

# Discussion on PRA

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**1. Introduction**

**2. Issues That Need Clarifications**

**3. Plan for Further Meeting with the Staff**

# 1. Introduction (1/2)

## ❖ Interactions on PRA Issues

- 04/2013 : Pre-application Audit of PRA
  - NRC staff conducted an audit to assess the quality and completeness of the APR1400 PRA as well as the process for maintaining it.
  - KHNP presented documentations of Level 1 PRA for internal events and provided briefing of the PRA results including Level 2, external events, and LPSP analysis.
- 06/2013 : Pre-application Audit of APR1400 DCD
  - NRC staff identified 9 observations. One significant observation was recommended to be resolved before DC application.
- 09/2013 : APR1400 DC Application
  - KHNP resolved staff's observations including the significant observation and reflected in the final DCD.
- 11/2013 : Interim Acceptance Review Comments
  - NRC staff raised 4 comments.
  - KHNP submitted the responses to NRC (ML13345A102 and ML13345A200). NRC staff and KHNP held teleconference call for clarification of the comments on 12/12/2013.
- 12/2013 : Notice not to Docket APR1400 DC Application
  - NRC noted PRA was one of the areas of the application's deficiencies.
- 02/2014 : Clarification Meeting

# 1. Introduction (2/2)

## ❖ Clarification on acceptance review issues

- Total number of comments : 4 items
- Focus on those comments that need clarification from NRC staffs
  - To confirm if KHNP's understandings are correct
  - To confirm if the proposed response plans are acceptable
  - To clarify if there are any further concerns that are not addressed in the DCD

## 2. Issues That Need Clarifications (1/4)

- ❖ An internal fire and internal flooding probabilistic risk assessment (PRA) for low-power and shutdown (LPSD) is not developed for the APR1400 DC. These risks are evaluated qualitatively for LPSD and do not evaluate or discuss the risk impact of breached fire barriers or flood barriers at LPSD. Also, this qualitative analysis does not evaluate LPSD specific initiators (e.g., fire induced hot shorts that could cause overdrain of the reactor coolant system). Due to this issue, the risk evaluation results for this subject area are also not complete. Based on the discussion above, a review of this subject area cannot be conducted due to a lack of information in the DC submittal. Note, this issue could affect the review of SAMDA in the APR1400 Environmental Report and the review of DCD Section 5.4.7.
  - KHNP plans to provide an expanded evaluation which covers
    - The risk impact of breached fire barriers or flood barriers during LPSD
    - LPSD specific initiators (fire induced hot shorts that could cause over-drain, losses of the AC power and switchyard, etc.)

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## 2. Issues That Need Clarifications (2/4)

- ❖ A Level 2 PRA for LPSD is not developed for the APR1400 DC. Rather, the applicant uses a qualitative approach to evaluate the large release frequency (LRF) that credits containment closure. This approach is technically deficient since the feasibility for containment closure is not evaluated per Generic Letter (GL) 88-17, "Loss of Decay Heat Removal -10 CFR 50.54(f)," which is essential for estimating LRF at LPSD. In addition, the need for hydrogen control to keep the containment intact following a severe accident at LPSD is also not evaluated. Due to this issue, the risk evaluation results for this subject area are also not complete. To resolve this issue, the applicant would have to evaluate the feasibility for containment closure and the need for hydrogen control during LPSD. This could potentially lead to significant schedule delay. Note, this issue could affect the review of SAMDA in the APR1400 Environmental Report and the review of DCD Section 5.4.7.
  - KHNP plans to provide an expanded evaluation which covers
    - The feasibility for containment closer per GL 88-17
    - The need for hydrogen control during LPSD

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## 2. Issues That Need Clarifications (3/4)

- ❖ The list of PRA risk insights and key assumptions, which are associated with many design aspects and features described in several chapters of the DCD, is not sufficiently developed for the APR1400 DC and lacks disposition to relevant sections of the DCD. Based on previous design certification reviews, resolving this issue could potentially lead to significant schedule delay.
  - KHNP plans to provide an updated list of PRA insights and key assumptions
  - The updated list will be rechecked to ensure that any additional items from the list are appropriately reflected in TIER 1 ITAAC information

## 2. Issues That Need Clarifications (4/4)

- ❖ DCD Chapter 19 defines only four COL action items. Also, statements are made throughout DCD Chapter 19 regarding activities that the COL applicant will perform. However, these are not defined as COL action Items. Also, there are additional COL action items that need to be identified (e.g., COL action item for COL applicant to verify the seismic as-built High Confidence of Low Probability of failure).
  - KHNP plans to document the detailed specific COL action items associated DCD Chapter 19.

### 3. Plan for Further Meeting with the Staff

- ❖ May request a review meeting in June 2014 to discuss the draft results for the internal fire and internal flooding for LPSD, and the Level 2 for LPSD.