

ArevaEPRDCPEm Resource

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Sent: Wednesday, December 17, 2008 8:38 PM
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Subject: U.S. EPR Design Certification Application RAI No. 152 (1720), FSAR Ch. 9
Attachments: RAI_152_SBPA_1720.doc

Attached please find the subject requests for additional information (RAI). A draft of the RAI was provided to you on December 5, 2008. Since you are unable to support a telecon within a reasonable period of time, the RAI is issued as final with the following change: Draft RAI Questions 09.05.04-8 is deleted since it is a duplicate of Draft RAI Question 09.05.04-7. The schedule we have established for review of your application assumes technically correct and complete responses within 30 days of receipt of RAIs, excluding the time period of **December 20, 2008 thru January 1, 2009, to account for the holiday season** as discussed with AREVA NP Inc. For any RAIs that cannot be answered **within 45 days**, it is expected that a date for receipt of this information will be provided to the staff within the 45-day period so that the staff can assess how this information will impact the published schedule.

Thanks,
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Request for Additional Information No. 152 (1720), Revision 0

12/17/2008

U. S. EPR Standard Design Certification

AREVA NP Inc.

Docket No. 52-020

SRP Section: 09.05.04 - Emergency Diesel Engine Fuel Oil Storage and Transfer System

Application Section: 9.5.4

QUESTIONS for Balance of Plant Branch 1 (AP1000/EPR Projects) (SBPA)

09.05.04-7

General Design Criteria 2 requires that structures, systems, and component (SSC) important to safety be protected from natural phenomena, including earthquakes, tornados, hurricanes, and missiles. The applicant stated in FSAR Section 9.5.4.2.2, "Component Description," that there are sufficient features and administrative controls on the storage tank outside fill, vent, and pump-out lines to protect against damage from vehicles, tornado, missiles, floods, extreme cold, and accidental contamination. The applicant did not describe the protection from the effects of natural phenomena for the external portions of the DGFOSTS. Describe the protective features for the fill and vent connections from the effects of natural phenomena such as tornados, missiles and hurricanes.

The FSAR should be changed to reflect this information.

09.05.04-8

(Intentionally Deleted)

09.05.04-9

The applicant stated that there are no high energy lines in the EPGB; however, the applicant did not state that the DGFOSTS are protected from moderate energy line breaks. Since the applicant did not state that each DGFOSTS could withstand the effects of moderate energy line breaks in the area, the applicant did not demonstrate that the application meets the requirements of GDC 4.

Provide or reference a moderate energy line break analysis for the DGFOSTS.

09.05.04-10

SRP Section 9.5.4, "Emergency Diesel Engine Fuel Oil Storage and Transfer System," Revision 3 specifies the guidance of American National Standards Institute/ American Nuclear Society (ANSI/ANS)-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," regarding onsite fuel oil storage for each diesel generator. This standard specifies each emergency diesel generator (EDG) has onsite fuel-oil storage sufficient to operate the EDG following any design-basis accident and

loss of offsite power for either seven (7) days, or the time required to replenish the oil from sources outside the plant site following any limiting design-basis accident without interrupting the operation of the diesel, whichever is longer. The EDG is operated at its rated capacity. .

FSAR Tier 1 Section 2.5.4, Emergency Diesel Generator,” Tier 2 Section 9.5.4, “Diesel Fuel Oil Storage and Transfer system,” and Technical Specification Bases B3.8.3 provide apparently conflicting statements regarding the 7-day requirement as follows:

1. Sec. 9.5.4.1 - Following a LOOP, the system provides onsite storage and delivery of fuel oil for at least seven days of diesel generator operation at the continuous rating.
2. Sec. 9.5.4.2.1 - The fuel oil storage tanks for EDG 1 and 2 have a cross tie between them which consists of a removable spool piece and locked closed isolation valves. This allows for a 3.5 day fuel oil storage inventory in each fuel oil storage tank (plus 10 percent for surveillance testing) and still maintains a seven day fuel supply to the minimum required number of EDGs.
3. Sec. 9.5.4.2.2 - The capacity of each tank is based on the fuel consumption by one diesel engine for operation at the continuous rating for seven days, plus an additional ten percent for surveillance testing.
4. Sec. 9.5.4.4 - The capacity of each emergency fuel oil storage tank is sufficient for seven days of operation of one EDG at its continuous rating. Within this period, additional fuel can be delivered to the plant site by truck.
5. Sec. 9.5.4.4 - Fuel consumption is calculated in accordance with the method outlined in ANSI/ANS-59.51. (Note: There are two methods provided in ANSI/ANS-59.51.)
6. Sec. 9.5.4.6 - Particularly, the alarm labeled as fuel inventory below the required seven day quantity warns the operator to refill the storage tank.
7. Figure 9.5.4-1 shows the Fuel Oil Storage Tank component labeled as -- Capacity 7 days.
8. TS B3.8.3.1--The 3 1/2 day period is sufficient time to place the unit in a safe shutdown condition and to bring replenishment fuel from an on-site or off-site location.
9. FSAR Tier 1 Table 2.5.4-3 (ITAAC) Item 3.09 states "Each EDG fuel oil storage tank capacity is greater than the volume of fuel oil consumed by the EDG operating at the continuous rating for seven days." [Note: This ITAAC acceptance criteria appears to be at odds with item #2 above.]

The applicant needs to verify that each fuel oil storage tank has a sufficient quantity of fuel oil to operate the associated EDG at rated capacity for 7 days or the time required to replenish the fuel oil from sources outside the plant site following any limiting design-basis accident without interrupting the operation of the diesel, whichever is longer. The FSAR needs to be changed to address the above apparent conflicting statements, so that the fuel oil capacity is consistent throughout the FSAR.

