ArevaEPRDCPEm Resource

From: WELLS Russell D (AREVA NP INC) [Russell.Wells@areva.com]
Sent: Wednesday, February 25, 2009 5:27 PM
To: Getachew Tesfaye
Cc: Pederson Ronda M (AREVA NP INC); BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); SLIVA Dana (EXT)
Subject: Response to U.S. EPR Design Certification Application RAI No. 136, FSAR Ch 12, Supplement 1
Attachments: RAI 136 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided a schedule for a technically correct and complete response to RAI No. 136 on December 12, 2008. The attached file, "RAI 136 Supplement 1 Response US EPR DC.pdf" provides technically correct and complete responses to the remaining question, as committed. Since the response file contains security-related sensitive information that should be withheld from public disclosure in accordance with 10 CFR 2.390, a public version is provided with the security-related sensitive information redacted. This email does not contain any security-related information. The unredacted SUNSI version is provided under separate email.

Appended to this file are affected pages of the U.S. EPR Final Safety Analysis Report in redline-strikeout format which support the response to RAI 136 Question 12.03-12.04-2.

The following table indicates the respective pages in the response document, "RAI 136 Supplement 1 Response US EPR DC SUNSI.pdf" that contain AREVA NP's response to the subject questions.

Question #	Start Page	End Page
RAI 136 — 12.03-12.04-2	2	5

This concludes the formal AREVA NP response to RAI 136, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

(Russ Wells on behalf of)
Ronda Pederson
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
New Plants Deployment
AREVA NP, Inc.
An AREVA and Siemens company
3315 Old Forest Road
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From: Pederson Ronda M (AREVA US)
Sent: Friday, December 12, 2008 3:57 PM
To: 'Getachew Tesfaye'
Cc: BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); DUNCAN Leslie E (AREVA NP INC)
Subject: Response to U.S. EPR Design Certification Application RAI No. 136 (1377), FSARCh. 12

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 136 Response US EPR DC.pdf" provides a schedule response date since a technically correct and complete response to the one (1) question is not provided.

The following table indicates the respective pages in the response document "RAI 136 Response US EPR DC.pdf" that contain AREVA NP's response to the subject question.

Question #	Start Page	End Page
RAI 136 — 12.03-12.04-2	2	3

A complete answer is not provided to the question. The schedule for a technically correct and complete response to this question is provided below.

Question #	Response Date
RAI 136 — 12.03-12.04-2	February 26, 2009

Sincerely,

Ronda Pederson
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From: Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
Sent: Tuesday, November 18, 2008 12:34 PM
To: ZZ-DL-A-USEPR-DL
Cc: Sara Bernal; Timothy Frye; Surinder Arora; Tarun Roy; Joseph Colaccino; John Rycyna
Subject: U.S. EPR Design Certification Application RAI No. 136 (1377), FSARCh. 12

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on November 6, 2008, and on November 17, 2008, you informed us that the RAI is clear and no further clarification is needed. As a result, no change is made to the draft RAI. 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: 254

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Subject: Response to U.S. EPR Design Certification Application RAI No. 136, FSAR Ch 12, Supplement 1
Sent Date: 2/25/2009 5:27:07 PM
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From: WELLS Russell D (AREVA NP INC)

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Tracking Status: None

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MESSAGE	4216	2/25/2009 5:27:11 PM
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Options
Priority: Standard
Return Notification: No
Reply Requested: No
Sensitivity: Normal
Expiration Date:
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Response to

Request for Additional Information No. 136, Supplement 1

11/18/2008

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 12.03-12.04 - Radiation Protection Design Features
Application Section: FSAR, Tier 2, Section 12.3.5.2, Postaccident Access to Radiological Vital Areas

QUESTIONS for Health Physics Branch (CHPB)

Question 12.03-12.04-2:

Personnel access to radiological vital areas under accident conditions should be demonstrated in accordance with 10 CFR 50.34(f)(2)(vii), GDC 19, and the criteria in Item II.B.2 of NUREG-0737.

1. EPR FSAR, Tier 2, Section 12.3.5.2, Postaccident Access to Radiological Vital Areas, states that Figures 12.3-64 – 12.3-71 contain postaccident radiation zone maps that encompass the following radiological vital areas:

   - -MCR, technical support center, and adjoining rooms
   - -Safeguard Building containment heat removal system pump rooms
   - -Safeguard Building residual heat removal system pump rooms,
   - -Post-LOCA sampling room in the Fuel Building
   - -Post-LOCA ventilation air sampling room in the Fuel Building
   - -Radiological analysis laboratory in the Nuclear Auxiliary Building
   - -Diesel fuel oil delivery area.

