AREVA

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U.S. Nuclear Regulatory Commission
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Potential Non-Conservatism in NRC Branch Technical Position 5-3

Ref. 1: Regulatory Guide 1.99, Revision 2, "Radiation Embrittlement of Reactor Vessel Materials," May, 1988.

Ref. 2: NUREG 0800, Revision 2, Standard Review Plan, Branch Technical Position 5-3, "Fracture Toughness Requirements," March 2007.

Ref. 3: "NRC Review of the Technical Basis for Use of the Master Curve in Evaluation of Reactor Pressure Vessel Integrity," pp. 411-437 of NUREG/CP-0172, "Proceedings of the Twenty-Eighth Water Reactor Safety Information Meeting," May 2001.

During evaluation of adjusted reference temperatures (Reference 1) for reactor vessel extended beltline materials, AREVA Inc. (AREVA) considered invoking Paragraph 1.1(4) of Branch Technical Position 5-3 (Reference 2) to estimate the initial RT_{NDT} (reference temperature for nil ductility transition) for these materials. In this assessment, AREVA determined that this position is not bounding of AREVA's measured initial RT_{NDT} database, as Reference 3 implies. Attachment A to this letter discusses the potential non-conservatism in Reference 2.

AREVA has not used this Branch Technical Position in its existing calculations for operating plants. The purpose of this letter is to bring this observation to the NRC Staff's attention for the Staff to assess its potential significance and the need to determine extent of condition.

If you have any questions related to this submittal, please contact Ms. Gayle F. Elliott, Product Licensing Manager at 434-832-3347 or by e-mail at Gayle.Elliott@areva.com.

Sincerely,

Pedro Salas, Director
Regulatory Affairs
AREVA Inc.

cc: J. G. Rowley
M. T. Ericksonkirk
Project 728

Attachment:
Discussion of Potential Non-Conservatism in NRC Branch Technical Position 5-3

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Attachment A

Discussion of Potential Non-Conservatism in NRC Branch Technical Position 5-3

NUREG-0800, Branch Technical Position 5-3 (Reference 2, previously identified as MTEB-5.2) presents various options for estimating initial RT_{NDT} when there is not sufficient data to make a direct measurement.

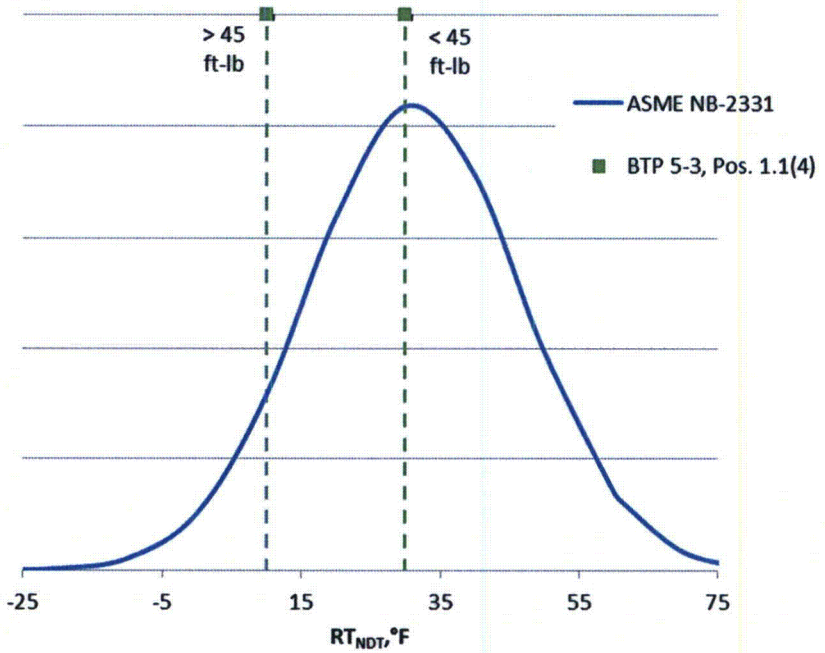
Paragraph 1.1 (4) of Reference 2 reads as follows:

> *"If limited Charpy V-notch tests were performed at a single temperature to confirm that at least 41 J (30 ft-lbs) was obtained, that temperature may be used as an estimate of the RT_{NDT} provided that at least 61 J (45 ft-lbs) was obtained if the specimens were longitudinally oriented. If the minimum value obtained was less than 61 J (45 ft-lbs), the RT_{NDT} may be estimated as 11°C (20 °F) above the test temperature."*

The limited Charpy V-notch tests for B&W procured forgings were typically tested at +10° F. Based on the above, one could estimate the RT_{NDT} is either 10 °F or 30 °F, depending on the Charpy test results. Per page 421 of Reference 3, the Branch Technical Position is intended to produce a bounding estimate of RT_{NDT}. The following is stated on Page 422 of Reference 3:

> *"... the sum $\{RT_{NDT}(u) + 2\sigma_I\}$ represents a bounding value of RT_{NDT} before irradiation. When RT_{NDT} is determined according to ASME NB-2331 or MTEB-5.2[1], these protocols produce a bounding estimate, so σ_I can be zero."*

RT_{NDT} values from B&W procured RPV forgings were determined according to ASME NB-2331 and estimated per Paragraph 1.1(4) of Reference 2. The below comparison shows that use of RT_{NDT} as estimated according to Paragraph 1.1(4) of Reference 2, with $\sigma_I = 0$, does not result in a bounding estimate of RT_{NDT} before irradiation, as stated in Reference 3 above.



[1] MTEB-5.2 is a previous identifier for the guidance contained in Reference 1.