently confirmed the major contributor to the "high" overall vibration readings occurs at the "blade pass frequency" for each LPSI pump and is not indicative of bearing degradation.

However, spectral analysis is not required by the Code. Therefore, the effects of low-flow operation on a centrifugal pump make the required broadband vibration readings during the current quarterly test of minimal value. This conclusion is supported by our historical test data. Under the OM Code, the operational readiness of group B pumps is reasonably assured without requiring quarterly vibration measurements. Based on this, we feel that an acceptable level of quality and safety is still maintained while many of the burdens and costs associated with vibration testing, including cumulative annual radiation dose and manpower, will be eliminated.

Minimum Pump Run-Time

As group B pumps, the two-minute minimum pump run-time for quarterly tests is also eliminated. Eliminating the minimum pump run-time requirement and the requirement to record differential pressure and vibration levels is expected to slightly reduce the length of each pump test. This will help to reduce the cumulative run-time of each LPSI pump under low-flow conditions to support testing, with a commensurate reduction in potential pump wear.

Other Considerations

These proposed changes simplify the quarterly IST pump test to allow combining the quarterly IST pump test into the related quarterly engineering safety features actuation logic test for each pump. As a result, the total number of starting demands on each pump motor to support testing may be reduced and the cumulative run-time of each LPSI pump under low-flow conditions to support testing may be further reduced. Calvert Cliffs Nuclear Power Plant estimates that this course of action could eliminate approximately two hours of operation under low-flow conditions for each LPSI pump per year.

This is also a significant reduction in unavailability hours against our NRC Performance Indicator for the residual heat removal safety function in Modes 1-4.

Relationship to Calvert Cliffs' Technical Specification Surveillance Requirements

The Calvert Cliffs' Technical Specification (TS) Surveillance Requirement (SR) for each pump (SR 3.5.2.3: HPSI [High-Pressure Safety Injection] and LPSI pumps) requires periodic testing of each pump to verify that the "developed head at the test flow point is greater than or equal to the required developed head." The specified frequency for the surveillance requirement is, "in accordance with the Inservice Test Program." Calvert Cliffs' Technical Specification Surveillance Requirements do not contain any additional (explicit or implied) testing requirements for these pumps beyond those required by the IST Program. This means that, as long as the testing complies with the requirements of the approved IST Program, there is no conflict with Calvert Cliffs' Technical Specification Surveillance Requirements. Therefore, none of the changes to the IST Program requested in this relief request would conflict with any Calvert Cliffs' Technical Specification Surveillance Requirements.

Bases for Proposed Modification of the 2004 OM Code

LPSI Pump Group Classification

Subsection ISTB Paragraph ISTB-2000 of the OM Code defines group A pumps as, "pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations," and Group B pumps as, "pumps in standby systems that are not operated routinely except for testing." Based on these definitions and CCNPP's Operating Procedures, the LPSI pumps meet the definition of group A & group B pumps.

The LPSI pumps clearly meet the definition of group B pumps during normal operation in Modes 1-4. In Modes 5-6, the LPSI pumps are used for shutdown cooling and meet the definition of group A pumps. Subsection ISTB Paragraph ISTB-1400(b) states: "A pump that meets both Group A and Group B pump definitions shall be categorized as a group A pump." This means that the LPSI pumps would be classified as group A and would be subjected to essentially the same quarterly test requirements that currently apply under OM-1987, OMa-1988 Part 6.

NUREG/CP-0137 Vol. 1, Proceedings of the Third NRC/American Society of Mechanical Engineers (ASME) Symposium on Valve and Pump Testing, includes a paper entitled, "Description of Comprehensive Pump Test Change to ASME Code, Subsection ISTB." This paper describes the philosophy of classifying pumps in one group or the other (group A vs. group B). According to this paper, the intent of having different test requirements for the different pump groups, is to relate the amount and degree of quarterly performance monitoring required to the amount of degradation expected due to pump operation.

Requiring the LPSI pumps to be tested quarterly as group A pumps during normal operation in Modes 1-4 is contrary to the philosophy of the referenced paper. Quarterly testing subjects the LPSI pumps to increased test requirements, performance monitoring, and potentially more degradation due to low-flow operation at the time when they are standby pumps and would not otherwise be subject to operation-induced degradation. In fact, out of all of the ECCS and

AFW pumps, the LPSI pumps are the ones, due to their design and test conditions, for which the detrimental effects of cumulative low-flow operation are the most drastic. Calvert Cliffs considers the requirement to test the LPSI pumps as group A pumps during normal operation in Modes 1-4 to be potentially detrimental on a long-term basis. Therefore, the LPSI pumps will be considered to be group B pumps during normal operation in Modes 1-4, and will be tested accordingly.

