Request for Additional Information No. 64 (994,995,996,997), Revision 0

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U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 05.03.01 - Reactor Vessel Materials
SRP Section: 05.03.02 - Pressure-Temperature Limits, Upper-Shelf Energy, and Pressurized Thermal Shock
SRP Section: 05.03.03 - Reactor Vessel Integrity
Application Section: FSAR Ch. 5
CIB1 Branch

QUESTIONS

05.03.01-1

Figure 5.1-2 “RCS Layout” indicates the principal dimensions of RCS components in relation to their surrounding structures. In order for the staff to evaluate reactor pressure vessel (RPV) functionality and ensure standardization of the vessel is achieved, the key RPV dimensions (e.g., thickness, height, width, and location of nozzles) should be provided in the FSAR.

05.03.01-2

The FSAR Section 5.3.1.2 states that the surfaces of the RPV that come into contact with the reactor coolant are clad in stainless steel or Ni-Cr-Fe alloy. However,
Section 1.2.3.2.1 states the internal surface of the RPV is covered by stainless steel cladding for corrosion resistance. Clarify the material used for the vessel cladding. Also, provide the thickness of the cladding and describe the process for applying it.

05.03.01-3

Section 5.3.1.5 of the EPR FSAR states that the vessel fracture toughness data is calculated in accordance with RG 1.99, Revision 2. Use of the procedures in RG 1.99, Revision 2 is only valid for a nominal irradiation temperature of 550° F. Irradiation below 525° F. produces greater embrittlement. Confirm in the FSAR that the operating temperature of the EPR RPV will be above 525°F.

05.03.01-4

Section 5.3.1.6 of the FSAR discusses the RPV material surveillance program based on a
60-year design life. The program will use four specimen capsules. What is the basis for selecting four capsules? While this amount meets minimum requirements of ASTM E185-82, it may be beneficial to have additional capsules when applying for license extension in the future. Discuss the extent to which additional life extension was considered in selecting the number of capsules.

05.03.01-5

(a) EPR FSAR Section 5.3.1.6 “Material Surveillance” does not discuss locations of capsules or lead factors. Discuss the locations and the associated lead factors of the surveillance capsules in the FSAR.

(b) Section 5.3.1.6 of the FSAR states that a COL applicant will identify the implementation milestones for the material surveillance program (listed as COL Information Item 5.3-1). The FSAR also states that the material surveillance program has been fully described. However, the staff needs additional information (e.g., capsule environment and capsule preparation) to evaluate the adequacy of a fully described surveillance capsule program. RG 1.206 states, “because the material surveillance program is an operational program, as discussed in SECY-05-0197, the [COL] applicant must describe the program and its implementation.” A full description of the material surveillance program should be provided prior to COL issuance. Any information that will not be included in the FSAR should be identified as COL action items.

05.03.02-1

FSAR Section 5.3.2 does not discuss how results of the RPV material surveillance capsule program are used in updating pressure-temperature (P/T) limits. In Section 5.3.2, discuss in detail the use of the material surveillance program in updating the P/T limits as applicable. Also, discuss the process of using the integrated surveillance capsule program, if applicable, in recalculating P/T limits.

05.03.02-2

FSAR Section 5.3.2 discusses the development of pressure-temperature limits. Table 5.3-4 provided 1/4T and 3/4T adjusted RT_{NDT} values. However, the FSAR does not provide the projected fluence used in the calculation. Please provide the projected fluence used in the calculation of P-T limits in the FSAR. Also, describe the methodology used in developing the projected fluence values.

05.03.02-3

FSAR Section 5.3.2.3 discusses pressurized thermal shock (PTS) and provides the projected RT_{PTS} values for 60 EFPY. However, the FSAR does not provide the applicable projected fluence. Please provide in the FSAR the projected fluence used in the calculation of PTS and describe the methodology used.

05.03.02-4

FSAR Section 5.3.2.4 discusses upper-shelf energy (USE). Please describe in the FSAR the method used in projecting USE.

05.03.02-5

Section 5.3.2 of the FSAR states that the COL applicant will provide a plant-specific Pressure Temperature Limits Report (PTLR). To enhance the level of standardization in the certification information, it would appear appropriate to provide the PTLR at the

design certification stage rather than in each COL application. Discuss your rationale for not including the PTLR in the FSAR. Also, discuss how the adequacy of Technical Specification requirements for pressure-temperature limits can be assured at the design certification stage if generic P-T limits or a PTLR is not provided at the design certification stage.

05.03.03-1

Provisions for annealing the RPV provide assurance that fracture toughness properties can be restored to satisfy the fracture toughness requirements of GDC 31, if necessary. Describe in the FSAR the provisions that are in place for the EPR design if thermal annealing of the RPV should be necessary.