## ArevaEPRDCPEm Resource

**From:** Pederson Ronda M (AREVA NP INC) [Ronda.Pederson@areva.com]
**Sent:** Wednesday, April 15, 2009 5:54 PM
**To:** Getachew Tesfaye
**Cc:** BENNETT Kathy A (OFR) (AREVA NP INC); DELANO Karen V (AREVA NP INC); KOWALSKI David J (AREVA NP INC)
**Subject:** Response to U.S. EPR Design Certification Application RAI No. 169, FSAR Ch 9, Supplement 1
**Attachments:** RAI 169 Supplement 1 Response US EPR DC.pdf

Getachew,

AREVA NP Inc. provided responses to 2 of the 3 questions of RAI No. 169 on February 23, 2009. The attached file, "RAI 169 Supplement 1 Response US EPR DC.pdf" provides a technically correct and complete response to the remaining question, as committed.

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 169 Question 09.05.01-66.

The following table indicates the respective pages in the response document, "RAI 169 Supplement 1 Response US EPR DC.pdf," that contain AREVA NP's response to the subject question.

| Question # | Start Page | End Page |
|---|---|---|
| RAI 169 — 09.05.01-66 | 2 | 3 |

This concludes the formal AREVA NP response to RAI 169, and there are no questions from this RAI for which AREVA NP has not provided responses.

Sincerely,

*Ronda Pederson*
ronda.pederson@areva.com
Licensing Manager, U.S. EPR Design Certification
**AREVA NP Inc.**
An AREVA and Siemens company
3315 Old Forest Road
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

---

**From:** WELLS Russell D (AREVA NP INC)
**Sent:** Monday, February 23, 2009 4:51 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. 169, FSAR Ch 9

Getachew,

Attached please find AREVA NP Inc.'s response to the subject request for additional information (RAI). The attached file, "RAI 169 Response US EPR DC.pdf" provides technically correct and complete responses to 2 of the 3 questions.

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 169 Questions 09.02.05-2 and 09.05.01-67.

The following table indicates the respective pages in the response document, "RAI 169 Response US EPR DC.pdf," that contain AREVA NP's response to the subject questions.

| Question # | Start Page | End Page |
|---|---|---|
| RAI 169 — 09.02.05-2 | 2 | 2 |
| RAI 169 — 09.05.01-66 | 3 | 3 |
| RAI 169 — 09.05.01-67 | 4 | 6 |

A complete answer is not provided for 1 of the 3 questions. The schedule for a technically correct and complete response to this question is provided below.

| Question # | Response Date |
|---|---|
| RAI 169 — 09.05.01-66 | April 15, 2009 |

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
Lynchburg, VA 24506-0935
Phone: 434-832-3694
Cell: 434-841-8788

---

**From:** Getachew Tesfaye [mailto:Getachew.Tesfaye@nrc.gov]
**Sent:** Thursday, January 22, 2009 9:01 AM
**To:** ZZ-DL-A-USEPR-DL
**Cc:** Edward McCann; Robert Radlinski; Larry Wheeler; Peter Wilson; Peter Hearn; Joseph Colaccino; Meena Khanna; ArevaEPRDCPEm Resource
**Subject:** U.S. EPR Design Certification Application RAI No. 169 (1822, 1901),FSAR Ch. 9

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on January 6, 2009, and discussed with your staff on January 15, 2009. No changes were made to the Draft RAI Questions as a result of that discussion. 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:** 410

**Mail Envelope Properties** (5CEC4184E98FFE49A383961FAD402D31D58731)

**Subject:** Response to U.S. EPR Design Certification Application RAI No. 169, FSAR Ch 9, Supplement 1
**Sent Date:** 4/15/2009 5:54:15 PM
**Received Date:** 4/15/2009 5:54:19 PM
**From:** Pederson Ronda M (AREVA NP INC)