   It is not clear from the above mentioned figures where the Containment Heat Removal System (CHRS) Pump rooms are located. Verify that the CHRS pump rooms are represented in the post accident radiation zone maps by the Medium Head Safety Injection pump rooms, or provide information on where the CHRS rooms are located.

2. Regulatory Guide 1.206, Part C.I. Section 12.3.2, Shielding, states that each COL applicant should verify that the plant shielding is sufficient to ensure adequate access to all vital areas following an accident in accordance with the requirements in 10 CFR 50.34(f)(2)(vii) and the criteria in Item II.B.2 of NUREG -0737. However, rather than relying solely on plant design to reduce dose during post accident vital area access, the EPR FSAR, Tier 2, Section 12.3.5.2, Postaccident Access to Radiological Vital Areas, states that for several radiological vital areas, mission dose was calculated assuming the use of full protective clothing, respiratory protection, temporary shielding and/or restrictions on earliest post accident access. Therefore please specify what type of procedure(s) will be used to make the determination of when personnel protection equipment (radiation protection suits, breathing gear, etc.), and/or temporary shielding will be used, what type of personnel protection equipment will be used, and when vital area access may occur after a design basis accident. Justify why this should not be identified as a COL item.

3. EPR FSAR, Tier 2, Figure 12.3-69, Safeguard Buildings 2 and 3 +0 Ft Elevation Postaccident Radiation Zones, appears to be inconsistent with Figure 12.3-70, Safeguard Buildings 2 and 3 Section Postaccident Radiation Zones. Figure 12.3-70 has designated the personnel air lock area to be a ≤ 5 rem/hr radiation zone while Figure 12.3-69 has the personnel air lock area designated as a ≤ 2.5 mrem/hr radiation area. Please provide clarification and/or corrected drawings.

4. EPR FSAR, Tier 2, Table 12.3-12, U.S. Estimated Accident Mission Dose, has 383 mrem as the dose per person for the post accident ventilation air sample mission. However, when the occupancy times and dose rates listed in Table 12.3-12 are used to calculate dose per person for this particular mission (i.e. occupancy time x dose rate = dose per person), the result is 0.627 mrem, not 383 mrem. Please clarify or correct this discrepancy.

5. Verify that Table 12.3-12, U.S. Estimated Accident Mission Dose, listed occupancy times for "access", also encompass the time needed to egress.
6. Section 12.3.5.2, Postaccident Access to Radiological Vital Areas, discusses the use of temporary shielding for processing samples in the laboratory. However, Table 12.3-12, U.S. Estimated Accident Mission Dose, lists only one dose rate for sample processing, specifically, 9.2 rem/hr.
   a. What is the dose rate and occupancy time associated with the installation of this temporary shielding, and how does it impact the total dose per person for this mission? Modify Table 12.3-12 to incorporate this information.
   b. Section 12.3.5.2 states that temporary shielding is used so that the sampling box is the only significant source the operator is exposed to. Provide a description or radiation zone map of the other sources which the operator would be exposed to without the use of temporary shielding.
   c. The occupancy time and dose rate listed for this mission in Table 12.3-12 results in a dose per person of 1.5 rem, not 1.0 rem, as indicated in the current table. If the discrepancy is due to the operator standing in a low dose area, please provide proposed location of the low dose rate area, as well the dose rate and occupancy time associated with the low dose area. If not, provide clarification or correct the information in the table.

Response to Question 12.03-12.04-2:

1. The CHRS has been renamed the severe accident heat removal system (SAHRS). There is a single SAHRS system for the U.S. EPR. The SAHRS pump is located in Safeguard Building 4, Elevation -31 ft, Room No. 4UJH01 008, and is identified as equipment number JMQ40 AP001.

   The SAHRS pump is located in Radiological Zone Area No. 7 (<500 rad/hr), as identified in U.S. EPR FSAR, Tier 2, Figure 12.3-64 for the corresponding room (Room 1UJH01 008) in Safeguard Building 1, Elevation -31 ft. The correspondence between the radiation zone maps for Safeguard Buildings 1 and 4 is described in U.S. EPR FSAR, Tier 2, Section 12.3.5.2.

2. U.S. EPR FSAR, Tier 2, Section 12.5 states that a combined license (COL) applicant that references the U.S. EPR design certification will fully describe, at the functional level, elements of the Radiation Protection Program. The purpose of the Radiation Protection Program is to maintain occupational and public radiation doses as low as reasonably achievable (ALARA).

