US-APWR

Discussion of Common Cause Failure Concurrent with Risk Significant External Event Scenarios

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Mitsubishi Heavy Industries, Ltd.

Mitsubishi Nuclear Energy Systems, Inc.

RAI #775-5836 Question No.07.08-23

MHI's D3 Coping Analysis Technical Report, MUAP-07014, Revision 3, section 4.1 under "External Hazards," states the following:

> *"In the D3 coping analysis, no external hazards such as earthquakes, fires, or other natural phenomena are assumed to occur concurrent with an event."*

The staff has reviewed MHI's DCD Chapter 19 which shows that the plant risk contribution from external events/hazards may significant compared with that from internal events/hazards. During the May 11-12th public meeting, MHI made a presentation on the subject. Based on the discussion at the meeting, the staff requests MHI to explain how the US-APWR is protected against potential software common cause failures concurrent with risk-significant external event/hazard scenarios. The staff requests MHI to address all risk significant external events/hazards including floods, fires, and earthquakes, or justify why an external event is not applicable.

Answer of RAI 07.08-23

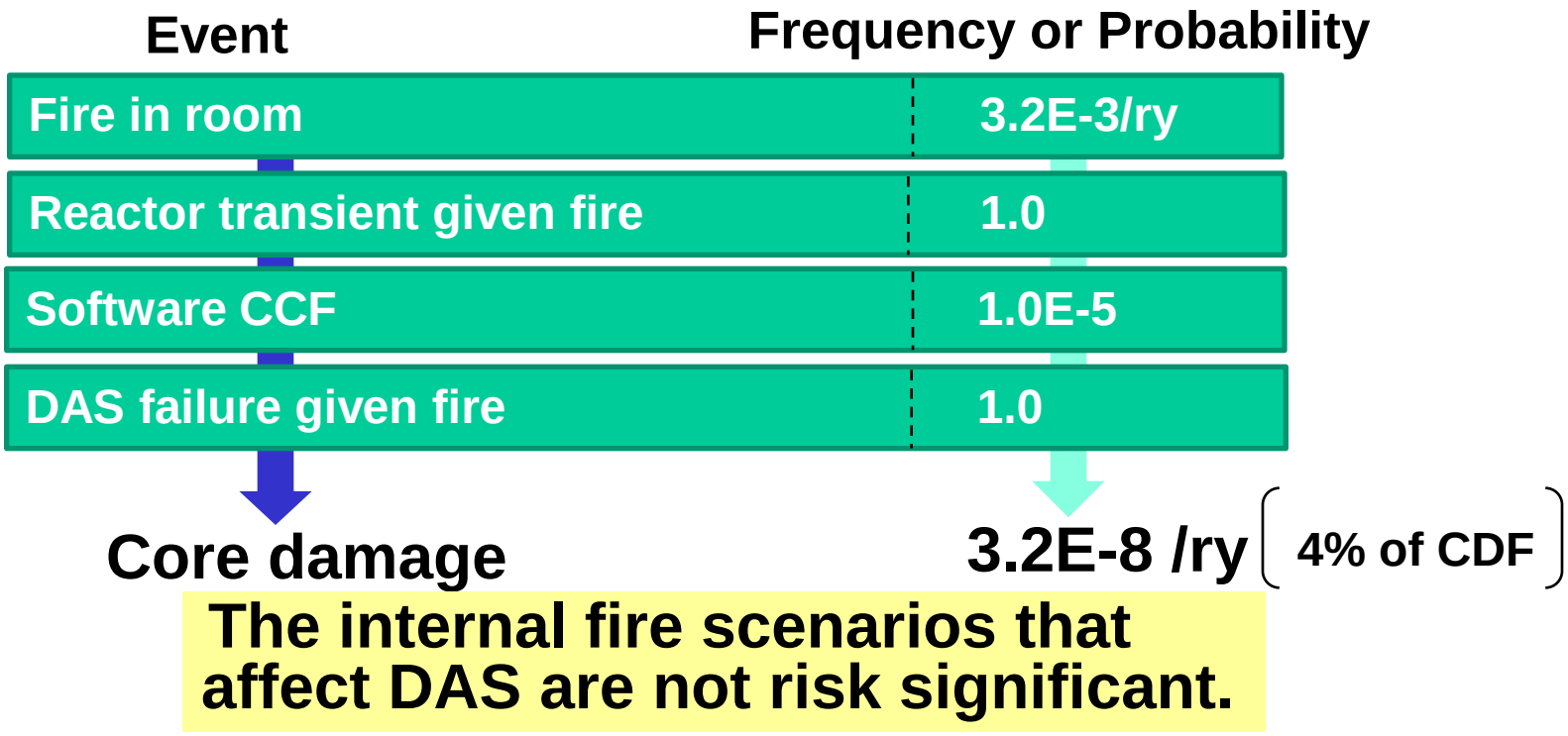
- **Initiating events introduced by external hazards are covered by Anticipated Operational Occurrence (AOO) and Postulated Accident (PA) conditions. Therefore, additional functions are not required for fire and floods.**

- **DAS consists of diverse automatic actuation cabinets (DAACs) and diverse human-system interface panel (DHP).**
  - ✓ DAACs are placed in the B and C class 1E electrical rooms and the DHP is placed in the main control room in the reactor building.
  - ✓ These areas are designed to protect impact from various internal and external hazards, such as fire, flooding, seismic and other external events.

Answer of RAI 07.08-23

➢ Internal Fire

- ✓ Fire protection for safety related equipment is described in the DCD Chapter 9.
- ✓ Only the internal fire scenarios that affect DAS concurrent with potential CCFs of digital I&C systems are fires caused in B-class 1E electrical room or C-class 1E electrical room.