**Created By:** Ronda.Pederson@areva.com

**Recipients:**
"BENNETT Kathy A (OFR) (AREVA NP INC)" <Kathy.Bennett@areva.com>
Tracking Status: None
"DELANO Karen V (AREVA NP INC)" <Karen.Delano@areva.com>
Tracking Status: None
"KOWALSKI David J (AREVA NP INC)" <David.Kowalski@areva.com>
Tracking Status: None
"Getachew Tesfaye" <Getachew.Tesfaye@nrc.gov>
Tracking Status: None

**Post Office:** AUSLYNCMX02.adom.ad.corp

| **Files** | **Size** | **Date & Time** |
|---|---|---|
| MESSAGE | 4075 | 4/15/2009 5:54:19 PM |
| RAI 169 Supplement 1 Response US EPR DC.pdf | 689657 | |

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

**Response to**

**Request for Additional Information No. 169, Supplement 1**

**01/22/2009**

**U. S. EPR Standard Design Certification**
**AREVA NP Inc.**
**Docket No. 52-020**
**SRP Section: 09.02.05 - Ultimate Heat Sink**
**SRP Section: 09.05.01 - Fire Protection Program**

**Application Section: FSAR Ch. 9**

**QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)**
**QUESTIONS for Fire Protection Team (SFPT)**

**Question 09.05.01-66:**

The response to RAI No. 25 for Question 09.05.01-53 provided justification for using the fire protection system diesel fire pumps, water storage tanks, distribution piping, and associated equipment as the water supply for the standpipes and hose systems for manual fire suppression capability in all plant areas containing systems and components required for safe plant shutdown in the event of an SSE. This response stated that the U.S. EPR FPS is not Seismic Category I because it does not meet any of the criteria stated in RG 1.29, Regulatory Position 1. This response then states that "Pumps, water storage tanks, and distribution piping in the U.S. EPR FPS that provide fire protection capacity to areas of the U.S. EPR containing Seismic Category I equipment required for safe plant shutdown are classified as Seismic Category II because they meet the criteria in RG 1.29, Regulatory Position 2."

The above equipment is designated as Seismic Category II as per RG 1.29 but the system must remain functional and not just maintain structural integrity following an SSE. The above equipment could also be designed to meet the intent of RG 1.29 Seismic Category I and, therefore, be seismically qualified. This response states that the applicable FPS piping, piping supports, and valves are designed in accordance with ASME B31.1 and function following a SSE which is in accordance with RG 1.189 Regulatory Position 3.2.1 and Section B's Conditions of Fire Occurrence. Fire water storage tanks, diesel fire pumps, and associated equipment other than piping, piping supports, and valves are not within the scope of ASME B31.1.

Designate the fire water storage tanks, diesel fire pumps, and associated equipment other than piping, piping supports, and valves that are within the scope of ASME B31.1 as Seismic Category I or provide the method to seismically qualify the equipment. Ensure method considers any internal vibrational effects that could render the equipment non-functional and explain how it is different from full seismic qualification.

**Response to Question 09.05.01-66:**

As noted in the response to RAI 25, Supplement 1, Question 09.05.01-53, the fire water storage tanks, diesel fire pumps, and distribution piping do not meet any of the criteria stated in RG 1.29, Regulatory Position 1. Additionally, the U.S. EPR fire protection system (FPS) is not a safety-related system as defined in 10 CFR 50.2; its primary design functions do not include use that effects safe shutdown, or prevents or mitigates the consequences of accidents that could cause offsite exposures in excess of regulatory limits. Therefore, there is no regulatory basis for classifying the fire water storage tanks or the fire pumps and associated equipment as Seismic Category I. Rather, as noted in the response to RAI 25, Supplement 1, Question 09.05.01-53, these structures, systems and components (SSC) are classified as Seismic Category II in accordance with RG 1.29.

The fire water storage tanks and the fire pumps and associated equipment are designed and constructed such that the safe shutdown earthquake (SSE) would not cause the failure of these portions of the FPS to provide fire protection flow via system standpipes in those areas of the plant that contain safety-related Seismic Category I safe shutdown equipment at the flow rates required by RG 1.189.

