ArevaEPRDCPEm Resource

From: Tesfaye, Getachew
Sent: Tuesday, April 06, 2010 3:37 PM
To: 'usepr@areva.com'
Cc: Keim, Andrea; Rasmussen, Richard; Dehmel, Jean-Claude; Bernal, Sara; Roach, Edward; Jeng, David; Hawkins, Kimberly; Ng, Ching; Dixon-Herrity, Jennifer; Miernicki, Michael; Colaccino, Joseph; ArevaEPRDCPEm Resource
Subject: Draft - U.S. EPR Design Certification Application RAI No. 386 (4306,4418,4532,4349,2666,4512,4341), FSAR Ch. 14
Attachments: Draft RAI_386_CQVB_4306_CHPB_4418_4532_SEB2_4349_EMB2_2666_4512_CHPB_4341.doc

Attached please find draft RAI No. 386 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,
Getachew Tesfaye
Sr. Project Manager
NRO/DNRL/NARP
(301) 415-3361

Hearing Identifier: AREVA_EPR_DC_RAIs
Email Number: 1295

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED11165B4EBA6)

Subject: Draft - U.S. EPR Design Certification Application RAI No. 386 (4306,4418,4532,4349,2666,4512,4341), FSAR Ch. 14
Sent Date: 4/6/2010 3:37:24 PM
Received Date: 4/6/2010 3:37:25 PM
From: Tesfaye, Getachew

Created By: Getachew.Tesfaye@nrc.gov

Recipients:
"Keim, Andrea" <Andrea.Keim@nrc.gov>
Tracking Status: None
"Rasmussen, Richard" <Richard.Rasmussen@nrc.gov>
Tracking Status: None
"Dehmel, Jean-Claude" <Jean-Claude.Dehmel@nrc.gov>
Tracking Status: None
"Bernal, Sara" <Sara.Bernal@nrc.gov>
Tracking Status: None
"Roach, Edward" <Edward.Roach@nrc.gov>
Tracking Status: None
"Jeng, David" <David.Jeng@nrc.gov>
Tracking Status: None
"Hawkins, Kimberly" <Kimberly.Hawkins@nrc.gov>
Tracking Status: None
"Ng, Ching" <Ching.Ng@nrc.gov>
Tracking Status: None
"Dixon-Herrity, Jennifer" <Jennifer.Dixon-Herrity@nrc.gov>
Tracking Status: None
"Miernicki, Michael" <Michael.Miernicki@nrc.gov>
Tracking Status: None
"Colaccino, Joseph" <Joseph.Colaccino@nrc.gov>
Tracking Status: None
"ArevaEPRDCPEm Resource" <ArevaEPRDCPEm.Resource@nrc.gov>
Tracking Status: None
"'usepr@areva.com'" <usepr@areva.com>
Tracking Status: None

Post Office: HQCLSTR02.nrc.gov

Files	**Size**	**Date & Time**
MESSAGE	727	4/6/2010 3:37:25 PM
Draft RAI_386_CQVB_4306_CHPB_4418_4532_SEB2_4349_EMB2_2666_4512_CHPB_4341.doc	75258	

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

Recipients Received:

Draft

Request for Additional Information No. 386(4306, 4418, 4532, 4349, 2666, 4512, 4341), Revision 0

4/5/2010

U. S. EPR Standard Design Certification
AREVA NP Inc.
Docket No. 52-020
SRP Section: 14.02 - Initial Plant Test Program - Design Certification and New License Applicants
SRP Section: 14.03.02 - Structural and Systems Engineering - Inspections, Tests, Analyses, and Acceptance Criteria
SRP Section: 14.03.03 - Piping Systems and Components - Inspections, Tests, Analyses, and Acceptance Criteria
SRP Section: 14.03.08 - Radiation Protection Inspections, Tests, Analyses, and Acceptance Criteria

Application Section: SRP 14.02 (NUREG 0800)

QUESTIONS for Quality and Vendor Branch 2 (ESBWR/ABWR) (CQVB)
QUESTIONS for Health Physics Branch (CHPB)
QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)
QUESTIONS for Engineering Mechanics Branch 2 (ESBWR/ABWR Projects) (EMB2)

