Response to SDAA Audit Question

Question Number: A-5.2.1.1-5

Receipt Date: 06/30/2023

Question:

Section 5.2.1.1 states that “The ASME BPVC of record for the US460 standard design for the NPM is the ASME BPVC, 2017 Edition. However, Section 3.5.1.1.1 states that “Missiles from piping or valves designed in accordance with American Society of Mechanical Engineers (ASME) Section III, (Reference 3.5-1) and maintained in accordance with an ASME Section XI (Reference 3.5-2) inspection program”. Section 3.5.1.2 states that “The control rod drive mechanism housing is a Class 1 appurtenance per Reference 3.5-1.”The staff notes that References 3.5-1 and 3.5-2 refer to 2013 Code edition. Please clarify the inconsistency of the Code Edition.

Response:

Reference 3.5-1 and Reference 3.5-2 refer to incorrect American Society of Mechanical Engineers (ASME) Boiler Pressure Vessel Code (BPVC) editions for Section III and Section XI. The ASME BPVC 2017 edition is applicable to the entire standard design approval application. The attached markup corrects Reference 3.5-1 and Reference 3.5-2 to the 2017 edition of the ASME BPVC for Section III and Section XI, respectively.

Markups of the affected changes, as described in the response, are provided below:

In determining an appropriate equivalent static load, elasto-plastic behavior can be assumed with permissible ductility ratios as long as deflections do not result in loss of function of safety-related systems.

Section 3.8 provides additional information on loading combinations and analysis methods for the RXB and CRB.

3.5.4 References

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3.5-1 American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, 2017~~3~~ edition with no Addenda (subject to the conditions specified in paragraph (b)(1) of section 50.55a), Section III, "Rules for Construction of Nuclear Facility Components," New York, NY.

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3.5-2 American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, 2017~~3~~ edition with no Addenda (subject to the conditions specified in paragraph (b)(2) of section 50.55a), Section XI, "Rules for Inservice Inspection of Nuclear Power Plant Components," New York, NY.

3.5-3 Kennedy, R.P., "A Review of Procedures for the Analysis and Design of Concrete Structures to Resist Missile Impact Effects," Nuclear Engineering and Designs, (1976) 37(2), 183-203.

3.5-4 American Concrete Institute, "Code Requirements for Nuclear Safety-Related Concrete Structures and Commentary," ACI 349-06, Farmington Hills, MI.

3.5-5 Bechtel Power Corporation, "Design of Structures for Missile Impact," BC-TOP-9A, Revision 2, San Francisco, CA, September 1974.

3.5-6 Nuclear Engineering and Design, “Full-Scale Tornado-Missile Impact Tests,” Volume 45, Issue 1, March 1978, Pages 123-143.

3.5-7 Design of composite SC walls to prevent perforation from missile impact, Bruhl, J. C., et al., International Journal of Impact Engineering, 75 (2015) 75-87.

3.5-8 U.S. Reactor Containment Technology, Chapter 6, Volume 1, W.B. Cottrell and A.W. Savolainen, ORNL-NSIC-5, Oak Ridge National Laboratory, Oak Ridge, TN, 1965.

3.5-9 American Institute of Steel Construction, “Specification for the Design, Fabrication and Erection of Steel Safety-Related Structures for Nuclear Facilities,” ANSI/AISC N690, 2018.

3.5-10 Williamson, R.A., and R.R. Alvy, Impact Effect of Fragments Striking Structural Elements, Holmes and Narver, Inc., Orange, CA, 1973.