Methods on seismic qualification of equipment are described in U.S. EPR FSAR Tier 2, Section 3.10. Specific information on the seismic design of fire water storage tanks, diesel fire pumps,

and associated equipment other than piping, piping supports, and valves that are within the scope of ASME B31.1 is provided below.

(1) Fire water storage tanks:

Seismic design of the fire water storage tanks is in accordance with AWWA D100-2005, referenced by NFPA 22, "Standard for Water Tanks for Private Fire Protection," (Ref. 83 in RG 1.189).

(2) Fire pumps and associated equipment:

Seismic design of the diesel-driven fire pumps, and the associated diesel engines and fuel tanks for these pumps, including their attachments and supports, is in accordance with ASCE 43-05, "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities," Section 8.0, Equipment and Distribution Systems.

The limiting acceptable deformation, displacement or stress for the fire pump and associated equipment support structures is characterized by Limit State C of the standard.

(3) Batteries and racks:

Seismic design of the diesel-driven fire pump, including the battery racks and anchors, is in accordance with ASCE 43-05, "Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities," Section 8.0, Equipment and Distribution Systems. The limiting acceptable deformation, displacement or stress for the battery support structures, including the anchorage, is characterized by Limit State C of the standard.

U.S. EPR FSAR Tier 2, Table 3.2.2-1—Classification Summary, Fire Water Distribution System, will be revised to add the following standards: "ASCE/SEI Std. 43-05 and ANSI/AWWA D100-2005."

U.S. EPR FSAR Tier 2, Section 9.5.1.2.1 will be revised to specify the methods for seismic design of the fire water storage tanks, and of the fire pumps and associated equipment.

U.S. EPR FSAR Tier 2, Section 9.5.1.7 will be revised to reflect the addition of two new references.

**FSAR Impact:**

U.S. EPR FSAR Tier 2, Table 3.2.2-1, Section 9.5.1.2.1 and Section 9.5.1.7 will be revised as described in the response and indicated on the enclosed markup.

# U.S. EPR Final Safety Analysis Report Markups

**Table 3.2.2-1—Classification Summary**
**Sheet 107 of 180**

| KKS System or Component Code | ~~System or Component~~ SSC Description | Safety Classification (Note 15) | Quality Group Classification | Seismic Category (Note 16) | 10 CFR 50 Appendix B Program | Location (Note 17) | Comments/ Commercial Code |
|---|---|---|---|---|---|---|---|
| GK | GK System Components located in the UJH and UBP | NS | E | NSC | No | UJH, UBP | ANSI/ASME B31.1(6) |
| **SGA, SGB** | **Fire Water Distribution System** | | | | | | |
| SGA | Fire Water Distribution System, Conventional Area (Not Providing Safe Shutdown Earthquake Protection) | NS-AQ | D | NSC | No | USG, UZT | NFPA 20, 2007 Ed. NFPA 22, 2003 Ed. NFPA 24, 2007 Ed. NFPA 25, 2002 Ed. NFPA 804, 2006 Ed. |
| SGA | Fire Water Distribution System, Conventional Area (Safe Shutdown Equipment Protection) | NS-AQ | D | II | Yes | USG, UZT | NFPA 20, 2007 Ed. NFPA 22, 2003 Ed. NFPA 24, 2007 Ed. NFPA 25, 2002 Ed. NFPA 804, 2006 Ed. ~~NFPA,~~ ANSI/ASME B31.1(6); ASCE/SEI Std. 43-05; ANSI/AWWA D100-2005 Required for safe shutdown earthquake protection |

09.05.01-66

Fire hose meets the applicable criteria of NFPA 1961 (Reference 26) and is hydrostatically tested in accordance with the applicable guidance of NFPA 1962 (Reference 27).

Standpipe and hose systems in areas containing equipment required for safe plant shutdown following an SSE are designed to be functional following an SSE and capable of providing flow to at least two hose stations (approximately 75 gpm per hose stream). The standpipe and hose stations in these areas, the water supply and distribution piping, and the supports and valves, as a minimum, satisfy ASME B31.1 (Reference 32). This is accomplished by manually realigning valves to isolate non-seismically qualified portions of the FPS from the seismic portions of the system and manually starting the diesel fire pumps.

