ArevaEPRDCPEm Resource

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Sent: Thursday, February 05, 2009 7:17 PM
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Cc: Jeffrey Poehler; David Terao; Peter Hearn; Joseph Colaccino; Meena Khanna; ArevaEPRDCPEm Resource
Subject: Draft - U.S. EPR Design Certification Application RAI No. 185 (2097, 2101, 2085), FSAR Ch. 9
Attachments: Draft RAI_185_CIB1_2097_2101_2085.doc

Attached please find draft RAI No. 185 regarding your application for standard design certification of the U.S. EPR. If you have any question or need clarifications regarding this RAI, please let me know as soon as possible, I will have our technical Staff available to discuss them with you.

Please also review the RAI to ensure that we have not inadvertently included proprietary information. If there are any proprietary information, please let me know within the next ten days. If I do not hear from you within the next ten days, I will assume there are none and will make the draft RAI publicly available.

Thanks,
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Request for Additional Information No. 185 (2097, 2101, 2085), Revision 0

2/5/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.01.02 - New and Spent Fuel Storage
SRP Section: 09.01.03 - Spent Fuel Pool Cooling and Cleanup System
SRP Section: 09.03.02 - Process and Post-Accident Sampling Systems
Application Section: FSAR Ch. 9

QUESTIONS for Component Integrity, Performance, and Testing Branch 1 (AP1000/EPR Projects) (CIB1)

09.01.02-22

Background

Your response to RAI 86, Question 09.01.02-19, Item 2, indicated that chloride, fluoride, and sulfate levels would be checked quarterly for the EPR spent fuel pool. The EPRI guidelines recommend monthly monitoring of these parameters. Industry experience has shown that, especially for sulfates, the concentration can rapidly increase (above the 150 ppb limit) due to resin radiolytic degradation. This can be significant particularly following a refueling outage.

Requested Information

Provide evidence showing that quarterly sampling will provide sufficient time to take remedial actions to stem contaminant transients in the SFP.

09.01.02-23

Background

Your response to RAI 86, Question 09.01.02-19, Item 3, indicated that contaminant limits for chloride, fluoride and sulfate for the spent fuel pool were the same as those imposed on the RCS during refueling (100 mg/kg or 0.100 ppm). It was not clear to the staff from this response whether these limits applied only during refueling or at all times for the spent fuel pool.

Requested Information

1. Provide the limits on contaminants imposed during the operating fuel cycle when the SFP and RCS are not connected.

2. If the contaminant limits for the spent fuel pool during normal operation are different than the limits during the refueling outage, provide a technical justification for these different limits.

09.01.02-24

Background

Your response to RAI 86 Question 09.01.02-20 (RAI ID 1143, Question 3916), Items 1 and 2, described the maintenance and monitoring of the spent fuel pool leak channel system. Your responses to these two items are technically acceptable, but they should be included in the EPR FSAR.

Requested Information

Include the information provided in responses to RAI 86 Question 09.01.02-20 Items 1 and 2 in the EPR FSAR.

09.01.02-25

Background

Your response to RAI 86, Question 09.01.02-20, Items 3 and 4, did not include a design figure.

Requested Information

1. Confirm it is your intent to use the same design that has been used in the past and use monitoring to maintain integrity. Include this information in the FSAR.

2. If an alternate design is to be used, provide a description with a detailed justification including a figure that identifies the alternate design for these leak-off channels.

09.01.02-26

Background

In your response to RAI 86 Question 09.01.02-20 Item 6, you stated, "The Seismic Category I back-up water sources have larger volumes of available water."

Requested Information

1. Provide the system names, and volumes of these back-up sources.

2. Identify the operational methods for making up to the SFP through this source.

09.01.03-11

Background

The technical specification cited in your response to RAI 86, Question 09.01.03-2 Item 2 (RAI ID 1227, Question 4194) deals only with boron. It does not address impurity monitoring or limits in the SFP. You stated that the SFP liquid is part of the RCS. SRP 9.3.4 contains the NRC staff guidance on primary-water chemistry control which cites the EPRI PWR Primary-Water Chemistry Guidelines as an acceptable evaluation standard for primary-water chemistry.

Requested Information

1. Provide the approach you plan to use for monitoring frequency. Provide a technical justification for the monitoring frequency chosen if it differs from the recommendations for the spent fuel pool cooling and cleanup system in the EPRI PWR Primary Water Chemistry Guidelines.

2. Provide the approach you plan to use for impurity monitoring (i.e., which impurities and chemical paramters are tested) and the acceptance limits. Provide a detailed technical justification for the approach if it differs from the recommendations for the spent fuel pool cooling and cleanup system in the EPRI PWR Primary Water Chemistry Guidelines.