14.02-149

RG 1.68 Appendix A.1.h states that the testing of engineered safety features (ESFs) should demonstrate that such features will perform satisfactorily in all expected operating configurations or modes; however, U.S. EPR FSAR Section 14.2.12.11.22, “Protection System (Test #146),” does not demonstrate the operation of the protection system (PS) in the presence of a simulated single failure of the PS. Additionally, U.S. EPR FSAR section 7.2 and 7.3 (Tables 7.2-2 and 7.3-2) state Failure Mode and Effect Analysis (FMEA) of the PS with certain assumptions of PS functionality in the presence of a ‘real’ single failure. The NRC staff requests that the applicant revise test abstract #146 to include assumptions made concerning reactor Trip (RT) and ESF in the FMEA tables and verification of single failure of the PS.

14.02-150

Follow-up to RAI 275, Question 14.02-123

In response to RAI question 14.02-123 the applicant revised the test method item 3.6 of U.S. EPR FSAR Section 14.2.12.11.22 ,“Protection System (Test #146),” to observe ESF actuators response. The NRC staff requested that AREVA clarify the test method item 3.6 to address what is meant by the term “actuators”.

14.02-151

Follow-up to RAI 313, Question 14.02-128

The response to RAI 14.02-128 refers to the criteria said to be contained in FSAR Section 9.3.2, Table 9.3.2-2 (Secondary Side). However, the current version of Table 9.3.2-2 does not provide

this level of detail and the response does not commit to update Table 9.3.2-2 to ensure that the revised acceptance criteria are complemented with supporting FSAR data. The response should include a commitment to a parallel revision of Table 9.3.2-2 to ensure consistency.

14.02-152

Follow-up to RAI 313, Question 14.02-129

The response to RAI 14.02-129 refers to the criteria said to be contained in FSAR Section 9.3.2, Table 9.3.2-2 (Secondary Side). However, the current version of Table 9.3.2-2 does not provide this level of detail and the response does not commit to update Table 9.3.2-2 to ensure that the revised acceptance criteria are complemented with supporting FSAR data. The response should commit to a parallel revision of Table 9.3.2-2 to ensure consistency.

14.02-153

Follow-up to RAI 313, Question 14.02-132

Based on RAI 14.02-132 response the staff finds the inclusion of Test No. 193 in the response to Test No. 93 is not correct given that Test No. 193 addresses only the integrity of the bioshield during power ascension and not the adequacy of the radwaste "Drum Store" and "Tubular Shaft Store" located in the Radwaste Bldg. FSAR Section 12.3.2.2, as referenced in Test No.193, describes design criteria for the adequacy of the shielding based on design features and modeling, and does not address testing. Accordingly, the response to Test No. 93 should be revised to include provisions that confirm the integrity of the concrete shielding for the "Drum Store" and "Tubular Shaft Store" located in the Radwaste Bldg.

14.02-154

Follow-up to RAI 313, Question 14.02-133

In response to RAI 14.02-133, a review of components listed in Section 3.0 of revised test abstract No. 94 indicates that the "Drum Measuring Device" is not included in the equipment listing, given the description of FSAR Section 11.4.2.3.2. Note that this equipment is not listed in FSAR Table 11.5-1 since it is not part of the liquid and gaseous process and effluent monitoring system. Accordingly, the response to Test No. 94 should be revised to include this piece of equipment and associated criteria.

14.02-155

Follow-up to RAI 313, Question 14.02-134

Based on RAI 14.02-134 response,a review of components listed in Section 3.0 of revised test abstract No. 95 indicates that the "Evaporator Column" is not included in the equipment listing, given the description of FSAR Section 11.2.2.4.2.1. Accordingly, the response to Test No. 95 should be revised to include the Evaporator and Evaporator Column since the FSAR makes a technical distinction in their descriptions.

