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

January 28, 2011

Mr. Barry S. Allen
Site Vice President
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
Mail Stop A-DB-3080
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE: REQUEST TO INCORPORATE THE USE OF ALTERNATIVE METHODOLOGIES FOR THE DEVELOPMENT OF REACTOR PRESSURE VESSEL PRESSURE-TEMPERATURE LIMIT CURVES (TAC NO. ME1127)

Dear Mr. Allen:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No.282 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The amendment is in response to your application dated April 15, 2009 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML091130228), as supplemented by letters dated December 18, 2009 (ADAMS Accession No. ML093570103), October 8, 2010 (ADAMS Accession No. ML102861221), and electronic correspondence dated January 10, 2010 (ADAMS Accession No. ML110100757).

The amendment approves changes to the current licensing basis for DBNPS associated with the methodology used for the development of the reactor coolant system pressure-temperature limit curves in the unit's Pressure Temperature Limits Report.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,

Michael Mahoney, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Amendment No282to NPF-3
2. Safety Evaluation

cc w/encls: Distribution via Listserv

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

FIRSTENERGY NUCLEAR OPERATING COMPANY

DOCKET NO. 50-346

DAVIS-BESSE NUCLEAR POWER STATION,

UNIT NO. 1

AMENDMENT TO FACILITY OPERATING LICENSE

Amendment No. 282
License No. NPF-3

1. The U.S. Nuclear Regulatory Commission (the Commission) has found that:

   A. The application for amendment by FirstEnergy Nuclear Operating Company (FENOC, the licensee), dated April 15, 2009, as supplemented by letters dated December 18, 2009, October 8, 2010, and electronic correspondence dated December 9, 2010, complies with the standards and requirements of the Atomic Energy Act of 1954, as amended (the Act), and the Commission's rules and regulations set forth in 10 CFR Chapter I;

   B. The facility will operate in conformity with the application, the provisions of the Act, and the rules and regulations of the Commission;

   C. There is reasonable assurance (i) that the activities authorized by this amendment can be conducted without endangering the health and safety of the public, and (ii) that such activities will be conducted in compliance with the Commission's regulations;

   D. The issuance of this amendment will not be inimical to the common defense and security or to the health and safety of the public; and

   E. The issuance of this amendment is in accordance with 10 CFR Part 51 of the Commission's regulations and all applicable requirements have been satisfied.

2. Accordingly, the license is amended by changes to the Technical Specifications as indicated in the attachment to this license amendment and paragraph 2.C of Facility Operating License No. NPF-3 is hereby amended to read as follows:

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 282 , are hereby incorporated into the renewed operating license. The licensee shall operate the facility in accordance with the Technical Specifications.

3. This license amendment is effective as of its date of issuance and shall be implemented within 90 days of the date of issuance.

FOR THE NUCLEAR REGULATORY COMMISSION

Robert Carlson, Chief
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Attachment: Changes to the Technical
Specifications and Renewed Facility Operating License

Date of Issuance: January 28, 2011

ATTACHMENT TO LICENSE AMENDMENT NO. 282

FACILITY OPERATING LICENSE NO. NPF-3

DOCKET NO. 50-346

Replace the following pages of the Facility Operating Licenses and Appendix "A" Technical Specifications (TSs) with the attached pages. The revised pages are identified by number and contain marginal lines indicating the areas of change.

Remove	Insert
License NPF-3 Page 4	License NPF-3 Page 4
License NPF-3 Page 5	License NPF-3 Page 5
TSs 5.6-3	TSs 5.6-3

2.C. This license shall be deemed to contain and is subject to the conditions specified in the following Commission regulations in 10 CFR Chapter I: Part 20, Section 30.34 of Part 30, Section 40.41 of Part 40, Sections 50.54 and 50.59 of Part 50, and Section 70.32 of Part 70; and is subject to all applicable provisions of the Act and to the rules, regulations, and orders of the Commission now or hereafter in effect; and is subject to the additional conditions specified or incorporated below:

(1) Maximum Power Level

FENOC is authorized to operate the facility at steady state reactor core power levels not in excess of 2817 megawatts (thermal). Prior to attaining the power level, Toledo Edison Company shall comply with the conditions identified in Paragraph (3) (o) below and complete the preoperational tests, startup tests and other items identified in Attachment 2 to this license in the sequence specified. Attachment 2 is an integral part of this license.

(2) Technical Specifications

The Technical Specifications contained in Appendix A, as revised through Amendment No. 282 , are hereby incorporated in the license. FENOC shall operate the facility in accordance with the Technical Specifications.

(3) Additional Conditions

The matters specified in the following conditions shall be completed to the satisfaction of the Commission within the stated time periods following the issuance of the license or within the operational restrictions indicated. The removal of these conditions shall be made by an amendment to the license supported by a favorable evaluation by the Commission:

(a) FENOC shall not operate the reactor in operational Modes 1 and 2 with less than three reactor coolant pumps in operation.

(b) Deleted per Amendment 6

(c) Deleted per Amendment 5

2.C(3)(d) Prior to operation beyond 32 Effective Full Power Years, FENOC shall provide to the NRC a reanalysis and proposed modifications, as necessary, to ensure continued means of protection against low temperature reactor coolant system overpressure events.

(e) Deleted per Amendment 33

(f) Deleted per Amendment 33

(g) Deleted per Amendment 33

(h) Deleted per Amendment 24

(i) Deleted per Amendment 11

(j) Revised per Amendment 3
Deleted per Amendment 28

(k) Within 60 days of startup following the first (1st) regularly scheduled refueling outage, Toledo Edison Company shall complete tests and obtain test results as required by the Commission to verify that faults on non-Class IE circuits would not propagate to the Class IE circuits in the Reactor Protection System and the Engineered Safety Features Actuation System.

(l) Revised per Amendment 7
Deleted per Amendment 15

(m) Deleted per Amendment 7

(n) Deleted per Amendment 10

(o) Deleted per Amendment 2

(p) Deleted per Amendment 29

(q) Deieted per Amendment 7

(r) Deleted per Amendment 30

(s) Toledo Edison Company shall be exempted from the requirements of Technical Specification 3/4.7.8.1 for the two (2) Americium-Beryllium-Copper startup sources to be installed or already installed for use during the first refueling cycle until such time as the sources are replaced.