   U.S. EPR FSAR, Tier 2, Section 12.3.5.2 identifies the bases for the estimated accident mission doses to be used by the COL applicant for implementing the ALARA program. U.S. EPR FSAR, Tier 2, Section 2.3.5.2 (10^{th} bulleted item) will be revised as follows:

   > "Process samples in the laboratory. The operator wears full protective clothing and respiratory protection, thus only direct dose is considered. Temporary shielding will be used as necessary so that the sampling box is the only significant source of exposure. The degassing vessel is the primary source of exposure within the sampling box."

3. AREVA NP concurs that there is an inconsistency between U.S. EPR FSAR, Tier 2, Figure 12.3-69 and Figure 12.3-70 regarding the postaccident radiation zone for the personnel air-lock area. U.S. EPR FSAR, Tier 2, Figure 12.3-69 (for Safeguard Buildings 2 and 3, Elevation 0 ft) is incorrect (it is for normal operation). The radiation zone designation for the personnel air lock area, as well as for adjacent areas, is Zone 6 (<5 rem/hr), consistent with U.S. EPR FSAR, Tier 2, Figure, 12.3-70. U.S. EPR FSAR, Tier 2, Figure 12.3-69 will be revised to correct this inconsistency.

4. U.S. EPR FSAR, Tier 2, Table 12.3-12—U.S. Estimated Accident Mission Dose contains two typographical errors and omitted some additional information contained in the U.S. EPR FSAR, as follows:

   - The dose to the operator from the KLB/KLC filter rooms while obtaining both samples is: (0.1667 hour)(2.3 rem/h) = 383 mrem
   - While taking the samples, the extremity dose is: (0.1667 hours)(4.68 mrem/h) = 0.78 mrem
   - For walking to the sample location and returning to the laboratory, the individual dose is: (0.22 hours)(2.5 mrem/h) = 0.55 mrem
   - The total individual dose for postaccident ventilation air sampling is: 383 mrem + 0.55 mrem ≈ 384 mrem for the whole body and <1 mrem for the extremities.

5. U.S. EPR FSAR, Tier 2, Table 12.3-12 lists “access” times for the CHRS (now termed the SAHRS) mission and the residual heat removal system mission. Both of these “access” times include the time needed to egress. In addition, the transport time in the postaccident sampling mission (ventilation air samples) includes both accessing the two sampling locations in the Fuel Building and returning to the UKA laboratory.

6.a Post-LOCA samples are collected in the Fuel Building and brought to the Auxiliary Building laboratory for analysis. Sample processing occurs in Room UKA01 058. There are three rooms adjacent to UKA01 058 and several rooms above UKA01 058 where the normal operation dose rate is >100 mrem/hr (i.e., 190–380 mrem/hr). UKA01 058 is well-shielded from these rooms by permanent shielding, and postaccident dose rates in the Auxiliary Building UKA greater than the maximum values for normal operation are not expected. Therefore, allowing 100 mrem/hr from sources outside UKA01 058 during postaccident sample processing is conservative, and takes no credit for temporary shielding. Temporary shielding is mentioned as a contingency since the analyzed source (the sampling box with the degassing vessel inside it) is the only significant source affecting UKA01 058 radiation levels during postaccident sample processing.

Since actual dose rates within UKA01 058 due to sources other than the sampling box are expected to be far less than the assumed 100 mrem/hr, even without credit for temporary shielding,, the absence of temporary shielding has no impact on the assessed dose. Accordingly, no analysis of dose rate and occupancy time associated with the installation of the temporary shielding has been performed.

6.b Rooms UKA01 056, UKA01 057, and UKA01 066 are adjacent to UKA01 058 and have dose rates of 380 mrem/hr within them during normal operation. The normal operation

dose rate in another adjacent room, UKA01 059, is 38 mrem/hr. Several rooms above UKA01 058 (e.g., UKA03 036, 055, 057, 067, and 069) have comparable dose rates (190–380 mrem/hr) during normal operation. No significant postaccident increase in dose rate in the Auxiliary Building UKA is expected.

UKA01 058 is permanently shielded from all of these rooms. The normal operation dose rate within UKA01 058 is 19 mrem/hr. All other spaces adjacent to UKA01 058 are designated “green” (≤2.5 mrem/hr).

6.c AREVA NP concurs that the occupancy time and dose rate listed for this mission in U.S. EPR FSAR, Tier 2, Table 12.3-12 results in a dose per person of 1.5 rem, not 1.0 rem. The table will be modified to clarify that the dose reduction is due to the operator standing in a low dose area. The low dose rate area is within the same room that houses the sampling box (Room UKA01 058), and is <100 mrem/hr. The occupancy time within the low-dose area is estimated to be about one-third of the total 10 minute exposure.