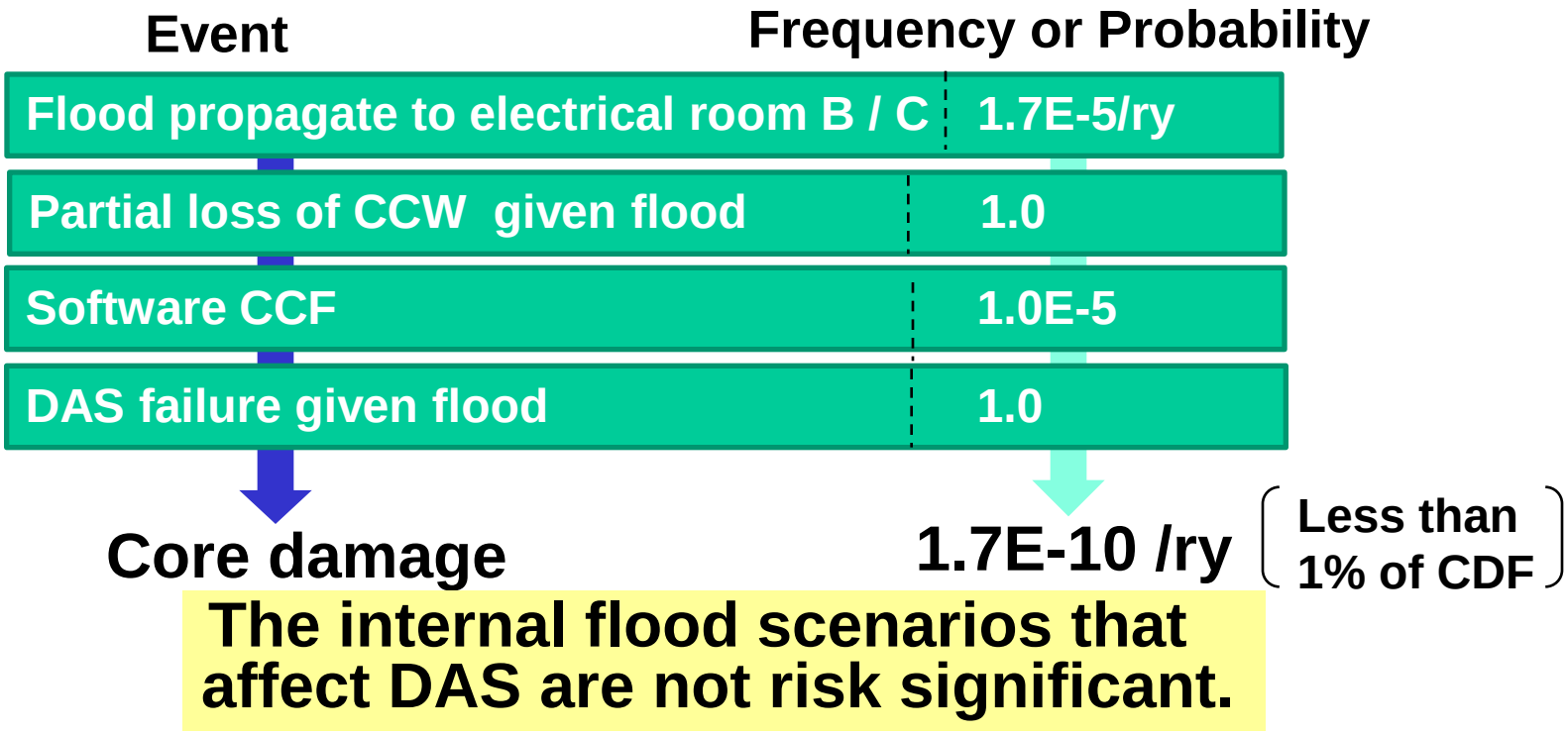


The internal fire scenarios that affect DAS are not risk significant.

Answer of RAI 07.08-23

➢ Internal Flooding

- ✓ Flood protection for safety related equipment is described in the DCD Chapter 3.
- ✓ Only the internal flooding scenarios that affect DAS concurrent with potential CCFs of digital I&C systems are fires caused in B-class 1E electrical room or C-class 1E electrical room.



Answer of RAI 07.08-23

Seismic

- ✓ DAS (DAACs and DHP) is now designed as Seismic Category II. However, MHI will change that DAS is designed to seismic category I. Therefore, DAS has sufficient seismic margin for Safe Shutdown Earthquake (SSE). DCD Section 7.8 and MUAP-07004 will be revised.

Other external hazards

- ✓ DAS is placed in the reactor building that protects the impact from other external hazards, such as high winds and tornadoes, external flooding, transportation and nearby facility accidents, and other external hazards as described in FSAR Chapter 2, Chapter 3 and Chapter 19. Detail information of risk assessment is included in a technical report "US-APWR Probabilistic Risk Assessment" MUAP-07030-P.

Answer of RAI 07.08-23

- **Therefore, the risk due to external hazards with a concurrent CCF of digital I&C systems are not significant.**

- **MHI will revise D3 Coping Analysis Technical Report, MUAP-07014, Revision 4 page 4-1 as follows.**

External hazards

In the D3 coping analysis, external hazards such as fire, flooding, seismic and other external hazards are also considered. D3 related equipment is located in reactor building and is designed to ***be protected from*** *external hazards. As described in a technical report, "US-APWR Probabilistic Risk Assessment" (MUAP-07030-P), the risk due to external hazards with a concurrent CCF is not significant.*