(t) Added per Amendment 83
Deleted per Amendment 122

5.6 Reporting Requirements

5.6.3 CORE OPERATING LIMITS REPORT (COLR) (continued)

2. Caldon Inc. Engineering Report-157P, "Supplement to Topical Report ER-80P: Basis for a Power Uprate with the LEFM√™ or LEFM CheckPlus™ System," Revision 5, dated October, 2001.

d. The core operating limits shall be determined such that all applicable limits (e.g., fuel thermal mechanical limits, core thermal hydraulic limits, Emergency Core Cooling System (ECCS) limits, nuclear limits such as SDM, transient analysis limits, and accident analysis limits) of the safety analysis are met.

e. The COLR, including any midcycle revisions or supplements, shall be provided upon issuance for each reload cycle to the NRC.

5.6.4 Reactor Coolant System (RCS) PRESSURE AND TEMPERATURE LIMITS REPORT (PTLR)

a. RCS pressure and temperature limits for heat up, cooldown, low temperature operation, criticality, and hydrostatic testing as well as heatup and cooldown rates shall be established and documented in the PTLR for the following:

1. LCO 3.4.3, "RCS Pressure and Temperature (P/T) Limits."

b. The analytical methods used to determine the RCS pressure and temperature limits shall be those previously reviewed and approved by the NRC, specifically those described in the following documents:

1. BAW-10046A, Rev. 2, "Methods of Compliance with Fracture Toughness and Operational Requirements of 10 CFR 50 Appendix G," June 1986;

2. ASME Code Section XI, Appendix G, 1995 Edition with Addenda through 1996, as modified by the alternative procedures provided in ASME Code Case N-640 and ASME Code Case N-588; and

3. BAW-2308, Revision 1-A and Revision 2-A, "Initial RT_{NDT} of Linde 80 Weld Materials," August 2005 and March 2008, respectively.

c. The PTLR shall be provided to the NRC upon issuance for each reactor vessel fluence period and for any revision or supplement thereto.

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SAFETY EVALUATION BY THE OFFICE OF NUCLEAR REACTOR REGULATION

REALATED TO AMENDMENT NO. 282 TO FACILITY OPERATING LICENSE NO. NPF-3,

FIRSTENERGY NUCLEAR OPERATING COMPANY

DAVIS-BESSE NUCLEAR POWER STATION, UNIT NO. 1

DOCKET NO. 50-346

1.0 INTRODUCTION

By letter to the U.S. Nuclear Regulatory Commission (NRC) dated April 15, 2009 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML091130228), as supplemented by letters December 18, 2009 (ADAMS Accession No. ML093570103), October 8, 2010 (ADAMS Accession No. ML102861221), and electronic correspondence dated January 10, 2010 (ADAMS Accession No. ML110100757), FirstEnergy Nuclear Operating Company (FENOC, the licensee) submitted a license amendment request to modify the methodology used for the development of the reactor coolant system (RCS) pressure-temperature (P-T) limit curves in the unit's Pressure Temperature Limits Report (PTLR) and requested exemption from certain requirements contained in Title 10 of the *Code of Federal Regulations*, (10 CFR) 50.61 and 10 CFR Part 50, Appendix G, for Davis-Besse Nuclear Power Station, Unit 1 (DBNPS). The exemption was granted on December 14, 2010 (ADAMS Accession No. ML103070285).

The proposed amendment request and proposed exemption request were to incorporate a new methodology for the development of RCS P-T limits into Technical Specification (TS) 5.6.4, "Reactor Coolant System (RCS) Pressure and Temperature Limits Report (PTLR)." The proposed amendment also requested a revision to the period of validity of the analysis for the low temperature overpressure protection (LTOP) system contained in Operating License Condition 2.C(3)(d). An associated revision to the TS Bases 3.4.12 "Low Temperature Overpressure Protection (LTOP)" supports the change to the operating license condition.

The supplemental letters contained clarifying information, did not change the initial no significant hazards consideration determination, and did not expand the scope of the original *Federal Register* notice.

2.0 REGULATORY EVALUATION

The NRC staff evaluates the acceptability of a facility's proposed PTLR methodology based on the following NRC regulations and guidance:

- Section 50.60 of 10 CFR requires that light-water reactors comply with the fracture toughness requirements of 10 CFR Part 50, Appendix G and the materials surveillance program requirements of 10 CFR Part 50, Appendix H.

- Appendix G to 10 CFR Part 50, which requires that facility P-T limit curves for the RCS be at least as conservative as those obtained by applying the methodology of Appendix G to Section XI of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code).

- Appendix H to 10 CFR Part 50, which establishes requirements related to reactor vessel (RV) material surveillance programs.

- Regulatory Guide (RG) 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials" (ADAMS Accession No. ML003740284); which describes methodologies acceptable to the NRC staff for (1) calculating the adjusted reference temperature (ART) values and (2) using surveillance capsule test results.

- NUREG-0800, Revision 2, dated March 23, 2007 (ADAMS Accession No. ML070380185), Standard Review Plan (SRP) Section 5.3.2, "Pressure-Temperature Limits and Pressurized Thermal Shock;" SRP Section 5.3.2 provides an acceptable method for determining the P-T limit curves for ferritic materials in the beltline of the RV based on the linear elastic fracture mechanics methodology of Appendix G to Section XI of the ASME Code.

- Generic Letter (GL) 96-03, "Relocation of the Pressure Temperature Limit Curves and Low Temperature Overpressure Protection System Limits" (ADAMS Accession No. ML031110004). GL 96-03 establishes the information that must be included in: (1) an acceptable PTLR methodology (which will be used to develop the PTLR) and, (2) the PTLR itself.

With regard to LTOP, the relevant regulations are general design criteria (GDC) 15 of Appendix A to 10 CFR Part 50, and Appendix G to 10 CFR Part 50. SRP Section 5.2.1 and Branch Technical Position (BTP) 5-2 provide regulatory guidance with regard to LTOP.

GDC 15 of Appendix A to 10 CFR Part 50 requires that "the Reactor Coolant System and associated auxiliary, control, and protection systems shall be designed with sufficient margin to assure that the design conditions of the reactor coolant pressure boundary are not exceeded during any condition of normal operation, including anticipated operational occurrences (AOOs)."

Appendix G to 10 CFR Part 50 provides the fracture toughness requirements for RVs under certain conditions. To ensure that the Appendix G limits of the reactor coolant pressure boundary (RCPB) are not exceeded during any AOOs, TS P-T limits are provided for operating the plant. The primary concern of this position is that during startup and shutdown conditions at low temperature, especially in a water-solid condition, the RCS pressure might exceed the RCS P-T limits in the TS established for protection against brittle fracture. Any one of a variety of malfunctions or operator errors could generate this inadvertent overpressurization.

