ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Monday, July 06, 2009 4:01 PM
To: Tesfaye, Getachew
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 217, FSAR Ch 9
Attachments: RAI 217 Response US EPR DC.pdf

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 217 Response US EPR DC.pdf" provides a technically correct and complete response to the question.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which supports the response to RAI 217 Question 09.03.02-13.

The following table indicates the respective pages in the response document, "RAI 217 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 217 — 09.03.02-13	2	3

This concludes the formal AREVA NP response to RAI 217, and there are no questions from this RAI for which AREVA NP has not provided responses.

(Russ Wells on behalf of)
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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Friday, June 05, 2009 4:54 PM
To: ZZ-DL-A-USEPR-DL
Cc: Sara Bernal; Timothy Frye; Peter Hearn; Joseph Colaccino; ArevaEPRDCPEm Resource
Subject: U.S. EPR Design Certification Application RAI No. 217 (2573), FSARCh. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on April 14, 2009, and discussed with your staff on April 27 and May 7, 2009. No changes were made to the draft RAI as a result of those discussions except correction of typographical errors. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs. For any RAIs that cannot be answered within 30 days, it is expected that a date for receipt of this information will be provided to the staff within the 30 day period so that the staff can assess how this information will impact the published schedule.

Thanks,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 621

Mail Envelope Properties (1F1CC1BBDC66B842A46CAC03D6B1CD4101AD10BF)

Subject: Response to U.S. EPR Design Certification Application RAI No. 217, FSAR Ch 9
Sent Date: 7/6/2009 4:00:30 PM
Received Date: 7/6/2009 4:00:34 PM
From: WELLS Russell D (AREVA NP INC)

Created By: Russell.Wells@areva.com

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Post Office: AUSLYNCMX02.adom.ad.corp

Files	**Size**	**Date & Time**
MESSAGE	2321	7/6/2009 4:00:34 PM
RAI 217 Response US EPR DC.pdf	122105	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
Recipients Received:

Response to

Request for Additional Information No. 217 (2573), Revision 0

6/05/2009

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 09.03.02 - Process and Post-Accident Sampling Systems
Application Section: 9.3.2 Process Sampling Systems

QUESTIONS for Health Physics Branch (CHPB)

Question 09.03.02-13:

RAI 113, Question 09.03.02-8 described the guidelines as stated in 10CR20.1101(b) dealing with procedures and engineering controls to achieve occupational doses that are ALARA. The response to RAI 113 Question 09.03.03-8 identifies that the process sampling stations incorporate shielding and other design features that minimize personnel doses. However, clarification of the response is requested as follows:

1. Part 1 of 9.03.02-8 asked that the licensee verify that the design features of the sampling stations would minimize contamination of the facility and dose to samplers while taking samples. Several parts of the response to this question are noted here:

   a. "Sample stations are placed in a room isolated from the collection disposal of the samples". Justify locating the sampling stations in a room that is separate from the collection point.

   b. "Formation of crud is reduced through sample velocity, short delay times, and flushing. Deposition of radioactive materials is reduced by sloping of sample lines avoiding stagnant legs and providing low point drains."

      i) Explain the CRUD reduction by sample velocity or arrangement of sample lines configuration.

      ii) The EPRI Secondary Water Chemistry Guidelines, Chapter 7, has diagrams and a description of the proper configuration of sample lines to prevent sample bias when two phase flow is to be sampled. Such two-phase flow occurs in the primary system sample lines as well. Describe the representative sampling and reduction of "hot spots" during and after sampling resulting from the sloped sample lines during and after sampling.

   c. Laboratory and sample disposal areas are shielded and are in close proximity to the sampling station, thereby reducing the length of exposure." Provide clarification for the term "sample disposal area."

   d. Section 9.3.2 of the SRP discusses the need for ALARA considerations in the design of the Sampling System, including shielding. Revise Section 9.3.2 to incorporate the shielding design features that you included in your response to question 9.03.02-8. In addition, provide a reference to section 12.3.1.9.2 of the FSAR for additional discussion on sampling station accessibility and shielding.