09.05.04-11

Industry experience has shown that some drain/sample connections at the bottom of a tank have been connected to small internal standpipes inside the tank, such that the

drain/sample point was not really at the bottom of the tank, and water accumulated at the bottom of the tank and possibly above the fuel discharge pipe. The guidelines of NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability," state that fuel storage tanks have a gravity drain from the very bottom of the tank. The fuel outlet pipe or opening should be approximately 2 or 3 inches above the bottom of the water outlet pipe to allow some tank volume for settling of water. The applicant is asked to confirm that this guideline has been met in the EPR design and update the FSAR to state that the guideline has been met.

09.05.04-12

NUREG/CR-0660, "Enhancement of Onsite Emergency Diesel Generator Reliability." recommends Emergency Power Generating Building (EPGB) floors are painted with concrete or masonry type paint in all rooms to prevent concrete abrasive dust becoming airborne. The airborne dust had previously caused malfunctions of electrical contacts in existing nuclear power plants. Explain what design protective measures you have instituted that prevent concrete dust from becoming airborne in the EPGB. The FSAR should be changed to reflect this information.

09.05.04-13

SRP Section 9.5.4, "Emergency Diesel Engine Fuel Oil Storage and Transfer System," Revision 3, paragraph 9.5.4 I.1.G, specifies that the design include the capability to detect and control system leakage, including isolating system portions in the event of excessive leakage or component malfunction. Describe the system design for the capability to detect and control system leakage, including isolating system portions in the event of excessive leakage or component malfunction

The FSAR should be changed to reflect this information.

09.05.04-14

FSAR Tier 2 Chapter 16 Technical Specification Bases
B 3.8 ELECTRICAL POWER SYSTEMS
B 3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air
BASES
BACKGROUND states the following:

Each emergency diesel generator (EDG) is provided with a storage tank having a fuel oil capacity sufficient to operate that diesel for a period of 3 1/2 days while the EDG is supplying maximum post loss of coolant accident load demand discussed in FSAR Section 9.5.4.2. The maximum load demand is calculated using the assumption that a minimum of any two EDGs are available. This onsite fuel oil capacity is sufficient to operate the EDGs for longer than the time to replenish the onsite supply from outside sources; and

SRP Section 9.5.4, "Emergency Diesel Engine Fuel Oil Storage and Transfer System," Revision 3 specifies the guidance of standard ANSI/ANS-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators," regarding onsite fuel oil storage for each diesel generator. This standard specifies each emergency diesel generator (EDG) has onsite fuel-oil storage sufficient to operate the EDG following any design-basis accident and loss of offsite power for either seven (7) days, or the time required to replenish the oil from sources outside the plant site following any limiting design-basis accident without interrupting the operation of the diesel, whichever is longer. The EDG is operated at its rated capacity.

a) The specified fuel oil quantity of 3.5 days in the Technical Specification Bases is not in compliance with the guidelines specified in ANSI/ANS-59.51-1997, "Fuel Oil Systems for Safety-Related Emergency Diesel Generators." Justify the apparent inconsistency between your Technical Specification Bases and the ANSI standard.

b) Provide the methodology for factoring the assumption of two EDGs being available into the calculation for minimum fuel oil storage tank specified in TS 3.8.3 A as 47,000 to 55,000 gallons.

c) Technical Specification "3.8.3 Diesel Fuel Oil, Lube Oil, and Starting Air," Condition A states that "One or more EDGs with fuel level < 55,000 gal and > 47,000 gal in storage tank. The staff requests the applicant clarify that the fuel level is for the storage tank associated with that EDG only, not the combined capacity with a storage tank from any other EDG.

d) Technical specifications indicate that the minimum volume of diesel fuel in the day tank is 1350 gallons and 55,000 gallons for the fuel oil storage tank. Provide the technical basis and calculation information necessary to confirm these minimum values.

09.05.04-15

10 CFR 52.47(b) (1), "Contents of an application; technical information," requires that a DC application contain the proposed ITAAC that are necessary and sufficient to provide reasonable assurance that, if the ITAAC are performed and the acceptance criteria met, a plant that incorporates the design certification has been constructed and will be operated in conformity with the design certification, the provisions of the Act, and the Commission's rules and regulations.

FSAR Tier 1 Table 2.5.4-1 and Figure 2.5.4-1 show only one of the two fuel oil transfer pumps (for each EDG) as being in Tier 1. In this case, the ITAAC will not address the entire safety-related DGFOSTS, including the 2nd transfer pump or the safety-related duplex strainers and duplex filters, valves, instrumentation and alarms. Therefore, the ITAAC does not adequately address the entire safety-related DGFOSTS. The staff also notes that certified design material and ITAAC do not exist for other safety related and seismic category I SSC of the DGFOSTS, such as valves, filters and strainers, instrumentation and alarms.

In the absence of this ITAAC coverage, amend the certified design material and ITAAC presented in FSAR Tier I, Section 2.5.4, "Emergency Diesel Generator," to meet 10 CFR 52.47(b) (1)?

09.05.04-16

SRP Section 9.5.4, "Emergency Diesel Engine Fuel Oil Storage and Transfer System," Revision 3, paragraph 9.5.4 I.1.1 specifies that adequate and acceptable sources of fuel oil are available, including the means of transporting and recharging the fuel storage tank, following a design basis accident (DBA). The staff considers that the combined license (COL) applicant is responsible for this in that it is a site specific item. The applicant needs to make this a COL information item.