FSAR Impact:

U.S. EPR FSAR, Tier 2, Section 2.3.5.2, Table 12.3-12, and Figure 12.3-69 will be revised as described in the response and indicated on the enclosed markup.

U.S. EPR Final Safety Analysis Report Markups

- Figures 12.3-64 through 12.3-71 contain postaccident radiation zone maps that encompass the identified radiological vital areas. The radiation zones for Division 4 of the Safeguard Building are the same as those for Division 1 (symmetrical layout). These zones were determined in conformance with the source term assumptions of RG 1.183.

- For higher dose rate areas, actions such as flushing of pumps and lines and installation of local temporary shielding are used to reduce dose rate in area to 100 mrem/h. Thus, a higher dose rate is used during preparatory work, and a lower dose rate is used after shielding installation and flushing operations are complete.

- Occupancy values used for the MCR, technical support center, and adjoining rooms are in accordance with RG 1.183.

Additional mission specific assumptions are as follows:

- MCR, technical support center, and adjoining rooms. The two sources of radiation are airborne radioactivity (because of ESF leakage resulting in both an immersion and inhalation dose) and direct radiation from the intake filters and from the recirculation filters located in the floor above the MCR. External shine from the Reactor Building and annulus structure is not a significant contributor to the dose rate because of the presence of substantial concrete shielding.

- Containment heat removal system or residual heat removal systems to clear blockage, back flushing of sump screens. The operator wears full protective clothing and respiratory protection, thus only direct dose is considered. Access begins no sooner than 20 hours post-LOCA.

- Post-LOCA grab samples. The operator wears full protective clothing and respiratory protection, thus only direct dose is considered. The sample lines within the sample room are the only significant sources of exposure. The first samples are drawn no sooner than 13 hours post-LOCA and are then transported to the laboratory in a shielded container.

- Post-LOCA ventilation air samples. The operator wears full protective clothing and respiratory protection, thus only direct dose is considered. The samples are transported in a shielded container to the laboratory.

12.03-12.04-2

- Process samples in the laboratory. The operator wears full protective clothing and respiratory protection, thus only direct dose is considered. Temporary shielding ~~is~~will be used as necessary so that the sampling box is the only significant source of exposure. The degassing vessel is the primary source of exposure within the sampling box.

- Diesel fuel delivery. The operator wears respiratory protection during delivery, thus only direct dose is considered.

Access routes for each radiological vital area within buildings are shown in Figures 12.3-75 through 12.3-79. For the diesel fuel delivery, trucks enter via the security access facility and proceed to the fill valve located on the outside of the

Table 12.3-12—U.S. EPR Estimated Accident Mission Dose

12.03-12.04-2

Mission	Dose per Person	Area Dose Rate	Occupancy Time
Staffing of MCR, TSC, nearby stations	4.0 rem (3.9 rem from immersion/inhalation 0.1 rem from direct shine from filters)	Varies	30 day
Access to ~~CHRS~~SAHRS system	2.7 rem	200 mrem/h 700 mrem/h 100 mrem/h	0.5 h access/return 2 hr preparatory work 12 h repair
Access to RHR system	2.3 rem	300 mrem/h 400 mrem/h 100 mrem/h	1.0 h access/return 2 hr preparatory work 12 h repair
Postaccident sampling (RCS Liquid, Containment Atmosphere)	2.3 rem (1.05 rem extremity)	8.84 rem/h (63 rem/h extremity) 100 mrem/h	0.25 h in area, including 1 minute obtain sample 0.5 h transport route
Postaccident sampling (ventilation air samples)	383 mrem (obtain samples) (< 1 mrem (extremity) < 1 mrem (transport)	2.3 ~~m~~rem/h (4.7 mrem/h extremity) 2.5 mrem/h	~~2~~10 minutes in area to obtain sample 0.22 h transport route (access/return)
Sample counting lab (operator moves to lower dose rate area during processing)	1.0 rem	9.2 rem/h (adjacent to sampling box) 100 mrem/hr (low dose-rate area)	10 minutes in area (about 1/3rd of time in low dose-rate area)
Diesel Fuel Oil Delivery (per delivery)	0.5 rem	500 mrem/h	1 hour

Figure 12.3-69—Safeguard Buildings 2 and 3 +0 Ft Elevation Postaccident Radiation Zones

12.03-12.04-2