Accordingly, SRP Section 5.2.1 recommends that the design of the LTOP system should be in accordance with the requirements of BTP 5-2.

The use of ASME Code Cases N-588, N-640, and N-641 in the development of P-T limits is addressed in NRC Regulatory Issue Summary (RIS) 2004-04. RIS 2004-04 concludes that any of these Code Cases may be used with earlier versions of the ASME Code endorsed in 10 CFR 50.55a for the development of P-T limit curves without the need for an exemption. Section 50.55a in 10 CFR incorporates by reference certain editions and addenda of the ASME

Code, Section XI. Code cases that have been incorporated into any ASME Code edition incorporated by reference in 10 CFR 50.55a would be acceptable for use. Additionally, RG 1.147, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1," lists code cases that are acceptable to the NRC staff.

3.0 TECHNICAL EVALUATION

By letter dated April 15, 2009, as supplemented by letters dated December 18, 2009, October 8, 2010, and electronic correspondence dated January 10, 2011, FENOC provided the following information:

1) An evaluation of a proposed license amendment that would change TS 5.6.4 to allow the use of a different methodology in the development of the PTLR, and would also change Operating License Condition 2.C(3)(d) to extend the validity of the LTOP analysis from 21 to 32 effective full power years (EFPY). The evaluation included marked up TS pages. Changes to TS Bases B3.4.12 were included for information only. The licensee provided a reevaluation of the ART for the limiting beltline materials that supports determination of a revised minimum LTOP system enable temperature, which is based on the new P-T limit methodology.

2) A request for exemption to allow the use of the methodology of Topical Report (TR) BAW-2308, Revisions 1-A and 2-A, "Initial RT_{NDT} of Linde 80 Weld Materials," for determining the initial, unirradiated material reference temperature (initial RT_{NDT}) values of Linde 80 weld materials present in the beltline region of the DBNPS RV. The NRC's approval of the associated exemption was issued on December 14, 2010 (ADAMS Accession No. ML103070285).

3) A PTLR using the proposed new methodology (ADAMS Accession No. ML110100757).

The NRC staff's technical evaluation consists of two major parts: 1) an evaluation of the acceptability of the proposed new methodologies for developing P-T limits, and; 2) an evaluation of the licensee's proposed LTOP system enable temperature based on the new methodology, which includes a new method for determining material ART values.

3.1 P-T Curve Methodology

3.1.1 Licensee Evaluation

The licensee's new methodology to develop P-T limits includes the following elements:

- The licensee proposed an alternate method for determining the initial RT_{NDT} of the beltline materials. The regulation at 10 CFR Part 50, Appendix G requires that the initial RT_{NDT} be determined via a combination of Charpy V-notch (C_v) and drop weight tests in accordance with ASME Code, Section III, Paragraph NB-2331. However, the licensee proposed to determine the material specific initial RT_{NDT} using the methods described in Babcock & Wilcox (B&W) TR BAW-2308, Revisions 1A and 2A, "Initial RT_{NDT} of Linde 80 Weld Materials," which uses a direct fracture toughness approach for determining the initial RT_{NDT}. This TR has been reviewed and approved by the NRC by a safety evaluation (SE) dated March 24, 2008 (ADAMS Accession No. ML08770349); however, a condition in the NRC SE of the report requires submittal of a plant-specific exemption request in order to use the report.

- The licensee proposes to modify the methods of the ASME Code, Section XI, 1995 Edition with Addenda through 1996 (the licensee's ASME Code, Section XI edition of record) with the following Code Cases:

    - ASME Code Case N-588, which provides an alternate procedure for assuming axially-oriented reference defects in all axial welds and base metals, and circumferentially-oriented reference defects in all circumferential welds. This code case has been accepted for use by the NRC.

    - ASME Code Case N-640, which allows the use of K_{Ic} (the material toughness property measured in terms of stress intensity factor, K_I, which will lead to non-ductile crack propagation under static test conditions), instead of K_{IA} (the critical value of the stress intensity factor K_I, for crack arrest as a function of temperature) in the development of P-T limit curves. This code case has been accepted for use by the NRC.

To support its use of the two code cases, the licensee cited NRC RIS 2004-04, "Use of Code Cases N-588, N-640, and N-641 in Developing Pressure-Temperature Operating Limits," as a basis for the acceptability of these code cases. The licensee further stated the acceptance of these code cases as appropriate alternatives to the ASME Code, Section XI, Appendix G methodology is documented in NRC RG 1.147, Revision 15, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1."

3.1.2 NRC Staff Evaluation

The NRC staff's evaluation of the licensee's proposed P-T limit methodology consists of:

1) Verification that the conditions for use of BAW-2308, Revision 1-A, other than approval of a plant-specific exemption have been met, and;

2) Evaluation of the licensee's use of ASME Code Cases N-588 and N-640.

Conditions for Use of BAW-2308, Revision 1-A

The NRC staff's SE for BAW-2308, Revision 2 (ADAMS Accession No. ML08770349) required licensees to meet six conditions to use the methods of BAW-2308 Revision 2. This was a carryover from the NRC staff's SE for BAW-2308, Revision 1 dated August 4, 2005 (ADAMS Accession No. ML052070408).

The conditions are:

1. The initial reference temperature (IRT_{T0}) and the uncertainty in IRT_{T0} (σ_I) values given in Table 3 of the SE dated August 4, 2005 may be used by a licensee to define the initial heat-specific or generic properties of its facility's Linde 80 welds. For those Linde 80 weld wire heats for which heat-specific values are given, those values must be used when applying BAW-2308, Revision 1 if the heat-specific IRT_{T0} value is more conservative than the generic "all heats" IRT_{T0} value.

2. When the values from Table 3 of the SE dated August 4, 2005 are used by a licensee, the methodology of RG 1.99, Revision 2, may be used for the purpose of assessing the

shift in initial properties due to irradiation (ΔRT_{NDT}), even though the RG 1.99, Revision 2 methodology is based upon C_v 30 ft-lb energy level shift data. However, based on the information in BAW-2308, Revision 1, a minimum chemistry factor of 167 degrees Fahrenheit (°F) must be applied when using initial properties given in Table 3 of this SE. A higher chemistry factor may be required if weld wire heat-specific chemical composition or C_v surveillance data indicate, via the methodology of RG 1.99, Revision 2, that a higher chemistry factor should apply.