14.02-156

Follow-up to RAI 313, Question 14.02-137

The response to RAI 14.02-137 refers to the criteria said to be contained in FSAR Section 9.3.2, Table 9.3.2-2 (Secondary Side), but needs to include FSAR Table 9.3.2-1 (Primary Side). Also, the current versions of Tables 9.3.2-1 and 9.3.2-2 do not provide this level of detail and the response does not commit to update Tables 9.3.2-1 and 9.3.2-2 to ensure that the revised acceptance are complemented with supporting FSAR data. The response should commit to a revision of Tables 9.3.2-1 and 9.3.2-2 and include their citation in Test No. 155 to ensure consistency.

14.02-157

Follow-up to RAI 313, Question 14.02-138

The response to RAI 14.02-138 refers to actions and activities that are associated with COL holder activities in concluding that the instrumentation used to meet the RCPB leakage rate TS need not be considered in the ITP. The focus of the RAI is on the inclusion of tests and definition of test criteria that confirm the operation of the instrumentation used to meet the associated TS. The fact that this instrumentation is used to comply with a TS does not give it special exemption for being excluded in the ITP. In this context, the RAI identifies a concern that is no different than those applied to any other rad monitoring instrumentation, e.g., see the test methods and acceptance criteria stated in Test No. 92, as revised by a similar type of RAI.

14.02-158

Follow-up to RAI 313, Question 14.02-139

The response to RAI 14.02-139 refers to the criteria said to be contained in FSAR Section 9.3.2, Table 9.3.2-2 (Secondary Side). The test needs to also cite FSAR Table 9.3.2-1 (Primary Side) since Test No. 204 is for sampling the primary and secondary systems. Omitting a citation of Table 9.3.2-1 results in the definition of an incomplete set of acceptance criteria. In addition, the current versions of Tables 9.3.2-1 and 9.3.2-2 do not provide this level of detail and the response does not commit to update Tables 9.3.2-1 and 9.3.2-2 to ensure that the revised acceptance are complemented with supporting FSAR data. The response should commit to a revision of Tables 9.3.2-1 and 9.3.2-2 and include their citation in Test No. 204 to ensure consistency.

14.02-159

Follow-up to RAI 313, Question 14.02-140

The response to RAI 14.02-140 refers to the criteria said to be contained in FSAR Section 9.3.2, Table 9.3.2-2 (Secondary Side), but needs to include Table 9.3.2-1 for the primary side. The test is for failed fuel detection and the response should cite FSAR Table 9.3.2-1 (Primary Side) since Test No. 205 is for sampling the primary system. Omitting a citation of Table 9.3.2-1, results in the definition of an incomplete set of acceptance criteria. In addition, the current

version of Table 9.3.2-1 does not provide this level of detail and the response does not commit to updating Table 9.3.2-1 to ensure that the revised acceptance are complemented with supporting FSAR data. Finally, the response refers to FSAR Section 11.5, Table 11.5-1 for supporting information. However, the current version of Table 11.5-1 does not provide this level of detail. The response should commit to a revision of Tables 9.3.2-1 and 11.5-1 and include their citation in Test No. 205 to ensure consistency.

14.02-160

Follow-up to RAI 330, Question 14.02-144

The response to RAI 330 question 14.02-144 related to Test #143, the term safety related was added to the prerequisite section. The term adds some confusion as to which radiation monitors are safety-related or how the radiation monitors are part of the safety-related monitoring system. Regulatory Guide 1.206 Part, C.I.14.2.12, Individual Test Descriptions, states that the COL applicant's test abstracts should emphasize SSCs and design features which meets any of the eight criteria. Criterion (6) states that SSC's and design features which "process, store, control, measure, or limit the release of radioactive materials." Since the installed radiation monitoring system measures and limits the release of radioactive materials by warning workers of dose rate increases, the staff finds the added term of safety-related misleading.