09.03.02-9

Figures 9.3.2-1 to 9.3.2-3 of Section 9.3.2.1 identify the sample point for the RCDT as the mechanism of sampling the pressurizer. The applicant's response to RAI 113 Question 09.03.02-3 identified other gaseous inputs to the RCDT besides the vented pressurizer gas phase fluids. Both the noble gas content and the oxygen content of the gas phase of the pressurizer are important chemistry operational, start-up and shutdown parameters that need to be monitored on a routine basis. The pressurizer is part of the reactor coolant system.

1. During reactor start-up reactor coolant system dissolved oxygen shall be less than 100 ppb prior to proceeding above 250^0F. Identify the means for sampling the pressurizer liquid and gas phases to ensure that this part of the reactor coolant system is incompliance with this requirement.
2. Technical Specification B 3.4.9, identifies the bases for pressurizer controls during operation and states, “Relatively small amounts of non-condensible gases can inhibit the condensation heat transfer between the pressurizer spray and the steam, and diminish the spray effectiveness for pressure control.” Hydrogen is a non-condensable gas. The pressurizer gas phase is not sampled directly but via a line that combines other gaseous sources of variable hydrogen and nitrogen content. Describe the methods for calculating the hydrogen content of the pressurizer so that operators will be able to determine appropriate venting thus maintaining pressurizer control during operations.
3. Technical specification B 3.4.15 identifies the bases for radioactivity control in the RCS based on dose equivalent iodine (DEI) and dose equivalent xenon (DEX). Both of these constituent radionuclides in the RCS have significant fractions that are volatile. Justify the sampling of the RCS and RCDT ensures the pressurizer gas phase is in equilibrium with the liquid phase of the RCS (i.e., no concentration of these radionuclides has occurred) so that the LCO requirements of B 3.4.15 are met and no dilution of the contained gases has occurred.
4. The EPRI Primary Water Chemistry Guidelines in Appendix B Section 4 identify the need for control of oxygen and hydrogen in the pressurizer during operation, start-up and shutdown to prevent stress corrosion cracking (SCC) of components both in the pressurizer and the RCS. Describe the method for allocating the fraction of hydrogen and oxygen measured in the RCDT sample line to the specific amounts that are in the pressurizer.

09.03.02-10

Background

FSAR Tier 2, Figure 9.3.2-1—Nuclear Sampling System, Sheet 1, shows the nuclear sampling system (NSS) sample line from the LHSI system. The IRWST must be sampled once every 7 days for chemical parameters, ensuring it is within specifications. In response to RAI 113 for question 09.03.02-4 item 1 the applicant stated that the LHSI pumps will be run to perform this function. Representative sampling of a tank like the IRWST requires that the tank be recirculated for at least two tank volumes, or for a period of time that experience has shown is sufficient to create a representative sample. A one volume recirculation of the IRWST with a 2200 gpm (maximum) flow rate from the LHSI pumps will take approximately 3.8 to 4 hours based on the technical specification requirements for minimum and maximum volumes. Thus, a minimum time frame for operating these safety-related pumps (~8 hours) is much more than is necessary to ensure operability of the pumps and verifying they are operable.

Requested Information

State in the FSAR that operating of the LHSI pumps for at least the 8-hour time period will be the routine method of sampling of the IRWST. If not, provide an alternate method of ensuring a representative sample of the IRWST in the FSAR.

09.03.02-11

Background

The containment atmosphere is required to be sampled per TS 3.4.14. Normally this 'sampling' is performed by a continuous radiation monitor. In order to ensure compliance with GDC 64, as it relates to monitoring the containment atmosphere and plant environs for radioactivity, and GDC 60 as it relates to the capability of the PSS to control the release of radioactive materials to the environment, a back-up system for sampling containment for hydrogen and radioactive gases is required in the event that the continuous radiation monitor is out of service. The response to RAI 113, Question 09.03.02-4 indicated that the sampling activity monitoring and hydrogen monitoring system were also used to sample the containment atmosphere during normal operation. The SASS cannot serve as the backup system because it only operates during a severe accident.

Requested Information

Identify the system used to obtain containment gas samples in the event that the containment radiation monitor is out of service.

09.03.02-12

Background

FSAR Tier 2 Section 9.3.2.3 identifies that one function of the SASS is to sample the containment atmosphere for gases, both hydrogen and radioactive gases. The applicant's response to RAI 113 Question 09.03.02-6 indicates that the Figure 9.3.2-2 description of "in-situ pool samplers" are the water scrubbing systems that will remove the non-condensable gases, iodines and aerosols from the containment atmosphere and allow determination. Scrubbing would be an acceptable method for iodines and particulates; however, the determination of noble gases by enhancing solubility in a liquid phase is the reverse process of normally performed at US PWRs.

Requested Information

Describe the techniques for removing noble gases from the gas phase in the pool samplers and explain the technique for determining the noble gases in the containment air sample.