3. When the values from Table 3 of the SE dated August 4, 2005 are used by a licensee, a value of σ_Δ (the uncertainty in ΔRT_{NDT}) of 28 °F must be used to determine the overall margin term, when the margin term per BAW-2308, Revision 1, is defined as:

$$\text{Margin Term} = 2\sqrt{(\sigma_I^2 + \sigma_\Delta^2)}$$

4. Any licensee who wants to utilize the methodology of BAW-2308, Revision 1 as outlined in items (1) through (3) above, must request an exemption, per 10 CFR 50.12, from the requirements of Appendix G to 10 CFR Part 50, and 10 CFR 50.61 to do so. As part of a licensee's exemption request, the NRC staff expects that the licensee will also submit information which demonstrates what values the licensee proposes to use for ΔRT_{NDT} and the margin term for each Linde 80 weld in its RV through the end of its facility's current operating license.

5. The B&W Owner's Group (B&WOG) stated in correspondence dated August 19, 2003, that fracture toughness data from one more heat of Linde 80 weld material (weld wire heat 61782) are to be obtained. The NRC staff expects the B&WOG to evaluate this data to determine whether or not the conclusions of BAW-2308, Revision 1, and SE are nonconservative, and to communicate the B&WOG's conclusion to the NRC staff. Nonconservatism in BAW-2308, Revision 1, would be evident if: (1) the IRT_{T0} value from the to-be-tested Linde 80 weld wire heat turns out to be higher than the generic IRT_{T0} value approved in this SE, or (2) if the data from the to-be-tested Linde 80 weld wire heat results in an increase in the Linde 80 generic σ_I value.

6. Although the NRC staff concludes that there is reasonable assurance that the use of IRT_{T0} values for Linde 80 weld materials, which were determined using the loading rate correction addressed in BAW-2308, Revision 1, is acceptable for the purpose of RV material property determination, the NRC staff expects that action will be pursued within the appropriate consensus codes and standards organizations to address loading rate effects on a more generic basis (or determine that they do not need to be addressed) in the appropriate ASME Code Cases and/or American Society for Testing and Materials (ASTM) Standard Test Methods. The NRC staff requests that the B&WOG revise the recommended values in BAW-2308, Revision 1, in accordance with Table 3. When consensus codes and standards organizations address loading rate effects on a more generic basis, the NRC staff also expects that the B&WOG will re-evaluate BAW-2308, Revision 1, to determine whether or not revision of the topical report is warranted.

The NRC staff's evaluation of the licensee's compliance with the conditions is as follows:

Condition #1 was met because the licensee used the heat-specific IRT_{T0} and σ_I values for heat number 821T44, for which heat-specific values are reported in BAW-2308 Revision 1-A, and the generic values for heat number T29744, for which no heat specific values are available.

Condition #2 was met because the licensee used the RG 1.99 Revision 2 method to determine the shift in the initial properties, and used a chemistry factor greater than 167 °F for both limiting materials, as verified by the NRC staff's confirmatory calculation of the licensee's ART values.

Condition #3 was met because the NRC staff confirmatory calculation verified the margin terms provided in Table 1 of Enclosure B of licensee letter dated December 18, 2009 (ADAMS Accession No. ML093570103), used a σ_Δ term of 28 °F and the σ_I value from Table 3 of the NRC staff SE for BAW-2308, Revision 1-A.

Condition #4 was met because the licensee requested an exemption, per 10 CFR 50.12, from the requirements of Appendix G to 10 CFR Part 50 and 10 CFR 50.61, and also submitted information that demonstrated what values the licensee proposes to use for ΔRT_{NDT} and the margin term for each Linde 80 weld in its RV through the end of its facility's current operating license. The NRC's approval of the associated exemption is documented in letter dated December 14, 2010 (ADAMS Accession No. ML103070285).

Conditions #5 and #6 were met because the issues were resolved by BAW-2308, Revision 2, as documented in the final SE of that report (ADAMS Accession No. ML052070408).

Based on the above, the NRC staff finds that the licensee has met all six conditions for the use of the methodology of BAW-2308, Revision 1 for the determination of the initial material reference temperature. In the exemption required by Condition #4, the NRC staff found that the licensee will meet the intent of 10 CFR Part 50, Appendix G, and 10 CFR 50.61.

Use of ASME Code Cases N-588 and N-640

ASME Code Case N-588 provides an alternative procedure for assuming axially-oriented reference defects in all axial welds and base metal and circumferentially-oriented reference defects in all circumferential welds. ASME Code Case N-640 allows the use of K_{IC} instead of K_{IA} in the development of P-T limit curves. ASME Code Case N-641 presents alternative procedures for calculating P-T relationships and LTOP system effective temperatures and allowable pressures. These procedures take into account alternative fracture toughness properties, circumferential and axial reference flaws, and plant-specific LTOP enable temperature calculations.

The provisions of ASME Code Cases N-588, N-640, and N-641 that are applicable to P-T limit curve development were incorporated into ASME Code, Section XI, Appendix G in the 1998 edition through 2000 addenda which is included in the acceptable edition and addenda codified in 10 CFR 50.55a, effective September 10, 2008 (Volume 73 of the *Federal Register*, page 52748). These alternatives to the Appendix G methodology have been proposed and accepted as appropriate alternatives and are documented in RG 1.147, Revision 15, "Inservice Inspection Code Case Acceptability, ASME Section XI, Division 1." However, the ASME Code, Section XI edition of record for DBNPS is the 1995 edition with Addenda through 1996.

Additionally, RIS 2004-04 clarified the NRC's position with regard to the relationship between 10 CFR Part 50, Appendix G, and 10 CFR 50.55a as follows:

- Licensees may use the provisions of any edition and addenda of ASME Code, Section XI, Appendix G, incorporated into 10 CFR 50.55a for RV P-T limit curve development, up to and including the most recently incorporated edition and addenda, without the need for an exemption.

- Use of NRC-approved ASME Code Cases (e.g., N-588, N-640, and N-641) in conjunction with earlier versions of the ASME Code endorsed in 10 CFR 50.55a may also be used for the development of P-T limit curves without the need for an exemption.

- However, changing the P-T limit curve methodology specified in the licensee's TS or modifying a facility's PTLR methodology requires NRC staff approval since this is a license amendment.