14.03.02-44

Follow-up to RAI 230, Question 14.03.02-13

The staff review of U.S EPR FSAR, Tier 1, Section 2.1 determined that the design descriptions and ITAAC tables were too brief and lacked key design information. In order to meet the guidance of SRP 14.3.2, the staff in RAI 132, Question 14.03.02-11-1 requested that the applicant revise and augment Section 2.1 with additional information including a description of the design loads, critical dimensions and building protective features. The applicant responded with additional information including what it called key dimensions. This response addressed some but not all of the staff’s concerns. As a follow up to the applicant’s response, the staff in RAI 230, Question 14.03.02-13 requested that the applicant provide additional information since it was not clear if all key dimensions had been provided or what the safety significance was for the dimensions that were provided. The applicant’s response was that structural key dimensions include the overall building dimensions (i.e., length, width, and height) and those dimensions confirmed by the structural design of the critical sections in U.S. EPR FSAR Tier 2, Appendix 3E. The applicant stated that the overall building dimensions are key dimensions because they confirm the building size for global stability evaluations. Critical sections are those portions of individual Seismic Category I structures (i.e., shear walls, floor slabs and roofs, structure-to-structure connections) that prevent or mitigate consequences of postulated design basis accidents, are expected to experience the largest structural demands during design basis conditions, or are needed to evaluate a complete design. The overall building dimensions and the key dimensions of the critical sections defined in U.S. EPR FSAR Tier 2, Appendix 3E define the structural key dimensions for the Seismic Category I structures. The staff, however, believes the dimensional information is incomplete and requests that the following additional information be provided:

a. In Tier 1, Section 2.1 the applicant should define what constitutes a key dimension or a critical section for a structure.
b. For the reactor building structures, critical sections have been identified in Appendix 3E but are not included in the tables or figures of Tier 1, Section 2.1. These are the equipment hatch and typical cylinder wall and buttress. The applicant should either include these or justify why they are not included.
c. The critical sections of the Reactor Building Internal Structure discussed in Appendix 3E.
d. There are no critical dimensions provided for the Reactor Pressure Vessel cavity walls or floor. The applicant should explain why these were not provided and why this portion of the Reactor Building is not considered to be a critical element of the Reactor Building design.
e. The connections of the roofs of the Fuel Building and Safeguards Building 2 and 3 to the Reactor Shield Building are identified as critical sections in Appendix 3E but are not included in the Tables or Figures of Section 2.1. The applicant should either include these or justify why they are not included.
f. The applicant is requested to identify any additional critical sections that need to be included in Tier 1, Section 2.1. This includes critical sections applicable to the EPGB and ESWB structures.
g. The title of Table 2.1.1-2 is “Key Dimensions of NI Foundation Footprint” but the table also includes elevations of structures. The title of the table should be corrected.
h. In Figure 2.1.1-7 more information is required for the dimension S4, as the detail is not clear from the picture.

The existing commitment wording of Item 3.4 of Table 2.1.1-4 is identical to that under the Acceptance Criteria column. Consistent with other commitment wording, Item 3.4 of Table 2.1.1-4 should state that the NI structures include features which allow the plant to be shut-down safely and maintained in a cold safe shut-down following a pipe break accident with loss of offsite power.

14.03.02-45

Follow-up to RAI 132, Question 14.03.02-11(2)

GDC 4 states in part that structures systems and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping and discharging fluids. The applicant in its response to **RAI 132, Question 14.03.02-11(2)** identified certain design features that have been identified as internal hazards barriers. These are shown in Revision 1 to U.S EPR FSAR, Tier 1, Figures 2.1.1-20 to 2.1.1- 44, Figure 2.1.2-4 and Figure 2.1.5-6. It is not clear that all internal hazard barriers have been identified. For instance, it would seem that some of the walls within the Reactor Building are needed to provide missile protection for internal missiles, yet none have been identified in the figures presented. The applicant should state if all barriers are shown and if not to provide justification as to why they are not. In addition, SRP Section 14.3.2, Acceptance Criteria 2 states that key dimensions of structures be provided. As the safety function of seismic Category I structures includes providing barriers for protection against missile impact, pipe whip, jet impingement, flooding, etc., the key dimensions of these safety-related features should be included in the design descriptions and require verification in the ITAAC tables. The approach should be similar to what has been done for radiation barriers listed in Tier 1, Table 2.1.1-3. The staff is requesting that this information be provided not only for the NI Common Basemat Structures, but also for the EPGB and ESWB.