As previously stated, the LPSI pumps are typically run continuously during cold shutdown and refueling operations, depending on the decay heat rate. As a result, they may be subject to operation-induced degradation in Modes 5-6. Therefore, the LPSI pumps will be treated as group A pumps during any quarterly test that comes due during cold shutdown or refueling operations. However, typically during Modes 5-6, a Comprehensive Pump Test is preferable to a group A test for the LPSI pumps. This avoids the need to realign the LPSI pumps out of the normal shutdown cooling line-up and also avoids the detrimental effects of testing the LPSI pumps at low-flow conditions. Therefore, Calvert Cliffs expects that a Comprehensive Pump Test will typically be substituted for any group A test that may be required during Modes 5-6.

LPSI Pump Bearing Acceptance Criteria During Low-Flow Testing

Historically, the surveillance procedures used to perform these tests required vibration measurements to be recorded in terms of displacement (mils), not velocity. In recognition of the better indications provided by vibration measurements in terms of velocity, and as now permitted by ISTB, CCNPP has converted the vibration testing in the surveillance procedures to utilize velocity. However, CCNPP long ago recognized the benefit of velocity over displacement for analyzing pump vibrations and has included such measurements in the CCNPP Rotating Machinery Vibration Monitoring Program which conducts periodic vibration monitoring and analysis of numerous pumps and motors (including the LPSI pumps) beyond that required for the IST Program. The CCNPP Rotating Machinery Vibration Monitoring Program includes spectral analysis of the vibration measurements.

The long-term vibration trend (1995 through present) during quarterly testing of the LPSI pumps using the minimum recirculation flow path shows consistent results and stable performance with no unexplainable significant changes. The quarterly tests are performed at approximately 55-65 gpm which is between approximately 1.3% -1.6% of the LPSI pumps' "Best Efficiency Flow Rate." The Best Efficiency Flow Rate is based on the original Vendor Pump Curve. It is used instead of the system's design flow rate because the onset of pump internal recirculation and cavitation is a function of the pump's performance characteristics, not the system's design requirements.

Attachment 1 [of this submittal], “Effect of Pump Operation at Low Flow Rates,” discusses Calvert Cliffs’ detailed academic research regarding the effects of low-flow operation on centrifugal pump vibration levels and includes extensive spectral analysis of all Calvert Cliffs’ LPSI pump performance vibration data from an extended time period under low-flow and substantial-flow conditions. As discussed in Attachment 1 operating the LPSI pumps at these low flow rates

results in a variety of effects (e.g., internal recirculation, cavitation, and force imbalance on the impeller) which contribute to increased vibration. Spectral analysis of the LPSI pump vibration measurements reveals (1) a general increase in the broadband noise levels which is indicative of internal recirculation and cavitation, and (2) discrete spikes at frequencies corresponding to the blade pass frequency which is indicative of force imbalances acting on the impeller. (References: "Centrifugal Pump Clinic," 2nd edition, by Igor Karassik, Published by Marcel Dekker Inc., 1989, and "Predictive Maintenance and Vibration Signature Analysis I," by J. E. Berry, Technical Associates of Charlotte, Inc., Table 6.0, "Illustrated Vibration Diagnostic Chart.") The analysis confirms the presence and effect of these phenomenon.

Many of the normal vibration levels experienced when operating the LPSI pumps under low-flow conditions during quarterly testing routinely exceed or challenge the absolute Alert Acceptance Criteria of 0.325 inches per second specified in Table ISTB-5121-1. This would necessitate either testing at six-week intervals, or a new evaluation each quarter.

The following factors lead to the conclusion that the current vibration levels recorded during LPSI minimum recirculation flow testing are acceptable and are not indicative of any pump mechanical problems or degradation, and, therefore, that the LPSI pumps are operating acceptably.

(1) The long-term stability of the vibration trend based on data from the surveillance tests and CCNPP Rotating Machinery Vibration Monitoring Program obtained during quarterly minimum recirculation flow testing.

(2) Spectral analysis confirmed the major contributor to the overall vibration levels recorded during quarterly minimum recirculation flow testing is consistent with phenomena which are well known to be associated with operation of a centrifugal pump at low flow rates and also well known to cause higher vibrations at these low flow rates.