The NRC staff finds the licensee's addition of ASME Code Cases N-588 and N-640 to the methodology used to develop the P-T limits for DBNPS to be acceptable because these code cases have been incorporated into an ASME Code Edition/Addenda that is incorporated by reference in 10 CFR 50.55a, and ASME Code Case N-640 is included in the list of approved code cases in RG 1.147, Revision 15. (ASME Code Case N-588 was previously unconditionally approved in RG 1.147, Revision 15, but has been annulled by ASME as it has been incorporated in the ASME Code, Section XI, Appendix G). Since these code cases have now been incorporated into NRC staff-approved editions and addenda of the ASME Code, the NRC staff finds that (allowing for the different method of determining the initial reference temperature) use of the two code cases in the development of P-T limits will result in P-T limits that are at least as conservative as those determined using the most recent edition and addenda of the ASME Code, Section XI, Appendix G codified in 10 CFR 50.55a. Therefore, the requirements of 10 CFR Part 50, Appendix G are met.

Review of PTLR

The NRC staff reviewed the PTLR using the proposed new methodology sent by the licensee to the NRC by electronic correspondence dated January 10, 2011 (ADAMS Accession No. ML110100757), to determine if the content is consistent with the recommendations of GL 96-03, and whether the licensee has properly incorporated the proposed new methodologies. The NRC staff checked the PTLR versus the recommendations of the table from GL 96-03 entitled "Requirements for Methodology and PTLR." The items recommended by GL 96-03 for inclusion in a PTLR are 1) the neutron fluence values used to calculate the ART for the limiting materials, 2) the ART values and pressurized thermal shock reference temperature (RT_{PTS}) values for the limiting materials, 3) the surveillance capsule withdrawal schedule or a reference to a document where it is located, 4) the LTOP setpoint curves or setpoint values, 5) the P-T curves for heatup and cooldown during normal operation, criticality and leak test, 6) minimum temperatures such as boltup and hydrotest temperature, and 7) data used to calculated the chemistry factors of the limiting materials if surveillance data is used. In the PTLR, the licensee included all these items with the exception of the LTOP setpoint curves and values, and the surveillance data used to calculate the chemistry factors. The LTOP information is not included in the PTLR because the licensee maintains the LTOP information in the TS, which is acceptable since the licensee never relocated the LTOP information to the PTLR. The licensee is not using surveillance data to calculate the chemistry factors, so that item is not applicable. Since the licensee included all the information that GL 96-03 recommends be included in the PTLR, except those items that are not applicable, the NRC staff finds the content of the PTLR sent to the NRC by electronic correspondence dated January 10, 2011 (ADAMS Accession No. ML110100757) to be acceptable.

The NRC staff performed a confirmatory calculation of the new P-T limits for heatup and cooldown during normal operation and hydrostatic and leak tests. The licensee identified Circumferential Weld WF-182-1 and Lower Shell Forging BCC 241 as limiting materials. For the

confirmatory calculation, the NRC staff applied ASME Code Cases N-588 and N-640 per the licensee's revised methodology, and used the ART values for the circumferential weld as determined using the licensee's proposed revised methodology (using BAW-2308, Revisions 1-A and 2-A). The NRC staff notes that the lower shell forging becomes limiting with respect to P-T limits as a result of application of ASME Code Case N-588 and the BAW-2308, Revisions. 1-A and 2-A methodologies to Circumferential Weld WF-182-1. Based on the confirmatory calculation, the NRC staff finds the proposed new P-T limits are at least as conservative as those that would be calculated using the ASME Code, Section XI, Appendix G, and are therefore acceptable.

Summary – P-T Limit Methodology

The NRC staff finds the licensee's proposed new methodology is acceptable because:

- The licensee has met all conditions for the use of the method of BAW-2308 Revisions 1-A for the determination of initial material reference temperature, including submittal of a plant-specific exemption that has been approved by the NRC staff. Since the plant-specific exemption required to use BAW-2308, Revisions 1-A and 2-A has been granted by the NRC staff, and the other conditions have been met, the NRC staff finds the licensee's use of BAW-2308, Revisions 1-A and 2-A meets the intent of 10 CFR Part 50 Appendix G;

- ASME Code Cases N-588 and N-640 have been approved by the NRC staff and have been incorporated into versions of the ASME Code which are now incorporated by reference into 10 CFR 50.55a. Since these code cases have now been incorporated into NRC staff-approved editions and addenda of the ASME Code, the NRC staff finds that (allowing for the different method of determining the initial reference temperature) use of the two code cases in the development of P-T limits will result in P-T limits that are as least as conservative as those determined using the most recent edition and addenda of the ASME Code, Section XI, Appendix G codified in 10 CFR 50.55a; thus, the requirements of 10 CFR Part 50, Appendix G are met.

- The licensee has properly incorporated the proposed new methodologies into the revised PTLR, the content of the PTLR is consistent with the recommendations of GL 96-03, and the P-T limits are at least as conservative as would be calculated using the methods of the ASME Code, Section XI, Appendix G.

3.2 Modification Of Operating License Condition For LTOP

3.2.1 Licensee Evaluation

In Section 3.2 of its letter dated December 18, 2009, the licensee provided an analysis supporting the modification of Operating License Condition 2.C(3)(d) to extend the period of applicability of the LTOP analysis from 21 to 32 EFPY. The licensee stated that the P-T limits for LTOP are obtained by taking 100 percent of the controlling normal operation heatup/cooldown limit. The licensee indicated in this section that the same methodology would be used to analyze the LTOP limits as will be used to develop the P-T curves, which is based on BAW-10046A, Revision 2, "Methods of Compliance With Fracture Toughness and Operational Requirements of 10 CFR Part 50, Appendix G," RG 1.99, Revision 2; BAW-2308 Revisions 1-A and 2-A; and ASME Code Cases N-588 and N-640.

The licensee stated that the heatup condition is limiting for determination of the LTOP enable temperature because during the cooldown condition, the coolant temperature is always lower than the metal temperature.

The temperature at which the LTOP system must be enabled is determined by summing the following:

ART + Margin Term + reactor coolant-to-RV temperature difference.

Determination of ART

To determine the ART values at 32 EFPY that were used to determine the LTOP enable temperature, the methodology of TR BAW-2308, Revisions 1-A and 2-A, was used to determine the initial, unirradiated reference temperature of the controlling beltline materials. The licensee then used RG 1.99, Revision 2, to predict the shift in the material's reference temperature (ΔRT_{NDT}). A margin term was then added in accordance with RG 1.99, Revision 2, except that the portion of the margin related to uncertainty in the initial reference temperature (σ_I) is determined using BAW-2308, Revision 1-A.

