KHNPDCDRAIsPEm Resource

From: Ciocco, Jeff
Sent: Thursday, August 13, 2015 10:48 AM
To: KHNPDCDRAIsPEm Resource
Subject: FW: APR1400 Design Certification Application RAI 152-8006 (09.05.04 - Emergency Diesel Engine Fuel Oil Storage and Transfer System)
Attachments: APR1400 DC RAI 152 SPSB 8006.pdf; image001.jpg

From: Ciocco, Jeff
Sent: Monday, August 10, 2015 1:49 PM
To: apr1400rai@khnp.co.kr; KHNPDCDRAIsPEm Resource <KHNPDCDRAIsPEm.Resource@nrc.gov>; Harry (Hyun Seung) Chang <hyunseung.chang@gmail.com>; Yunho Kim <yshh8226@gmail.com>; Christopher Tyree <Christopher.tyree@aecom.com>
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Subject: APR1400 Design Certification Application RAI 152-8006 (09.05.04 - Emergency Diesel Engine Fuel Oil Storage and Transfer System)

KHNP,

The attachment contains the subject request for additional information (RAI). This RAI was sent to you in draft form. Your licensing review schedule assumes technically correct and complete responses within 30 days of receipt of RAIs.

Please submit your RAI response to the NRC Document Control Desk.

Thank you,

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U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

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MESSAGE	1153	8/13/2015 10:47:59 AM
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REQUEST FOR ADDITIONAL INFORMATION 152-8006

Issue Date: 08/10/2015
Application Title: APR1400 Design Certification Review – 52-046
Operating Company: Korea Hydro & Nuclear Power Co. Ltd.
Docket No. 52-046
Review Section: 09.05.04 - Emergency Diesel Engine Fuel Oil Storage and Transfer System
Application Section: 9.5.4

QUESTIONS

09.05.04-1

10 CFR 52.47(a)(2) requires that a standard design certification applicant provide a description and analysis of the structures, systems, and components (SSCs) of the facility, with emphasis upon performance requirements, the bases, with technical justification therefor, upon which these requirements have been established, and the evaluations required to show that safety functions will be accomplished.

DCD Tier 2, Section 9.5.4.6 describes the instrumentation requirements for a self-cleaning fuel oil filter.

The staff is unable to find any description of these filters in DCD Tier 2, Section 9.5.4 or their location in Figure 9.5.4-1.

The applicant is requested to define the fuel oil filters and their use, and update the DCD and Figure 9.5.4-1 accordingly.

09.05.04-2

In accordance with NUREG-0800, SRP 9.5.4, GDC 5 prohibits the sharing of SSCs important to safety among nuclear power units unless such sharing can be demonstrated not to significantly impair their ability to perform safety functions, including, in the event of an accident in one unit, an orderly shutdown and cooldown of the remaining units.

DCD Tier 2, Figure 9.5.4-1 shows two main inlet and two outlet connections to the diesel fuel oil day tank for supplying diesel fuel to emergency diesel generator (EDG) engine and EDG engine auxiliary skid.

The staff is unable to find any description of the “EDG “A” engine aux skid” referenced on Figure 9.5.4-1 to verify that GDC 5 is met.

The applicant is requested to define the aux skid connection, and update the DCD accordingly.

09.05.04-3

In accordance with NUREG-0800, SRP 9.5.4, the SAR is reviewed to verify whether the EDEFSS description and related diagrams clearly indicate all modes of system operation, including the means for indicating, controlling, and monitoring fuel oil level, temperature, and pressure as required for uninterrupted operation. NUREG-0800, SRP 14.2 provides additional guidance on review of the acceptability of the pre-operational and startup tests.

DCD Tier 2, Section 9.5.4.5, “Inspection and Testing Requirements,” for the emergency diesel engine fuel oil system (EDEFOS) states that “[t]he operability of EDEFOS may be demonstrated during tests of the emergency diesel generator, or testing may be performed by operation of the system in recirculation mode (bypassing day tank) and sending fuel through the recirculation line back to the fuel oil storage tank.” In addition, DCD Tier 2, Section 14.2.12.1.88 contains an operability test to demonstrate the operation of the fuel oil recirculation system.