Finally, it appears from the markup of Table 2.1.1-4, Item 3.5 provided in the response to **RAI 230, Question 14.03.02-22**, that the applicant may have deleted Table 2.1.1-6 (Rooms with Jet Shields or Pipe Restraints) from the Tier 1 material. Since this information is also needed to meet GDC 4 and was the only information in Tier 1 that identified these protective features, the applicant is requested to include this table or provide justification as to why the table was deleted.

14.03.02-46

Follow-up to RAI 230, Question 14.03.02-25

In Revision 1 to U.S EPR FSAR, Tier1, Item 2.2 in Table 2.1.1-8 for the Reactor Building addresses prevention of water ingress into the core melt spreading area. Under the "Acceptance Criteria" column, it references a watertight door shown in Figure 2.1.1-4. However, the door is not shown in the referenced figure. In **RAI 230, Question 14.03.02**-25 the staff requested that the figure be corrected. In response to the staff request, the applicant stated that the water tight door identified in U.S. EPR FSAR Tier 1, Section 2.1.1, Item 2.2 and Table 2.1.1-8, Item 2.2 is not a safety-significant design feature and should not be included as part of the ITAAC item. Therefore, it stated that the reference to the watertight door would be removed from U.S. EPR FSAR Tier 1, Section 2.1.1, Item 2.2 and Table 2.1.1-8, Item 2.2. In SRP Section 14.3, Appendix C.I.A.iii, Item (6) it states that severe accident features should be described in the design description, and the basic configuration ITAAC should verify that they exist. The staff notes that other severe accident features have been included in the ITAAC tables, such as the concrete support structures that limit the downward expansion of the lower head. Since the watertight door is a feature intended to mitigate a severe accident the staff is requesting that the applicant include it in the design description and its existence be confirmed by ITAAC.

14.03.02-47

Follow-up to RAI 230, Question 14.03.02-29

In **RAI 230, Question 14.03.02-29, the staff** requested that a requirement for a final inspection and reconciliation of the as-built condition to the final design basis loads be added to the ITAAC tables. In its response, the applicant referred to its response to **RAI 230, Question 14.03.02-28.** The response to **RAI 230, Question 14.03.02-28** does not address this issue. To ensure the requirements of GDC 2, GDC 4 and GDC 50 have been met and the guidance of SRP 14.3.2, SAC-03 has been implemented, the applicant is requested to add under the Inspections, Tests, Analyses column in Tables 2.1.1-8, 2.1.1-11, 2.1.1-4.2, 2.1.1-10, 2.1.1-11, 2.1.2-3 and 2.1.5-3 a statement which requires that a final analysis be performed to verify that the as-built condition of the structure as shown on final as-built construction drawings is acceptable under the application of the structure's final design basis loads.

14.03.02-48

Follow-up to RAI 230, Question 14.03.02-15

In SRP Section 14.3.2, SAC-08, for internal flood, it states that ITAAC should require inspections to verify that penetrations in division walls are at least 2.5 M above the floor and safety-related electrical, instrumentation, and control equipment are located at least 20 cm above the floor surface. The staff in **RAI 230, Question 14.03.02-15** requested that inspections

for these features be added to the ITAAC tables or that the applicant provide justification for not doing so. The applicant's response was that the requirements for penetration and equipment locations are not part of the U.S. EPR design approach for protection against internal flooding which is described in U.S. EPR FSAR, Tier 2, Section 3.4.1. Therefore, an ITAAC to confirm that these requirements are met in U.S. EPR FSAR, Tier 1 is not appropriate. The staff reviewed U.S. EPR FSAR, Tier 2, Section 3.4.1 in which it states that the principal protective measure for Seismic Category I buildings is physical separation of the redundant safe shutdown systems and components. Starting on the bottom of page 3.4-1, it states that division walls below elevation 0 ft, 0 inches provide separation and serve as flood barriers to prevent flood waters spreading to adjacent divisions. However, it goes on to state that these division walls are water tight, have no doors, and a *minimal number of penetrations*. Thus, it appears penetrations may be present in which case it might be possible for water to flow from one division to another division and thus compromise the design approach for protection from internal flooding through physical separation. The applicant needs to state how water is prevented from entering adjacent safety divisions through these penetrations and why the acceptance criteria of SRP 14.3.2, SAC-08 need not be met for the U.S. EPR design.