Table 1 of Enclosure B, "Request for Exemption," to FENOC's December 18, 2009 letter (ADAMS Accession No. ML093570103) identifies the Linde 80 beltline weld materials for DBNPS. FENOC identified the Linde 80 beltline weld materials in the DBNPS RV and provided the material properties for these welds, including the initial reference temperature, ΔRT_{NDT} for ¼ of the thickness of the RPV wall, measured from the clad-to-base metal interface (1/4t) and ¾ of the thickness of the RPV wall, measured from the clad-to-base metal interface (3/4t) locations, and ART for the 1/4t and 3/4t locations. Enclosure B stated in reference to the Table 1 data that the values are valid through 52 EFPY, although the end of service for the DBNPS is currently 32 EFPY. This was because the neutron fluence values used to calculate ΔRT_{NDT} were calculated for 52 EFPY. The Linde 80 weld materials are designated WF-233 and WF-182-1. BAW-2308, Revision 1 indicates that these numbers with the prefix "WF" refer to a combination of weld wire heat and flux lot.

The licensee provided an ART value of 156.23 °F as the controlling RT_{NDT} for the DBNPS RV in their evaluation of the LTOP enable temperature. In Table 1 of Enclosure B, this ART corresponds to weld WF-182-1.

LTOP Enable Temperature

The licensee calculated the temperature at which the LTOP system must be enabled as 235°F, using 156.23 °F for ART, 50 °F for the margin term, and 28.77 °F for the reactor coolant-to-RV (1/4t) temperature difference.

The licensee indicated that since TS 3.4.12 requires the LTOP system to be enabled any time the plant is operating below 280 °F, the need to have the LTOP system active before the temperature goes below 235 °F is met.

With respect to the maximum allowable pressure when below the LTOP system enable temperature, the licensee stated in Section 3.2 of Enclosure A to licensee's December 18, 2009 letter, that ASME Code Case N-640 allows the use of the K_{Ic} fracture toughness curve rather than the K_{IA} curve. The licensee further stated that if this alternative is used, ASME Code Case N-640 requires that LTOP systems limit the maximum pressure to 100 percent of the pressure

allowed by the P-T limit curves. Finally, the licensee stated that the allowable pressure below 235 °F is controlled by the RV head nil-ductility temperature limit and stated that, therefore, 625 pounds per square-inch, gauge (psig) was selected as the uncorrected LTOP limit. The pressure values corrected for the measurement location at either the "A" or "B" hot-leg are 540 psig and 565 psig. In a September 3, 2010 conference call, the licensee indicated that these pressure values are from the revised P-T curves which have not yet been submitted to the NRC. In Enclosure A, the licensee stated that the requirements of TS 3.4.12, "Low Temperature Overpressure Protection (LTOP)," are more conservative than the values calculated using BAW-2308, Revisions 1-A and 2-A, and ASME Code Cases N-588 and N-640; therefore, no changes are proposed to TS 3.4.12. TS Bases B3.4.12 identifies that 4-inch Decay Heat Removal System relief valve (DH-4849) with a lift setpoint ≤ 330 psig provide LTOP protection for DBNPS.

3.2.2 NRC Staff Evaluation

The NRC staff's review of the licensee's analysis of the minimum LTOP enable temperature consisted of two main parts:

- A review of the ART values proposed by the licensee;
- A review of the calculation of the LTOP enable temperature based on the equations from the ASME Code and/or SRP Section 5.2.2, BTP 5-2.

Determination of ART

Table 1-2 of BAW-2308, Revision 1, indicates that WF-182-1 used wire heat number 821T44 and flux lot 8754. Heat number 821T44 was one of seven heats of Linde 80 weld material for which heat-specific T_o data is available. The IRT_{T_0} and σ_I of heat 821T44 given in Table 1 of Enclosure B (-80.2 °F and 9.3 °F) match the proposed heat-specific IRT_{T_0} from Table 7-1, "Heat Specific and Generic Initial RT_{T_0} with Associated Initial Margin," of BAW-2308, Revision 1-A. The NRC staff approved BAW-2308, Revision 1, in a SE dated August 4, 2005 (ADAMS Accession No. ML052070408). Table 3 of the NRC staff's SE contains the approved values of IRT_{T_0}. For heat number 821T44, the NRC staff-approved IRT_{T_0} value and σ_I value are identical to those proposed in BAW-2308, Revision 1-A. Table 9 of BAW-2308, Revision 2-A provides slightly lower IRT_{T_0} values for heat 821T44 and the generic values based on a proposed loading rate adjustment from ASTM E1921-07, "Standard Test Method for Determination of Reference Temperature T_0 for Ferritic Steels in the Transition Range." However, the licensee's use of the BAW-2308, Revision 1-A, IRT_{T_0} is conservative since these values are slightly higher.

Table 1-2 of BAW-2308, Revision 1, indicates that WF-233 used wire heat number T29744 and flux lot 8790. For heats without heat-specific T_o data, such as heat number T29744, BAW-2308 Revision 1-A proposed that a generic Linde 80 alternative IRT_{T_0} with a larger appropriate initial margin be used. The generic values of IRT_{T_0} and σ_I approved in SE dated August 4, 2005 (ADAMS Accession No. ML052070408) are -47.6 °F and 17.2 °F. The IRT_{T_0} value provided by the licensee for weld WF-233 (Heat T29744) is identical to the approved generic value given in Table 3 of the SE dated August 4, 2005. Use of the generic IRT_{T_0} value is required since there was insufficient data for heat T29744 to generate a heat-specific value.

The neutron fluence values used to calculate ΔRT_{NDT} were not provided in Table 1 of Enclosure B of licensee letter dated December 18, 2009 (ADAMS Accession No. ML093570103). The NRC staff required these neutron fluence values in order to perform an independent evaluation of the shift (ΔRT_{NDT}) for these materials. The NRC staff therefore

requested that the licensee supply these fluence values. By letter dated August 26, 2010 (ADAMS Accession No. ML102440105), the licensee supplied the fluence values for both welds at the wetted surface of the RV, the 1/4t location, the 3/4t location, and confirmed these fluence values were valid through 52 EFPY.