The staff is unable to locate any description of this recirculation mode or system in DCD Tier 2, Section 9.5.4 or Figure 9.5.4-1.

The applicant is requested to describe the recirculation system and mode, and update the DCD accordingly.

09.05.04-4

NUREG-0800, SRP Section 9.5.4, 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.

DCD Tier 2, Section 9.5.4.1 regarding the emergency diesel engine fuel oil system (EDEFOS) specifies that “[t]he EDEFOS is designed to be capable of detecting and controlling system leakage by putting appropriate monitors and confining fuel oil leaks and spills in and around the system, components and structures.” No further information is provided regarding the design, qualification, and location for these monitors.

The applicant is requested to describe the “appropriate monitors” responsible for leakage detection and control.

09.05.04-5

As required by 10 CFR 52.47(b)(1), the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) 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 design certification, the provisions of the Act, and the Commission's rules and regulations.

According to NUREG-0800, SRP Section 14.3, the term “as-built” means the physical properties of the structure, system, or component (SSC) following the completion of its installation or construction activities at its final location at the plant site.

The acceptance criteria for design commitment 9 in DCD Tier 1, Table 2.6.2-3 (ITAAC) indicates that a report exists and concludes that each EDG has fuel storage capacity to operate the EDG for seven days with the EDG supplying power during the most limiting design basis event. The table indicates this will be done by inspection and analyses. However, DCD Tier 2, Table 9.5.4-1 already provides a tank capacity of 363,360 L (96,000 gal), which has been derived for DCD design.

The use of the expression “report exists” may not be sufficient for verification that the “as-built” SSCs are meeting their safety function. The acceptance criteria use of a “report exists” (i.e., design calculations, etc…) would provide confirmation that the components and system is properly sized and designed to meet its demand, however, the use of a report would not verify that the actual installed components and system would perform its safety function.

The applicant is requested to justify how the use of “report exists” in DCD Tier 1, Table 2.6.2-3 will be sufficient to verify an “as-built” SSC design, following the completion of its installation or construction activities at its final location at the plant site.

09.05.04-6

As required by 10 CFR 52.47(b)(1), the proposed inspections, tests, analyses, and acceptance criteria (ITAAC) 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 design certification, the provisions of the Act, and the Commission's rules and regulations.

As shown in DCD Tier 1, Table 2.6.2-3 (1 of 7), the Item 1 ITAAC contains a design commitment to perform inspection of the as-built functional arrangement of the emergency diesel generator (EDG) system as described in DCD Tier 1, Subsection 2.6.2.1 and in Tables 2.6.2-1 and 2.6.2-2. Acceptance criteria for Item 1 ITAAC requests confirmation that the functional arrangements are in accordance with Subsection 2.6.2.1. However, Subsection 2.6.2.1 does not contain any functional arrangement information and the design details of Subsection 2.6.2.1 are already verified by use of other items in the ITAAC. In addition, Tables 2.6.2-1 and 2.6.2-2 contain information related to seismic category and ASME classification and do not include functional arrangement information.

In addition, the emergency diesel engine cooling water system (EDECWS) is not referenced in Tier 1 or ITAAC; which results in the current DCD not requiring any verification of the functional arrangement of the safety-related EDECWS.

The staff is unclear how the acceptance criteria to verify as-built functional arrangement can be achieved with the current Tier 1 content. In addition, Tier 1 information does not contain any figures showing the functional arrangement to inspect or verify. (This RAI also applies to other EDG support system Section 9.5.5, 9.5.6, 9.5.7, and 9.5.8 containing similar content)

The applicant is requested to provide functional arrangement information and/or the corresponding figures to allow acceptable closure of the ITAAC design commitment.

09.05.04-7

NUREG-0800, SRP Section 9.5.4, "Emergency Diesel Engine Fuel Oil Storage and Transfer System," Revision 3, paragraph 9.5.4.III.6.A, specifies that each storage tank has a stick gauge connection for determining its fuel level.

Based on its review of the DCD, the staff is unable to verify that each storage tank has a stick gauge connection for determining its fuel level.

The applicant is requested to update the DCD accordingly.


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