Response to Question 09.03.02-13:

a. The nuclear sampling system (NSS) primary sample station and recycle collection tank are located in separate rooms. The rooms are side-by-side, but the room entryways are not shared. Positioning the collection tank in a separate room reduces the dose to plant personnel collecting samples.

b. The response to Parts i) and ii) include:

   i) The Response to RAI 113, Supplement 1, Question 09.03.02-8, Part 1 contained the following information:

- "Formation of crud is reduced through sample velocity, short delay times, and flushing. Deposition of radioactive material is reduced by sloping sample lines, avoiding stagnant legs, and providing low point drains. These features enhance decontamination."

A more appropriate response would be:

- "The deposition of crud is minimized through sample velocity, short delay times, flushing, sloping of sample lines, avoiding stagnant legs, and providing low point drains."

ii) The U.S. EPR uses the EPRI Secondary Water Chemistry Guidelines to design the sample systems. Consistent with the guidance in this EPRI document, the sample lines are optimized by short runs and minimal bends, which minimize chemical reaction times and deposition during transit from the process stream to the collector.

When a two-phase (liquid-solid) sample is split, the sample flow intercepts the "tee" which forces the flow into a 90 degree turn for the subsequent flow paths. This configuration confirms that fractionation of suspended matter based on preferential flow path for suspended matter does not occur.

Chapter 7 of the EPRI Secondary Water Chemistry Guidelines does not mention sloping. The U.S. EPR sample lines are sloped to avoid potential crud traps. Piping that is sloped in the direction of flow minimizes crud from settling and aids in draining the piping, if maintenance is required during plant operation. In addition, dead legs are avoided, except as necessary for vents and drains. For fluids with high solid contents, the velocity is sufficient to maintain suspended solids without plugging.

c. Refer to the Response to Part a.

d. U.S. EPR FSAR Tier 2, Section 9.3.2 will be revised to incorporate the shielding design features described in the Response to RAI 113 Supplement 1, Question 09.03.02-8, and also to provide a reference to U.S. EPR FSAR Tier 2, Section 12.3.1.9.2 for additional information on sampling station accessibility and shielding.

FSAR Impact:

U.S. EPR FSAR Tier 2, Section 9.3.2 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

- Coolant supply and storage system (CSSS).
- Coolant treatment system (CTS).
- Chemical and volume control system (CVCS).
- Four trains of low head safety injection (LHSI) system.
- NSS (upstream of boron meter).

The NSS also collects local grab samples, specifically for corrosion product sampling, from:

- CPS - upstream and downstream of mechanical filters.
- Fuel pool purification system (FPPS) - upstream and downstream of mechanical filter.

To obtain a sample, the respective sample line is chosen by opening the associated solenoid valve. The sample flow rate is adjusted by control valves using local flow meters. After an elapsed purge time has passed to achieve a representative sample, the grab sample is taken inside a glove box. It is possible to perform parallel sampling from all connected systems.

09.03.02-13

~~In order to consider the ALARA principle, one sample stream is degassed at a time to remove dissolved noble gases. The sample stream is routed through a multiple position valve into a degassing vessel. The vessel is purged before sampling to avoid cross-contamination. When the vessel inlet is isolated, dissolved gases are stripped off the liquid by means of nitrogen. Grab samples are taken from the vessel.~~In consideration of ALARA principles:

- One sample stream is degassed at a time to remove dissolved noble gases. The sample stream is routed through a multiple position valve into a degassing vessel. The vessel is purged before sampling to avoid cross-contamination. When the vessel inlet is isolated, dissolved gases are stripped off the liquid by nitrogen. Grab samples are taken from the vessel.
- The primary sample station and collection tank are shielded by being located in separate rooms, which reduces exposure by isolating the radiation source.
- Refer to Section 12.3.1.9.2 for additional information on sampling station accessibility and shielding.

To provide assurance that representative samples are obtained from liquid processes, sample points are located in turbulent flow zones (where applicable). For tanks, samples are taken from the bulk volume to avoid low points and sediment traps. Sample lines are flushed for a sufficient period of time prior to sample extraction in order to remove sediment deposits and air and gas pockets.