
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.: 243-8289
SRP Section: 16 – Technical Specifications
Application Section: 16
Date of RAI Issue: 10/14/2015

Question No. 16-107

10 CFR 50.36 (d) (2), “Technical specifications,” requires a licensee’s TSs to establish limiting conditions for operation (LCOs) for equipment that is required for safe operation of the facility. The staff has the following questions related to DCD Tier 2, Chapter 16, Technical Specification, Section 3.8, Electrical Power System:

- a) DCD Tier 2, Chapter 16, Section 3.8.1 – “AC Sources Operating”, Surveillance Requirement (SR) 3.8.1.4, requires verification that each day tank contains $\geq 2,404$ L (635 Gal) of fuel oil. However, DCD Tier 2, Table 9.5.4-1 states for the fuel oil day tank a capacity (usable volume) of 2,078 L (549 Gal). Provide clarification of the discrepancy.
- b) DCD Tier 2, Chapter 16, Section 3.8.3 – “Diesel Fuel Oil, Lube Oil, and Starting air”, Condition E and SR 3.8.3.4 indicates starting air receiver pressure as < 40.77 kg_f/cm²G (580 psig) and ≥ 8.78 kg_f/cm²G (125 psig). Please provide a discussion and/or justification of the stated starting air receiver pressure. A summary of any supporting calculations may be referred.

Response

- a) The day tank level expressed in the TS SR 3.8.1.4 is the equivalent volume in liters (gallons) to ensure adequate fuel oil for a minimum of 1 hour of EDG operation at full load plus ten percent. The value listed of $\geq 2,404$ L (635 Gal) of fuel oil is an approximate amount based on existing plant EDGs and is not the specific value to be used in the generic TS. The specific value will depend upon vendor specific engine data supplied by the COL applicant. Therefore, this value will be bracketed to denote that it is not an established quantity. The fuel oil day tank capacity listed in Table 9.5.4-1 provides a description of the day tank is not associated with the value in the TS. Also, in accordance with the response to RAI 152-8006, Question No. 09.05.04-05,

(reference MKD/NW-15-0142L dated 9/14/2015; ML15257A429) the capacity of the fuel oil day tank is to be deleted from DCD Tier 2, Table 9.5.4-1.

- b) The pressure specified in this SR is intended to reflect the lowest value for which a minimum of five engine start cycles can be supplied without recharging. The air pressure of the starting air receiver will vary depending on engine manufacturer specific design requirements. The starting air receiver pressures listed, $< 40.77 \text{ kg/cm}^2\text{G}$ (580 psig) and $\geq 8.78 \text{ kg/cm}^2\text{G}$ (125 psig) is an approximate amount based on existing plant EDGs in Korea and is not the specific value to be used in the APR1400 generic TS. Therefore, this value will be bracketed to denote that it is not an established quantity.

Impact on DCD

Same as changes described in the Impact on Technical Specifications section.

Impact on PRA

There is no impact on the PRA.

Impact on Technical Specifications

TS LCO Condition 3.8.3.E, Surveillance Requirements 3.8.1.4 and 3.8.3.4 will be revised as indicated in the attached markup.

Impact on Technical/Topical/Environmental Reports

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

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.1.1	Verify correct breaker alignment and indicated power availability for each offsite circuit.	7 days
SR 3.8.1.2	<p>----- NOTE -----</p> <ol style="list-style-type: none"> All EDG starts may be preceded by an engine prelube period and followed by a warmup period prior to loading. A modified EDG start, involving idling and gradual acceleration to synchronous speed, may be used for this SR as recommended by the manufacturer. When modified start procedures are not used, the time, voltage, and frequency tolerances of SR 3.8.1.7 must be met. <hr/> <p>Verify each EDG starts from standby conditions and achieves steady state voltage $\geq 3,744$ V and $\leq 4,576$ V, and frequency ≥ 58.8 Hz and ≤ 61.2 Hz.</p>	31 days
SR 3.8.1.3	<p>----- NOTE -----</p> <ol style="list-style-type: none"> EDG loadings may include gradual loading as recommended by the manufacturer. Momentary transients outside the load range do not invalidate this test. This Surveillance shall be conducted on only one EDG at a time. This SR shall be preceded by and immediately follow without shutdown a successful performance of SR 3.8.1.2 or SR 3.8.1.7. <hr/> <p>Verify each EDG is synchronized and loaded, and operates for ≥ 60 minutes at a load ≥ 90 % rating and ≤ 100 % rating.</p>	31 days
SR 3.8.1.4	Verify each day tank contains $\geq 2,404$ L (635 gal) of fuel oil.	31 days

[2,404 L (635 gal)]

[40.77 kgf/cm²G (580 psig)] and
 ≥ [8.78 kgf/cm²G (125 psig)].

CONDITION	REQUIRED ACTION	COMPLETION TIME
E. One or more EDGs with starting air receiver pressure < 40.77 kgf/cm²G (580 psig) and ≥ 8.78 kgf/cm²G (125 psig) .	E.1 Restore starting air receiver pressure to ≥ 40.77 kgf/cm²G (580 psig) psig. <div style="border: 1px solid red; padding: 2px; display: inline-block; margin-top: 5px;">[40.77 kgf/cm²G (580 psig)].</div>	48 hours
F. Required Action and associated Completion Time not met. <u>OR</u> One or more DGs with diesel fuel oil, lube oil, or starting air subsystem not within limits for reasons other than Condition A, B, C, D, or E.	F.1 Declare associated EDG inoperable.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.8.3.1	Verify each fuel oil storage tank contains ≥ a 7-day supply of fuel.	31 days
SR 3.8.3.2	Verify lubricating oil inventory is ≥ a 7-day supply.	31 days
SR 3.8.3.3	Verify fuel oil properties of new and stored fuel oil are tested in accordance with, and maintained within the limits of, the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program

[40.77 kgf/cm²G (580 psig)].

SURVEILLANCE REQUIREMENTS (continued)

		SURVEILLANCE	FREQUENCY
SR	3.8.3.4	Verify each DG air start receiver pressure is \geq 40.77 kgf/cm²G (580 psig) psig.	31 days
SR	3.8.3.5	Check for and remove accumulated water from each fuel oil storage tank.	31 days