14.03.02-49

Section C.I.3.8.1.7 of Regulatory Guide 1.206 states in part that the applicant should describe the testing and ISI, including milestones, for the containment, with emphasis on the extent of compliance with Articles CC-6000 and CC-9000 of the ASME Code, Section III, Division 2. In Revision 1 of U.S EPR FSAR, Tier 1, Table 2.1.1-8, Item 2.6, under the Inspections, Tests, Analyses column, subparagraph (c) it states that a Structural Integrity Test (SIT) of the RCB post-tensioned pre-stressed concrete structure will be performed. Under the Acceptance Criteria column in subparagraph (c), it states that the RCB post-tensioned, pre-stressed concrete structure maintains its integrity at the design pressure of at least 62 psig. To meet the SIT requirements of the ASME Code, the containment needs to be tested at 115% of the design pressure and meet the acceptance criteria of Subsubarticle CC-6410. Subparagraph (c) of the Acceptance Criteria as currently written is incorrect. The applicant is requested to revise subparagraph (c) to reflect the SIT requirements of the ASME Code, Section III, Division 2 Code and the acceptance criteria of Subsubarticle CC-6410.

14.03.02-50

Follow-up to RAI 132, Question 14.03.02-11(1)(h)

GDC 4 states in part that structures systems and components shall be appropriately protected against dynamic effects, including the effects of missiles, pipe whipping and discharging fluids. In its response to **RAI 132, Question 14.03.02-11 (1), part h,** the applicant stated that the U.S. EPR FSAR, Tier 1, Section 2.1 would be revised to provide additional details regarding the basis for protection against pressurization effects associated with postulated rupture of pipes. In the revised design description write-up of Section 2.1.1 and associated subsections, there are references to accident pressure loads and pipe break loads. However, there is nothing that specifically addresses cubicle pressurization loads and the basis for protection against pressurization effects. Also, in revised ITAAC Tables 2.1.1-4 and 2.1.1-8, cubicle pressurization effects have not been explicitly included. Table 2.1.1-4 provides ITAAC for the Nuclear Island which includes the Reactor Building. Item 3.4 in Table 2.1.1-4 under "Commitment Wording" states that a pipe break hazards analyses summary exists that concludes the plant can be safely shut down and maintained in a cold safe shutdown following a pipe break with loss of

offsite power. Under "Inspection, Analysis or Test," it states that a pipe break hazards analysis will be performed. Under "Acceptance Criteria", it addresses pipe stresses in the penetration area, pipe whip restraints and jet impingement shields, environmental effects of postulated pipe rupture, and loads on safety-related SSCs. Cubicle pressurization is not mentioned. Under "Commitment Wording," it should state what the pipe break hazards analysis includes and address cubicle pressurization. Under "Inspection, Analysis or Test," a second activity should be added requiring that an inspection of as-installed features that provide protection against pipe break effects including the effects of cubicle pressurization will be performed and compared to the requirements identified in the pipe break hazards analysis. Under "Acceptance Criteria," cubicle pressurization should be addressed. Item 3.5 in Table 2.1.1-4 appears to address jet impingement shields and pipe whip restraints for certain rooms listed in Table 2.1.1-6. As a result, it is not clear if Item 3.4 addresses all other jet impingement shields and pipe whip restraints or is not supposed to address them at all. The applicant needs to revise the wording in the "Commitment Wording," "Inspection, Analysis or Test" and "Acceptance Criteria" columns for items 3.4 and 3.5 so it is clear as to which aspect of pipe hazards analysis each of these ITAAC items is to address.