Using the fluence values provided by the licensee, the NRC staff performed a confirmatory calculation of ΔRT_{NDT} and the ART values at 52 EFPY for the 1/4t and 3/4t locations. Table 1 of this SE contains the IRT_{T0}, neutron fluence, fluence factor, chemistry factor, and margin information used as inputs to the calculation. The ΔRT_{NDT} and ART values are also included in the table for both the NRC staff and licensee calculations. The IRT_{T0} and σ_I values used by the NRC staff and licensee are the same, and are from BAW-2308, Revisions 1-A and 2-A as discussed above. The NRC staff used a chemistry factor (CF) of 177.95 °F for weld WF-182-1, which is the CF calculated from RG 1.99, Revision 2, Table 1 using the copper and nickel values of 0.24 percent Cu and 0.63 percent Ni for this weld reported in Reactor Vessel Integrity Database (RVID).

Table 1 – NRC Staff Evaluation of ART at 52 EFPY for DBNPS

Material Description	Material ID	Heat No.	Initial Ref. Temp IRT_{T0} (°F)	CF	Fluence, (°F) x10^{19} (FF)		ΔRT_{NDT}, (°F)		Margin (°F)	ART	
					1/4t	3/4t	1/4t	3/4t		1/4t	3/4t
Nozzle Belt to Upper Shell Circ. Weld	WF-233	T29744	-47.6	177.95	0.134	0.0487	82.3	49.7	65.7	100.4	67.8
Upper Shell to Lower Shell Circumferential Weld	WF-182-1	821T44	-80.2	172.25	0.989	0.359	177.4	127.6	59	156.2	106.4

The NRC staff's calculated ART was identical to the licensee's ART for this weld. The NRC staff confirmed that based on the RV surveillance data in RVID for this weld, that the use of a CF of 177.95 °F was conservative.

For Weld WF-233, RVID listed a CF of 172.25 °F. The NRC staff used this CF value for the confirmatory calculation. In a conference call on September 3, 2010, the licensee confirmed that they used the RG 1.99, Revision 2, Table 1 values of the CF for both welds.

The confirmatory calculation of ΔRT_{NDT} was performed using the method of RG 1.99, Reision 2. The NRC staff's calculated ART values match the licensee's values. Therefore, the NRC staff finds the licensee's ART values to be acceptable.

LTOP Enable Temperature

The ASME Code, Section XI Appendix G states that LTOP systems shall be effective at RCS temperatures less than 200 °F (95 °C) or at RCS temperatures corresponding to a reactor vessel metal temperature less than RT_{NDT} + 50 °F (28 degree Celsius (°C)), whichever is greater, and that LTOP systems shall limit the maximum pressure in the vessel to 100 percent of the pressure determined to satisfy Equation (1). (where Equation (1) is $2K_{Im} + K_{It} < K_{Ic}$, the same equation used to determined allowable operating pressures).

The relevant guidance from BTP 5-2 is that the LTOP system should be operable during startup and shutdown conditions below the enable temperature, defined as the water temperature corresponding to a metal temperature of at least RT_{NDT} + 50 °C (90 °F) at the beltline location (1/4t or 3/4t) that is controlling in the 10 CFR Part 50, Appendix G, limit calculations.

The NRC staff reviewed the equation used to determine the LTOP system enable temperature and finds that it is consistent with the requirements of the ASME Code, Section XI, Appendix G. The NRC staff performed an independent calculation of the temperature difference between the reactor coolant and the metal temperature at the RV 1/4t location using the methods of the ASME Code, Section XI, Appendix G. The NRC staff calculated a significantly smaller value for the temperature difference between the reactor coolant and the 1/4t metal temperature than the licensee. Therefore, the NRC staff requested additional information on the methods used by the licensee to calculate the temperature differential. In the August 26, 2010 response, the licensee indicated that the through-wall temperature differential was determined by solving the one-dimensional axisymmetric heat conduction equation using a finite difference technique. The licensee also indicated that a computer code was used to determine the reactor coolant-to-vessel 1/4t location difference assuming a both a 50 °F/hour ramp heatup rate and a 75 °F/hour heatup rate modeled as a series of 15 °F step changes followed by a 12 minute hold period. The temperature differentials for these two scenarios provided by the licensee, in terms of a percentage of the overall temperature drop through the RV wall-thickness, are 44.4 percent and 45.5 percent at the 1/4t depth, while the temperature difference that would be determined using the ASME Code, Section XI, Appendix G, Article G-2214.3 would be 43.5 percent.

The licensee stated that the PTLR for DBNPS allows a 50 °F/ hour maximum heatup rate. The licensee further indicated that their calculated temperature differential is 24.2 °F, to which they added a 4.57 °F margin to account for revision of the ART during the development of the P-T curves, resulting in the temperature differential term of 28.77 °F. During a teleconference on September 3, 2010, the licensee clarified that the 4.57 °F term was a correction factor to reflect the fact that the temperature differential analysis was performed based on the previous ART values from the licensee's April 15, 2009, letter. The ART values were revised in the December 18, 2009 letter. The licensee indicated that the reactor coolant-to-vessel 1/4t metal temperature differential would be slightly different at the metal temperatures corresponding to the two different ART values. The licensee stated that 4.57 °F was the difference between the ART values determined by the two different methods for the limiting material and would bound the actual difference between the temperature differential values at the two different 1/4t metal temperatures. The NRC staff agrees that there should be little or no change in the temperature differential at two different metal temperatures.

The licensee stated this temperature differential was based on a 50 °F/hour step change, so it was not clear if they modeled a 50 °F/hour step change in addition to a 75 °F/hour step change. During the September 3, 2010 teleconference, the licensee clarified that because the thermal conductivity had a stronger influence on the temperature differential than the heatup rate, the

temperature differential was essentially the same for both the 50 °F/hour step change heatup and the 75 °F/hour step change heatup.

The licensee's December 18, 2009 letter (ADAMS Accession No. ML093570103), did not indicate whether the 1/4t or 3/4t location is controlling for heatup. During the September 3, 2010 conference call, the licensee indicated that heatup was more limiting than cooldown and the 1/4t location was limiting during heatup with respect to allowable pressure. The licensee therefore used the 1/4t ART, as the basis for the determination of the LTOP enable temperature. Using the ASME method to calculate the temperature difference from the reactor coolant to the 1/4t location for a 50 °F/hour heatup rate, the NRC staff determined the licensee's temperature difference of 28.77 °F is conservative because it is greater than the temperature differential calculated by the NRC staff. Since the licensee used a greater differential from the reactor coolant-to-vessel 1/4t metal location than would be calculated using the standard ASME equations, this is conservative because it will result in a higher LTOP enable temperature. Therefore, since the ART used by the licensee and the reactor coolant-to-metal temperature differential are conservative, the calculated LTOP system effective temperature is conservative.

