

## Davis-BesseNPEm Resource

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**Sent:** Monday, June 25, 2012 2:43 PM  
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**Cc:** Harris, Brian; Davis-BesseHearingFile Resource; Sydnor, Christopher  
**Subject:** Draft RAI 4.2.4-1 - Pressure-Temperature (P-T) Limits (REVISED RAI)  
**Attachments:** DB Revised RAI 4.2.4-1 6 25 2012 Sydnor.docx

**Importance:** High

Cliff,

I believe I mentioned this to you last week. The staff revised the P-T limits RAI (see draft RAI 4.2.4-1 attached). The attached draft RAI 4.2.4-1 supersedes RAI 4.2.2-4 sent on May 31, 2012. Let me know if you need clarification and I'll schedule a telephone conference call.

Regards,

**Samuel Cuadrado de Jesús**

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SUPPLEMENTAL REQUEST FOR ADDITIONAL INFORMATION  
LICENSE RENEWAL APPLICATION, SECTION 4.2  
TIME-LIMITED AGING ANALYSES OF NEUTRON EMBRITTLEMENT  
DAVIS-BESSE NUCLEAR POWER STATION  
FIRST ENERGY NUCLEAR OPERATING COMPANY  
DOCKET NO. 50-346

Draft RAI 4.2.4-1 – Pressure-Temperature (P-T) Limits

1.0 BACKGROUND

The Davis-Besse License Renewal Application (LRA), Section 4.2.4 describes the time-limited aging analysis for the pressure-temperature (P-T) limit curves at Davis-Besse. As stated in LRA Section 4.2.4, the Davis-Besse P-T limit curves are established in a P-T Limits Report (PTLR), the contents of which are controlled in accordance with Technical Specification (TS) 5.6.4 requirements. The current Davis-Besse PTLR contains P-T limit curves that are valid through 32 effective full power years of facility operation. LRA Section 4.2.4 states that the P-T limit curves, as established in the PTLR, will be updated as necessary in accordance with TS 5.6.4 requirements and managed for the period of extended operation, as part of the Reactor Vessel Surveillance Program (LRA Appendix B, Section B.2.35), in accordance with the requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 54.21(c)(1)(iii).

10 CFR Part 50, Appendix G, Paragraph IV.A states that, “*the pressure-retaining components of the reactor coolant pressure boundary [RCPB] that are made of ferritic materials must meet the requirements of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code [ASME Code, Section III], supplemented by the additional requirements set forth in [paragraph IV.A.2, “Pressure-Temperature (P-T) Limits and Minimum Temperature Requirements”]...*” Therefore, 10 CFR Part 50, Appendix G requires that P-T limits be developed for the ferritic materials in the reactor vessel (RV) beltline (neutron fluence  $\geq 1 \times 10^{17}$  n/cm<sup>2</sup>, E > 1 MeV), as well as ferritic materials not in the RV beltline (neutron fluence <  $1 \times 10^{17}$  n/cm<sup>2</sup>, E > 1 MeV). Further, 10 CFR Part 50, Appendix G requires that all RCPB components must meet the American Society of Mechanical Engineers (ASME) Code, Section III requirements. The relevant ASME Code, Section III requirement that will affect the P-T limits is the lowest service temperature requirement for all RCPB components specified in Section III, NB-2332(b).

2.0 ISSUE

P-T limit calculations for ferritic RCPB components that are not RV beltline shell materials may define P-T curves that are more limiting than those calculated for the RV beltline shell materials. This may be due to the following factors:

1. RV nozzles, penetrations, and other discontinuities have complex geometries that may exhibit significantly higher stresses than those for the RV beltline shell region. These higher stresses can potentially result in more restrictive P-T limits, even if the reference temperature (RT<sub>NDT</sub>) for these components is not as high as that of RV beltline shell materials that have simpler geometries.

2. Ferritic RCPB components that are not part of the RV may have initial  $RT_{NDT}$  values, which may define a more restrictive lowest operating temperature in the P -T limits than those for the RV beltline shell materials.

### 3.0 REQUEST

Describe how the P-T limit curves to be developed for use in the period of extended operation, and the methodology used to develop these curves, consider all RV materials (beltline and non-beltline) and the lowest service temperature of all ferritic RCPB materials, consistent with the requirements of 10 CFR Part 50, Appendix G.