
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

APR1400 Design Certification

Korea Electric Power Corporation / Korea Hydro & Nuclear Power Co., LTD

Docket No. 52-046

RAI No.: 206-8216
SRP Section: 08.04 – Station Blackout
Application Section: 8.4
Date of RAI Issue: 09/09/2015

Question No. 08.04-10

Section 8.4.1.3 of the DCD Tier 2 states: “The AAC GTG will be manually connected to the designated Class 1E 4.16 kV switchgears (train A or train B) by the operator within 10 minutes from the beginning of the SBO event.” Section 2.6.6 of the DCD Tier 1 states: “The AAC source is started and connected manually to the Class 1E train A or train B within 10 minutes in the event of SBO.”

- a. NUREG NUREG-0800, Section 8.4.III.3 states that “available within 10 minutes of the onset of SBO’ means that circuit breakers necessary to bring power to safe-shutdown buses can be actuated in the control room within that period”. Please confirm that the circuit breakers necessary to bring power from the AAC GTG to the safe-shutdown buses can be actuated in the control room within 10 minutes of the onset of the SBO.
- b. Please modify the Tier 1 statement, “within 10 minutes in the event of SBO” to indicate that the AAC is connected within 10 minutes from the onset of the SBO.

Response

KHNP confirms that the alternate alternating current (AAC) gas turbine generator (GTG) will be connected to the safe-shutdown bus, the Class 1E 4.16 kV switchgear (1A or 1B), within 10 minutes of the onset of an SBO.

After the AAC GTG is started and brought up to rated speed and voltage within two minutes upon receipt of a start signal, operators will connect the AAC GTG to the selected 1E 4.16 kV bus by closing three circuit breakers in accordance with the emergency operating procedures (EOPs) either from the main control room (MCR) or remote shutdown room (RSR). These circuit breakers include: one between the AAC GTG and the non-Class 1E switchgear (3N) and two in series between the non-Class 1E switchgear (3N) and the Class 1E switchgear (1A or 1B).

KHNP will revise DCD Tier 1 Subsection 2.6.6 to clarify that the AAC GTG is connected to the safe-shutdown bus within 10 minutes of the onset of an SBO.

Impact on DCD

DCD Tier 1, Subsection 2.6.6 will be revised as shown in the Attachment.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

There is no impact on the Technical Specifications.

Impact on Technical/Topical/Environmental Reports

There is no impact on any Technical, Topical, or Environmental Report.

APR1400 DCD TIER 12.6.6 Alternate AC Source2.6.6.1 Design Description

The alternate ac (AAC) source supplies power to safety-related loads to maintain the plant in a safe shutdown condition during station blackout (SBO). The AAC source also provides power to the permanent non-safety (PNS) buses during a loss of offsite power (LOOP) condition. The AAC source can be connected to Class 1E trains and PNS trains as shown on Figure 2.6.1-1. The AAC source is a gas turbine generator (GTG) that is independent from the EDGs and the offsite power sources.

The AAC source is designed as follows:

1. The functional arrangement of the AAC source is as described in the Design Description of Subsection 2.6.6.1.
2. The AAC source is sized with sufficient capacity to accommodate SBO or LOOP conditions.
3. The AAC source is connected to the Class 1E train A or train B bus through two in series (one Class 1E circuit breaker at the Class 1E bus and the other non-Class 1E circuit breaker at the non-Class 1E AAC bus) circuit breakers during SBO condition.
4. The AAC source is started and connected manually to the Class 1E train A or train B bus within 10 minutes ~~in the event of~~ SBO.
5. The AAC source is installed in the separate building. of the onset of an
6. The GTG has sufficient fuel oil storage capacity to supply power to the required SBO loads for 24 hours.
7. The GTG fuel oil system is non safety-related and independent from that of the Class 1E EDGs.

APR1400 DCD TIER 1

Table 2.6.6-1 (1 of 3)

Alternate AC Source ITAAC

| Design Commitment | Inspections, Tests, Analyses | Acceptance Criteria |
|--|--|--|
| 1. The functional arrangement of the AAC source is as described in the Design Description of Subsection 2.6.6.1. | 1. Inspection of the as-built AAC source will be performed. | 1. The as-built AAC source conforms with the functional arrangement described in the Design Description of Subsection 2.6.6.1. |
| 2. The AAC source is sized with sufficient capacity to accommodate SBO or LOOP conditions. | 2.a Analyses will be performed to verify that the AAC source is capable of supplying power for SBO or LOOP conditions. | 2.a A report exists and concludes that the calculated size of the AAC source gives it the sufficient capacity to accommodate SBO or LOOP loads. |
| | 2.b Inspections will be performed to verify that the rating of the as-built AAC source is consistent with the analysis. | 2.b The rating of the as-built AAC source is consistent with the analysis. |
| 3. The AAC source is connected to the Class 1E train A or train B bus through two in series (one Class 1E circuit breaker at the Class 1E bus and the other non-Class 1E circuit breaker at the non-Class 1E AAC bus) circuit breakers during SBO condition. | 3. Inspection of the connection between as-built Class 1E train bus and as-built AAC source will be performed. | 3. The as-built AAC source is connected to the Class 1E train A or train B bus through two in series (one Class 1E circuit breaker at the Class 1E bus and the other non-Class 1E circuit breaker at the non-Class 1E AAC bus) circuit breakers. |
| 4. The AAC source is started and connected manually to the Class 1E train A or train B bus within 10 minutes in the event of SBO. | 4. Tests will be performed to verify that the as-built AAC source is started and connected manually to the as-built Class 1E train bus within 10 minutes of a simulated SBO event. | 4. The as-built AAC source is started and connected manually to the Class 1E train A or train B bus within 10 minutes of a simulated SBO event. |
| 5. The AAC source is installed in the separate building. | 5. Inspection of the location of the as-built AAC source will be performed. | 5. The as-built AAC source is located in the dedicated building which is separated from the EDGs. |

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