14.03.02-51

Follow-up to RAI 230, Question 14.03.02-26

Section C.I.3.8.1.7 of regulatory Guide 1.206, states in part that the applicant should describe the testing and ISI, including milestones, for the containment, with emphasis on the extent of compliance with Articles CC-6000 and CC-9000 of the ASME Code, Section III, Division 2. In its response to **RAI 230, Question 14.03.02-26,** the applicant failed to address the need to provide instrumentation to measure strains for prototype containments during the SIT as required by ASME Code, Section III, Division 2, Subsubarticle CC-6370. The applicant is requested to address the requirement to measure strains for prototype containments and if strains are not to be measured provide justification for not doing so. As part of that same response, item 2.5 of Table 2.1.1-8 under Acceptance Criteria in subparagraph (d) the FSAR has been revised to state that the RCB including the liner plate and penetration assemblies maintains its integrity at the design pressure of at least 62 psig. However, to meet the SIT requirements of ASME Code, Section III, Division 2, the containment is to be tested at 115% of the design pressure and meet the acceptance criteria of Subsubarticle CC-6410. The applicant is requested to revise subparagraph (d) under Acceptance Criteria to reflect the SIT requirements of the ASME Code, Section III, Division 2 Code and the acceptance criteria of Subsubarticle CC-6410.

14.03.03-35

[Intentionally Deleted]

14.03.03-36

[Intentionally Deleted]

14.03.03-37

In EPR FSAR Tier 2, Section 3.9.3.1, Areva indicated that a COL applicant referencing the US EPR design certification will provide summary of the maximum total stress, deformation, and cumulative usage factor value for each ASME Code Class I components. Corresponding ITAAC is provided in Tier 1, Table 2.2.1-5, item 3.11, to address a) fatigue analysis and b) for

components identified as ASME Code Class I, operating modes where peak stress are within 10 percent of allowable have been identified. The staff found that ASME Code Class I components are also located in other systems including, but not limit to, Safety Injection System and Residual Heat Removal System (Tier 1, Section 2.2.3) and Extra Borating System (Tier 1, Section 2.2.7). However, an ITAAC similar to Tier 1, Table 2.2.1-5, item 3.11 addressing fatigue design and analysis is not included in those sections. The staff requests the applicant to include the ITAAC addressing the fatigue issue for ASME Code Class I components in appropriate sections in Tier 1 of the FSAR.

14.03.03-38 thru 14.03.03-45 were issued in RAIs 255, 260, and 307.

14.03.03-46

Follow up to RAI 260, Question 14.03.03-39.

In its response to RAI 14.03.03-39, the applicant included reference of SQDP, EQDP, or analyses in the ITA and AC for item b of the ITAAC related to the seismic Category I components. In its response, the applicant also stated that this seismic qualification ITAAC were clarified and standardized in the Response to RAI 210, Supplement 1, Question 14.03.02-12. However, the staff found the response not acceptable and there are two concerns.

1) In the ITAAC proposed, the applicant did not verify whether the seismic category I components will be located in a seismic Category I building. Thus, the staff requests the applicant to amend the ITA and AC of item b of the ITAAC to reflect that the seismic Category I components should be installed in the seismic Category I building as specified on the construction drawing.

2) The applicant proposed in the ITA and AC of item b of the ITAAC that the deviations will be reconciled to the seismic qualification reports (SQDP, EQDP, or analyses). The proposed clarifies that the reconciliation will be performed to compare the deviation with the SQDP, EQDP, or analyses and the staff found this portion of statement is acceptable. However, simply indicating that deviations will be reconciled, as proposed by the applicant, is insufficient. The staff believes that the proper acceptance criteria should be such that the conclusion of reconciliation reflects that the components, including anchorage, are seismically bounded by the tested or analyzed conditions. The staff was aware of and reviewed several RAI Questions (14.03.02-12, 14.03.06-27, 14.03.03-02, and 14.03.04-03) and AREVA's responses related to the Seismic qualification ITAAC. In all the original questions (14.03.06-27 and 14.03.04-03), the applicant was requested to include the statement "equipment including anchorage is seismically bounded by tested or analyzed conditions" in the ITA and AC of item b of the seismic qualification ITAAC. However, AREVA did not make the acceptable changes in the responses to the aforementioned questions. Thus, the applicant is requested to amend the ITA and AC of item b to reflect that "the reconciliation concludes that components identified in Table x.x.x-x, including anchorage, are seismically bounded by the tested or analyzed conditions".

