

KHNPDCDRAIsPEm Resource

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Sent: Wednesday, August 26, 2015 2:55 PM
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Subject: APR1400 Design Certification Application RAI 174-8211 (02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases)
Attachments: APR1400 DC RAI 174 RHMB 8211.pdf

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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REQUEST FOR ADDITIONAL INFORMATION 174-8211

Issue Date: 08/26/2015

Application Title: APR1400 Design Certification Review – 52-046

Operating Company: Korea Hydro & Nuclear Power Co. Ltd.

Docket No. 52-046

Review Section: 02.03.04 - Short Term Atmospheric Dispersion Estimates for Accident Releases

Application Section: Short-Term Atmospheric Dispersion Estimates for Accident Re

QUESTIONS

02.03.04-4

As stated in SRP Section 2.3.4, 10 CFR 50 Appendix A, GDC 19 provides the requirements related to the meteorological considerations used to evaluate the personnel exposures inside the control room during radiological and airborne hazardous material accident conditions. Regulatory Guide 1.183 discusses the need to provide an evaluation of the radiological consequences of design basis accidents at the Emergency Response Facility, otherwise known as the Technical Support Center (Paragraph IV.E.8 of Appendix E to 10 CFR Part 50).

FSAR Section 2.3.4 provides a description of short-term atmospheric dispersion estimates for onsite locations such as the main control room (MCR) and the auxiliary building (AB) air intakes. FSAR Section 15.0.3.5, "Atmospheric Dispersion Factor," states, "The MCR and TSC χ/Q values are described in Subsection 2.3.4 and given in Tables 2.3-2 through 2.3-12." FSAR Section 15.1.5.5.2 states, "The χ/Q values used in the analysis for EAB, LPZ, MCR, and TSC are described in Subsection 2.3.4 and are given in Tables 2.3-2 through 2.3-12." This implies that the intakes for the MRC are the same receptors used for the Technical Support Center (TSC). However, there is no mention of the TSC in Tier 2, Section 2.3.4 or any of the associated tables and figures.

- (1) Update the text in FSAR Tier 2, Section 2.3.4, to clarify that the short-term atmospheric dispersion factors (χ/Qs) for onsite locations related to the MCR and AB also apply to the TSC.
- (2) Update any applicable descriptions in FSAR Tables 2.3-2 through 2.3-13 and Figure 2.3-1 to clarify that the short-term atmospheric dispersion factors (χ/Qs) for onsite locations related to the MCR and AB also apply to the TSC.

02.03.04-5

The Staff considered the Applicant's responses to RAI Question Nos. 02.03.04-2 and 02.03.04-3 (see ML15132A599 and ML15132A600, dated May 12, 2015). These questions pertained to the accident-related atmospheric dispersion modeling analyses in the Revision 0 submittal of Section 2.3.4 of the Korea Hydro and Nuclear Power Co., Ltd. (KHNP) application for Design Certification (DC) of the APR1400 Standard Design (ML15006A059).

In particular, the items under RAI Question No. 02.03.04-2 sought clarification, through revision of Tier 2, DCD Figure 2.3-1, of several air intake and potential radiological release locations to be considered in the atmospheric dispersion modeling analyses in Section 2.3.4 using the ARCON96 dispersion model. Those results provide direct input to onsite Control Room (CR) and Technical Support Center (TSC) dose calculations for design-basis accidents in Chapter 15. RAI Question 02.03.04-3 requested verification and clarification of the relationship between the Applicant's dispersion analyses to develop CR and TSC site parameter values and the use of meteorological data from the existing Prairie Island nuclear generating plant.

SRP Acceptance Criterion (6) under Subsection II (Acceptance Criteria) of NUREG-0800 for Section 2.3.4 calls for "a site plan drawn to scale....showing True North and potential atmospheric release pathways, control room intake, and unfiltered inleakage pathways" to be provided. The Applicant's responses to the items under RAI Question No. 02.03.04-2 provided the requested clarifications including revisions to Tier 2, DCD Figure 2.3-1.

Tier 2, DCD Table 2.3-13 (Pages 1 to 6 of 6), as revised, list design input parameters to the ARCON96 dispersion modeling and include various source-receptor pairs. The resulting site parameter relative concentration (X/Q) values are listed in Tier 2, DCD Tables 2.3-2 through 2.3-12. However, it does not appear that all possible source-receptor combinations shown in Tier 2, DCD Figure 2.3-1 have been considered.

Further, Tier 2, DCD Figure 2.3-1 is referenced to Plant North. The Staff understands this to be appropriate at the DC stage and that a site-specific orientation of the layout will be determined by the Combined License (COL) (under 10 CFR Part 52) or Operating License (OL) (under 10 CFR Part 50) applicant. Nevertheless, source receptor combinations not modeled in the DCD may apply to some COL or OL applicants and could represent the controlling conditions for a given accident scenario (e.g., based on worse dispersion conditions for a given source-receptor combination and orientation that is farther apart). Therefore, the Applicant should address the following technical issues:

REQUEST FOR ADDITIONAL INFORMATION 174-8211

- (a) Identify the source-receptor pairs that have not been evaluated and, given the above, provide technical justification for not having done so for each. If additional modeling is necessary, revise the affected site parameter values, text, and associated current or new tables.
- (b) The Applicant's response to RAI Question 02.03.04-3 indicates that the decision to use the Prairie Island meteorological data from among the six site locations considered (i.e., San Onofre, Hope Creek, Prairie Island, Quad Cities, Limerick, and J.A. Fitzpatrick) was based on using these data and the APR1400 design-specific source-receptor design parameters to perform a sensitivity analysis to identify the most conservative data for the Control Room habitability analysis.

Explain in more detail the scope and limitations of the sensitivity analysis and whether it simply evaluated variations in X/Qs for the various source-receptor pairs considered based on presumably different meteorological conditions from among the six sites, or because wind direction measurements are referenced to True North whether different plant layout orientations were also accounted for using each meteorological data set.



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