The NRC staff's evaluation confirmed that the licensee's calculated minimum LTOP system effective temperature of 235 °F meets the ASME Code, Section XI, Appendix G criterion. The licensee's calculated value of the LTOP system effective temperature is less than the minimum LTOP system effective temperature of 280 °F required by TS 3.4.12. The NRC staff notes that the NRC review guidance for the LTOP enable temperature differs from the ASME Code criterion for the LTOP enable temperature, in that the NRC staff guidance in BTP 5-2 calls for adding a margin term of 90 °F versus the margin term of 50 °F required by the ASME code. Even if the larger margin term of 90 °F was used for DBNPS, the required LTOP enable (system effective) temperature would be 275 °F, which is still less than the current value in the TS of 280 °F. Therefore, the NRC staff agrees that no change is needed to the minimum LTOP system effective temperature of 280 °F required by TS 3.4.12. Additionally, since the fluence value used as the basis for the revised ART that is used to determine the LTOP system effective temperature is valid for 52 EFPY, the valid date for the current LTOP system effective temperature may be extended to 32 EFPY.

Summary – Modification of Operating License Condition for LTOP

The NRC staff finds the licensee's proposed change to extend the applicability of the operating license condition for LTOP from 21 EFPY to 32 EFPY to be acceptable because the licensee correctly applied the new methodology for determining ART as discussed Section 3.1 of this report, and because the licensee calculated the revised minimum LTOP enable temperature appropriately in accordance with ASME Code requirements. Since sufficient margin to assure that the design conditions of the RCPB are not exceeded during any condition of normal operation, including AOOs, will continue to be maintained given the change in the time period of applicability of the LTOP analysis, the NRC staff finds DBNPS will continue to meet GDC 15 with respect to LTOP.

4.0 STATE CONSULTATION

In accordance with the Commission's regulations, the Ohio State official was notified of the proposed issuance of the amendment on October 29, 2010. The State official had no comments.

5.0 ENVIRONMENTAL CONSIDERATION

Amendment change requirements with respect to installation or use of a facility's components located within the restricted area as defined in 10 CFR Part 20. The NRC staff has determined that this amendment involve no significant increase in the amounts, and no significant change in the types, of any effluents that may be released offsite, and that there is no significant increase in individual or cumulative occupational radiation exposure. The Commission has previously issued a proposed finding that the amendments involve no significant hazards consideration, and there has been no public comment on such finding. Accordingly, this amendment meet the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9). Pursuant to 10 CFR 51.22(b) no environmental impact statement or environmental assessment need be prepared in connection with the issuance of the amendments.

6.0 CONCLUSIONS

The NRC staff concludes that the licensee's proposed TS change to implement an alternate methodology for the development of P-T curves is acceptable because:

- The licensee has met all conditions for the use of the method of BAW-2308, Rev. 1-A, for the determination of initial material reference temperature, including submittal of a plant-specific exemption that has been approved by the NRC staff.

- ASME Code Cases N-588 and N-640 have been approved by the NRC staff and have been incorporated into Appendix G of versions of the ASME Code, Section XI, which are now incorporated by reference into 10 CFR 50.55a.

- The intent of 10 CFR Part 50, Appendix G, will be met because the NRC staff granted the plant-specific exemption to use the methods of BAW-2308, Revisions 1-A and 2-A, on that basis, and the methods of ASME Code Cases N-588 and N-640 are now incorporated in NRC staff-approved versions of Appendix G the ASME Code, Section XI. Therefore, allowing for the different method of determining the initial reference temperature, P-T limits developed using the new methodology will be at least as conservative as P-T limits developed using the methodology of the ASME Code, Section XI, Appendix G; thereby meeting the requirements of 10 CFR Part 50, Appendix G.

- The licensee has properly incorporated the proposed new methodologies into the PTLR, the content of the PTLR is consistent with the recommendations of GL 96-03, and the P-T limits are at least as conservative as would be calculated using the methods of the ASME Code, Section XI, Appendix G.

The NRC staff also concludes that the change to Operating License Condition 2.C(3)(d) to extend the applicability of its LTOP analysis from 21 to 32 EFPY is acceptable because the NRC staff verified through an independent calculation that:

- The licensee appropriately determined the ART values using the proposed new methodology, and;

- The licensee correctly applied the ASME Code requirements for determining the minimum LTOP enable temperature, which was shown to remain below the value of 280 °F currently included in TS 3.4.12.

Therefore, since an appropriate margin will be maintained relative to LTOP, DBNPS will continue to meet GDC 15.

Principal Contributor: Jeffrey Poehler, NRR

Date: January 28, 2011

January 28, 2011

Mr. Barry S. Allen
Site Vice President
FirstEnergy Nuclear Operating Company
Davis-Besse Nuclear Power Station
Mail Stop A-DB-3080
5501 North State Route 2
Oak Harbor, OH 43449-9760

SUBJECT: DAVIS-BESSE NUCLEAR POWER STATION, UNIT 1 - ISSUANCE OF AMENDMENT RE: REQUEST TO INCORPORATE THE USE OF ALTERNATIVE METHODOLOGIES FOR THE DEVELOPMENT OF REACTOR PRESSURE VESSEL PRESSURE-TEMPERATURE LIMIT CURVES (TAC NO. ME1127)

Dear Mr. Allen:

The U.S. Nuclear Regulatory Commission has issued the enclosed Amendment No.282 to Facility Operating License No. NPF-3 for the Davis-Besse Nuclear Power Station, Unit 1 DBNPS). The amendment is in response to your application dated April 15, 2009 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML091130228), as supplemented by letters dated December 18, 2009 (ADAMS Accession No. ML093570103), October 8, 2010 (ADAMS Accession No. ML102861221), and electronic correspondence dated January 10, 2010 (ADAMS Accession No. ML110100757).

The amendment approves changes to the current licensing basis for DBNPS associated with the methodology used for the development of the reactor coolant system pressure-temperature limit curves in the unit's Pressure Temperature Limits Report.

A copy of the Safety Evaluation is also enclosed. The Notice of Issuance will be included in the Commission's biweekly *Federal Register* notice.

Sincerely,
/RA/
Michael Mahoney, Project Manager
Plant Licensing Branch III-2
Division of Operating Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 50-346

Enclosures:
1. Amendment No. 282 to NPF-3
2. Safety Evaluation

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