Request for Additional Information No. 65 (1017,1018,1019), Revision 0

9/22/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 05.02.04 - Reactor Coolant Pressure Boundary Inservice Inspection and Testing
Application Section: 5.2.4
CIB1 Branch

Question 05.02.04-1:

Discuss the design details for preservice and inservice inspection of Class 1 austenitic and dissimilar metal welds (DMW) with respect to monitoring for primary water stress corrosion cracking (PWSCC). Specifically, address the method and type of nondestructive examination and two-sided access provisions. If two-sided access cannot be obtained to perform the same type of nondestructive examination method during inservice examination as performed during preservice examination, discuss how NRC regulations and the ASME Code ISI requirements will be met during plant operation. Note that the staff assumes that any relief from ISI of these susceptible welds on the basis of design, geometry, or materials of construction should not be necessary, since these factors can be rectified during the design stage before the plant is constructed. If radiography is to be used to supplement one-sided examinations, discuss how operational and radiological concerns associated with the method will be taken into consideration such that 100% examination of the required weld volume is practical during plant operation. Finally, provide a commitment that any changes to the design of EPR components by the COL applicant should include a discussion of the provisions to preserve accessibility when meeting IWA-1500 and 10 CFR 50.55a(g)(3)(i).

Response to Question 05.02.04-1:

Nickel-based alloys used in the U.S. EPR are protected from primary water stress corrosion cracking (PWSCC) because the Alloy 690 materials used are not susceptible to PWSCC, as described in U.S. EPR FSAR Tier 2, Section 5.2.3.5.

ASME BPV Code, Section XI requires that a 100 percent volumetric examination be performed (Reference 1). Two-sided access is provided to perform the same type of nondestructive examination method during inservice examination as performed during preservice examination, where possible. In cases where two-sided access is not possible, the examination will be performed in accordance with 10 CFR 50.55a (b)(xv)(A)(2), which states:

> "Where examination from both sides is not possible on austenitic welds or dissimilar metal welds, full coverage credit from a single side may be claimed only after completing a successful single-sided Appendix VIII demonstration using flaws on the opposite side of the weld. Dissimilar metal weld qualifications must be demonstrated from the austenitic side of the weld and may be used to perform examinations from either side of the weld."

The type of volumetric examination (and associated radiological concerns) will be included in the licensee's inservice inspection (ISI) program based on station preference and is therefore not included in the U.S. EPR FSAR. No relief from ISI is requested for welds susceptible to PWSCC on the basis of design, geometry, or materials of construction. U.S. EPR FSAR Tier 2, Section 5.2.4.1.1 states:

> "The U.S. EPR design provides ready access to systems, structures, and components (SSC) to accommodate comprehensive inspection using currently available inspection equipment and techniques. The accessibility incorporated into the design conforms with IWA-1500 and the requirements of 10 CFR 50.55a(g)(3)(i)."

Therefore, any design changes of U.S. EPR components by the COL applicant that would change inspection accessibility must include a discussion on the deviation from U.S. EPR FSAR Tier 2, Section 5.2.4.1.1.

References for Question 05.02.04-1:

1. ASME Boiler and Pressure Vessel Code, Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” The American Society of Mechanical Engineers, 2004.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 05.02.04-2:

U.S. EPR FSAR Section 5.2.4.1.3 states that it is not necessary for an inspection interval for the Class 1 portions of the ISI Program to conform to the same inspection program as those for the Class 2 and Class 3 inspections. In addition, Section 6.6.4 of the U.S. EPR FSAR states that the Class 1 inspection intervals do not need to be the same that of Class 2 and 3 components. The staff recognizes that an interval may be extended by up to a year, but that extension applies to all components within the ISI program. Please provide additional information explaining the basis for permitting different intervals for the Code Class 1, 2, and 3 components within one operating unit under one ISI Program. Finally, if different inspection intervals are requested for the EPR Class 1 and Class 2 and 3 components, submit an alternative to the regulations pursuant to 10 CFR 50.55a(a)(3).