(3) The overall vibration levels recorded during large flow testing of the LPSI pumps are significantly reduced compared to the levels recorded during the quarterly minimum recirculation flow tests and are consistent with vibration levels experienced while testing centrifugal pumps at substantial flow rates in other systems and applications.

(4) Spectral analysis confirmed that the major contributors to the overall vibration levels observed during quarterly minimum recirculation flow testing which are associated with operation of a centrifugal pump at low flow rates are significantly reduced during large flow testing of the LPSI pumps.

(5) Similar vibration patterns have been observed for the other standby ECCS pumps, although the effects are not as pronounced as they are for the LPSI pump because the LPSI pumps are the pumps which are tested at the lowest flow condition relative to their Best Efficiency Flow Rate.

(6) The LPSI pumps have no history of mechanical failures nor have they required significant maintenance on a regular basis.

The “Large Flow Rate” tests for the LPSI pumps have been in use at CCNPP since approximately 1991. At a minimum, each pump has been tested during each refueling outage since these tests were implemented. Vibration data (in both displacement and velocity) was collected during these tests via the surveillance tests themselves and the CCNPP Rotating Machinery Vibration Monitoring Program. The vibration data recorded during these large flow tests show the overall vibration levels drop significantly, as expected. Furthermore, spectral analysis of these results show the general broadband noise and spikes at discrete frequencies caused by the blade passing are significantly reduced.

The overall vibration levels observed during quarterly LPSI pump minimum recirculation flow testing, augmented by spectral analysis, are not sufficiently high as to prevent detection of increases in the LPSI pump vibration levels which would be indicative of mechanical degradation. Furthermore, the vibration monitoring during less frequent LPSI comprehensive pump (large flow) testing, also augmented by spectral analysis, provides even greater opportunities to detect increases in the LPSI pump vibration levels which would be indicative of mechanical degradation. CCNPP's experience has shown that spectral analysis of the vibration measurements obtained during quarterly minimum recirculation flow testing is sufficiently sensitive to changes in the pumps' mechanical condition and provides reasonable assurance that mechanical degradation can be detected early.

[…]

Spectral analysis of quarterly minimum flow vibration results and less frequent comprehensive pump (large flow) vibration results in accordance with CCNPP's Rotating Machinery Vibration Monitoring Program will continue to provide adequate assurance that increases in vibration levels at discrete frequencies which are not sufficiently large to effect the overall vibration reading will be detected and analyzed.

Relief is requested pursuant to 10CFR50.55a(a)(3)(i) based on the proposed alternative providing an acceptable level of quality and safety.

3.6.3 Alternative Testing

The following alternate testing proposal is stated in the licensee’s July 2, 2007, submittal:

Perform inservice testing of the LPSI Pumps per the 2004 Edition of the OM Code Subsection ISTB, “Inservice Testing of Pumps in Light-Water Reactor Power Plants,” with the following modifications:

The LPSI pumps will be tested as stand-by pumps (group B) during Modes 1-4 and continuously operating pumps (group A) during Modes 5-6. In Modes 5-6, the Comprehensive Pump Test [CPT] may be substituted for a quarterly group A test that comes due during a mid-cycle cold shutdown period.

3.6.4 Safety Evaluation of Relief Request SI-RR-01

The licensee has proposed that the LPSI pumps be tested as standby pumps (Group B) during Modes 1-4 and as continuously operating pumps (Group A) during Modes 5-6. In Modes 5-6, the CPT may be substituted for a quarterly Group A test that comes due during a mid-cycle cold shutdown period as provided by the OM Code, Subsection ISTB. The Code Paragraph ISTB-5000 states that when a Group A test is required, a CPT may be substituted.

The ASME Code, Paragraph ISTB-2000, defines Group A pumps as "pumps that are operated continuously or routinely during normal operation, cold shutdown, or refueling operations;" and Group B pumps as "pumps in standby systems that are not operated routinely except for testing." Based on these definitions, the LPSI pumps clearly meet the definition of Group B pumps during normal operation in Modes 1-4. In Modes 5-6, the LPSI pumps are used for shutdown cooling and appear to meet the definition of Group A pumps. Paragraph ISTB-1400(b) states: "A pump that meets both Group A and Group B pump definitions shall be categorized as a Group A pump." This would normally cause the LPSI pumps to be classified as Group A. However, because of the inability to achieve a substantial flow rate in Modes 1-4, it is not possible to conduct a Group A test that would provide very much meaningful data to detect degradation due to the relatively flat profile of the pump hydraulic curve and the higher vibration levels present at these near shut-off head flow conditions. Additionally, the LPSI pumps are standby pumps during Modes 1-4 and little degradation is expected with respect to hydraulic performance during the operational period when the pumps are idle.