14.03.08-2

Follow-up to RAI 43, Question 14.03.08-1

In response to RAI 43, Question 14.3.8-1, Supplement 1, Revision 0, the applicant revised Tier 1 to include additional detail for the Radiation Monitoring System, specifically ITAAC for the safety-related radiation monitors and a sentence describing the non safety related monitors.

This revision is satisfactory except for the following which is needed to demonstrate compliance with 10 CFR Part 52.47(b)(1).

As detailed in Staff RAI 292, Question 14.3.7-33, dated September 18, 2009, the staff evaluation of the applicant's responses to prior RAIs (RAI No. 43, 105, and 116) indicates that the approach being used in addressing ITAAC is based on previous certified designs and that the EPR FSAR Tier 1 incorporates safety significant features credited to comply with the requirements of 10 CFR Parts 20, 50, 52, 73, or 100. However, 10 CFR Part 52.47(b)(1) states that a design certification application must contain the following:

> "*The proposed inspections, tests, and analyses, …that the licensee shall perform, and the acceptance criteria that are necessary and sufficient to provide reasonable assurance that, if the inspections, tests, and analyses are performed and the acceptance criteria met, a facility that incorporates the design certification has been constructed and will be operated in conformity with the combined license, the provisions of the Act, and the Commission's rules and regulations*."

The staff concludes that Tier 1 safety significant radiation protection structures, systems and components (SSC), which the applicant has credited for complying with the requirements of 10 CFR Part 20, do not contain sufficient detail to provide reasonable assurance that the facility will be constructed and operated in accordance with the Commission's rules and regulations, specifically 10 CFR Part 20, GDC 63 and GDC 64. For this reason, RG 1.206 Part C.II states that additional Tier 1 and ITAAC detail should be provided for those SSCs necessary to demonstrate compliance with 10 CFR Part 20, although they are not safety-related SSCs. As an example, the AP1000 certified design which the applicant referenced in its response to RAI 43, Question 14.3.8-1, has recognized this and, therefore, includes Tier 1 information and ITAAC for the non-safety related radiation monitoring system relevant to demonstrating the design's compliance with 10 CFR Part 20, GDC 63, and GDC 64 in accordance with 10 CFR Part 52.47(b)(1). Similarly, the ESBWR Design Certification Document (Rev. 6) includes specific ITAACs for area and airborne radiation monitors. The staff maintains that these radiation monitors are equivalent in purpose and safety significance to corresponding monitors in the U.S. EPR design, for which FSAR Tier 1, Rev. 1 does not provide equivalent ITAACs. Therefore the EPR's non-safety related radiation monitoring system should include additional Tier 1 information and ITAACs in order to demonstrate compliance with NRC regulations.

It is recognized that the level of Tier 1 and ITAAC details for these systems will be less than that required for safety related SSCs. However, without sufficient details the staff cannot complete its evaluation and conclude, with reasonable assurance, that if the tests and inspections were performed and acceptance criteria were met, that all design commitments will be fulfilled and that the plant will be built and operated in accordance with the design certification and comply with applicable NRC regulations. Accordingly, the applicant is requested to provide Tier 1 information and ITAACs for the U.S. EPR radiation monitoring system as described above.

14.03.08-3

FSAR, Tier 1, Table 2.4.22-1, Radiation monitoring System Equipment mechanical design, lists the containment high range dose rate monitors as located in the reactor building. However, according to FSAR, tier 2, section 12.3 of the FSAR, the reactor building includes the annulus and the containment building. Item II.F.1.3 states that the high range monitors should be located inside containment. Please modify this and any related tables so that they state the containment high range dose rate monitors are located inside containment.