09.05.01-66

To comply with this requirement, portions of the fire protection water supply and water distribution system are designed to satisfy, as a minimum, the following requirements ~~of ASME B31.1 as follows~~:

- Seismic design of the fire water storage tanks is in accordance with AWWA D100-2005 (Reference 45), referenced by NFPA 22 (Reference 6), "Standard for Water Tanks for Private Fire Protection," (refer to RG 1.189).~~The two fire water storage tanks (Part of USG) and their associated piping, supports and valves are designed to remain functional following an SSE.~~

- The fire pump house (Part of USG) is designed in accordance with ASCE 43-05 (Reference 44), with the seismic demand on the structure calculated for the site SSE.~~to satisfy the requirements of a seismically qualified structure.~~

- The two diesel fire pump drivers and fuel tanks, including their attachments and supports, are designed for seismic loads in accordance with ASCE 43-05. The limiting acceptable deformation, displacement or stress for the equipment support structures is characterized by Limit State C of the standard. Seismic demand on the SSC being evaluated is based on the SSE for the site.~~The two diesel fire pumps and associated pipe, supports and valves are designed to remain functional following an SSE. This includes the diesel day tanks (fuel supply) for each pump and associated piping, valves and supports and the diesel fire pump batteries for each pump which are located in the fire pump house.~~ The diesel pumps are design to be started manually following an SSE utilizing the pump batteries. Isolation valves which isolate the diesel fire pumps from the motor driven fire pump are designed to remain functional so that the cross connections to the motor driven pump can be manually closed after an SSE.

- Seismic design of the battery racks and anchors is in accordance with ASCE 43-05. The limiting acceptable deformation, displacement or stress for the battery support structures, including the anchorage, is characterized by Limit State C of the standard. Seismic demand on the SSC being evaluated is based on the SSE for the site.

33. IEEE Std 634, "IEEE Standard Cable Penetration Fire Stop Qualification Test," Institute of Electrical and Electronics Engineers, Inc., 2004.

34. IEEE Std 1202, "IEEE Standard for Flame-Propagation Testing of Wire and Cable," Institute of Electrical and Electronics Engineers, Inc., 2006.

35. UL 555, "Standard for Fire Dampers," Underwriters Laboratories, 2006.

36. UL 1479, "Standard for Fire Tests of Through-Penetration Firestops," Underwriters Laboratories 2003.

37. NUREG-0800, Standard Review Plan for the Review of Safety Analysis Reports for Nuclear Power Plants, U.S. Nuclear Regulatory Commission, 2007.

38. SECY 90-016, "Evolutionary Light-Water Reactor (QA) Certification Issues and Their Relationship to Current Regulatory Requirements," U.S. Nuclear Regulatory Commission, 1990.

39. NEI 00-01, Revision 1, "Guidance for Post-Fire Safe Shutdown Circuit Analysis," Nuclear Energy Institute, 2001.

40. NUREG/CR-6850, "Fire PRA Methodology for Nuclear Power Facilities," U.S. Nuclear Regulatory Commission, September 2005.

41. ANP-10266-A, "AREVA NP Inc. Quality Assurance Plan (QAP) for Design Certification of the U.S. EPR Topical Report," AREVA NP Inc, June 2007.

42. NFPA 804, "Standard for Fire Protection for Advanced Light Water Reactor Electric-Generating Plants," National Fire Protection Association Standards, 2006.

43. NFPA 105, "Installation of Smoke Door Assemblies and Other Protective Openings," National Fire Protection Association Standards, 2007.

44. ASCE/SEI Std. 43-05, "Seismic Design Criteria for Structures, Systems and Components in Nuclear Facilities," American Society of Civil Engineers/Structural Engineering Institute, 2005.

45. ANSI/AWWA D100-2005, "Welded Steel Tanks for Water Storage," American National Standards Institute/American Water Works Association, 2005.

09.05.01-66