In GL 89-04, Position 9, the NRC determined that, in cases where flow can only be established through a non-instrumented, minimum-flow path during quarterly pump testing, and a path exists at cold shutdown or refueling outages to perform a test of the pump under full or substantial flow conditions, the increased interval is an acceptable alternative to the Code requirements. Therefore, the proposed alternative testing of the LPSI pumps as Group B during Modes 1-4 and as Group A during Modes 5-6 is consistent with GL 89-04, Position 9, and provides reasonable assurance of operational readiness of the LPSI pumps.

The licensee states that the current quarterly Group A pump test being performed under the third 10-year IST interval program at CCNPP requires pump vibration measurements. The overall vibration readings recorded during quarterly low-flow testing have always been relatively "high" when compared to the Code acceptance values. These vibration readings have been subject to spectral analysis under CCNPP's Rotating Machinery Condition Monitoring Program, which is separate from the IST Program. The spectral analyses have consistently confirmed the major contributor to the "high" overall vibration readings occurs at the "blade pass frequency" for each LPSI pump and is not indicative of bearing degradation. The long-term vibration trend (1995 through present) during quarterly testing of the LPSI pumps using the minimum recirculation flow path shows consistent results and stable performance with no unexplainable significant changes. The licensee will continue to perform spectral analysis under CCNPP's Rotating Machinery Condition Monitoring Program. The spectral analysis is above and beyond the Code requirements. Therefore, the operational readiness of the LPSI pumps during the proposed Group B pump test (Mode 1-4) is reasonably assured without requiring quarterly vibration measurements, which are not required by the Code for Group B pumps.

CCNPP TS SR 3.5.2.3 requires verification that the LPSI pump's developed head at the test flow point is greater than or equal to the required developed head in accordance with the frequency established by the IST program. As stated above, the LPSI pumps will be tested as Group B

pumps during Modes 1-4, and Group A pumps during Modes 5-6 (every refueling outage, as well as during planned and unplanned cold shutdown). A CPT may be substituted for a Group A test per the ASME Code. The quarterly Group B test will be performed using the minimum recirculation flow path under low-flow conditions and only flow will be measured. The TS requirement to measure pump head will be performed at the frequency for Group A or CPT tests as required by the IST program.

3.6.5 Conclusion

Based on the above evaluation, the NRC staff concludes that the licensee's proposed alternative testing of the LPSI pumps as Group B during Modes 1-4, and as Group A during Modes 5-6 is authorized pursuant to 10 CFR 50.55a(a)(3)(i), based on the alternative providing an acceptable level of quality and safety.

As above, the licensee's proposed alternative in Relief Request SI-RR-01 Item 1 (as mentioned in letter dated July 2, 2007) related to LPSI pump classification, is authorized; therefore, Item 2, related to LPSI pump vibration, is not required nor authorized.

4.0 REFERENCES

U.S. Code of Federal Regulations, Domestic Licensing of Production and Utilization Facilities," Part 50, Chapter I, Title 10, "Energy," Section 50.55a, Codes and standards.

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

U.S. Nuclear Regulatory Commission, "Guidance for Inservice Testing at Nuclear Power Plants," NUREG-1482, Revision 1.

American Society of Mechanical Engineers Operation and Maintenance Code, Inservice Testing of Nuclear Power Plant Components.

Letter from James A. Spina, Constellation Energy, to NRC, "Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Docket Nos. 50-317 and 50-318, Fourth 10-year Inservice Testing (IST) Program," dated July 2, 2007.

Letter from James A. Spina, Constellation Energy, to NRC, "Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Docket Nos. 50-317 and 50-318, Response to Request for Additional Information for the Fourth 10-year Inservice Testing (IST) Program for Safety-related Pumps and Valves – (TAC Nos. MD5998 through MD6011)," dated January 25, 2008.

Letter from James A. Spina, Constellation Energy, to NRC, "Calvert Cliffs Nuclear Power Plant, Units 1 and 2, Docket Nos. 50-317 and 50-318, Supplement to Response to Request for Additional Information for the Fourth 10-year Inservice Testing (IST) Program for Safety-related Pumps and Valves - (TAC Nos. MD5998 through MD6011)," dated March 14, 2008.

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