Response to Question 05.02.04-2:

10 CFR 50.55a does not preclude a licensee from applying different inspection intervals for the Class 1 and Class 2 and 3 components, nor does it require that allowable variations in the inspection intervals be the same for all component classes within the inservice inspection (ISI) program. Additionally, ASME BPV Code, Section XI, paragraph IWA-2430 allows such variation, stating, “It is not required that the inspection intervals of IWB, IWC, IWD, IWE, and IWF conform to the same inspection program” (Reference 1).

Therefore, no additional basis or alternative to the regulations pursuant to 10 CFR 50.55a(a)(3) is required. The inspection intervals for the Class 1 and Class 2 and 3 components will be detailed in the licensee’s ISI site-specific program, and it is expected that those intervals will keep with industry standard practice and meet the requirements of 10 CFR 50.55a(a)(3).

References for Question 05.02.04-2:

1. ASME Boiler and Pressure Vessel Code, Section XI, “Rules for Inservice Inspection of Nuclear Power Plant Components,” The American Society of Mechanical Engineers, 2004.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

Question 05.02.04-3:

The U.S. EPR FSAR, Section 5.2.4.1.8 discusses Order EA-03-009 and ASME Code Case N-729-1, as guidance to the system boundary subject to inspection of the reactor vessel head. Due to CRDM J-Groove weld cracking, the staff believes it is important that the most recent inspection guidance be applied during operation. The current NRC position applicable to inspection guidance for the reactor vessel is presented in the proposed amendments to 10 CFR 50.55a(g)(6)(ii)(D) related to reactor vessel head inspections (72 FR 16740). Please ensure the FSAR is consistent with augmented requirements for the inservice inspection program for the reactor vessel top head by implementing ASME Code Case N-729-1 as amended in the final rule in 10 CFR 50.55a.

Response to Question 05.02.04-3:

ASME Code Case N-729-1 will be implemented in accordance with the conditions specified in the recent revision to 10 CFR 50.55a (73FR52730). U.S. EPR FSAR Tier 2, Section 5.2.4.1.8 will be revised to replace the reference to NRC Order EA-03-009 with 10 CFR 50.55a.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 5.2.4.1.8 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

- That have one inlet and one outlet, both of which are NPS 1 and smaller.
- Those that have multiple inlets or multiple outlets whose cumulative cross-sectional area does not exceed the cross-sectional area defined by the OD of NPS 1 pipe.

- Reactor vessel head connections and associated piping, NPS 2 and smaller, made inaccessible by control rod drive penetrations.

5.2.4.1.7 Relief Requests

No relief from Class 1 PSI or ISI requirements is required for the U.S. EPR.

5.2.4.1.8 Code Cases

No code cases applicable to Class 1 PSI or ISI requirements are invoked for U.S. EPR design. However, supplemental inservice inspections for the reactor pressure vessel head are required, in accordance with ~~NRC Order EA-03-009 and First Revised Order EA-03-009, are required as noted in~~ 10 CFR 50.55a. Compliance with the requirements of this order may be accomplished with conditional implementation of code case N-729-1, "Alternative Examination Requirements for PWR Reactor Vessel Upper Heads with Nozzles Having Pressure-Retaining Partial-Penetration Welds." COL applicants that reference the U.S. EPR design certification may invoke code case N-729-1, with conditions, in accordance with 10 CFR 50.55a~~cited in NRC order EA-03-009 and first revised order EA-03-009, until subsequent NRC requirements supersede the order~~.

05.02.04-3

05.02.04-3

5.2.4.1.9 Augmented ISI to Protect Against Postulated Piping Failures

No Class 1 piping penetrates the Reactor Building. Therefore, augmented ISI to protect against postulated failures of Class 1 piping between containment isolation valves is not required for the U.S. EPR. Refer to Section 6.6 for a description of augmented ISI for Class 2 high energy piping.

5.2.4.1.10 Other Inspection Programs

The ISI program includes provisions to detect and correct potential RCPB corrosion caused by boric acid leaks, as described in NRC generic letter 88-05.

The ISI program includes supplemental inservice inspections for the reactor pressure vessel head consistent with those inspections required by NRC order EA-03-009 and first revised order EA-03-009.

5.2.4.2 Preservice Inspection and Testing Program

The PSI program for Class 1 components conforms to the guidelines of Article NB-5280 of Section III, Division I, of the ASME code. The program consists of inspecting