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Subject: Response to Portion of NRC Request for Additional Information Letter No. 59 Related to ESBWR Design Certification Application ESBWR Probabilistic Risk Assessment RAI Number 19.1-37

Enclosure 1 contains GE's response to the subject NRC RAI transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

Reference:

1. MFN 06-329, Letter from NRC to David Hinds, *Request for Additional Information Letter No. 59 Related to ESBWR Design Certification*, dated September 13, 2006

Enclosures:

1. MFN 07-007, Response to Portion of NRC Request for Additional Information Letter No. 59 Related to ESBWR Design Certification Application ESBWR Probabilistic Risk Assessment RAI Number 19.1-37

cc: AE Cubbage USNRC (with enclosures)
David Hinds GE/Wilmington (with enclosures)
eDRF 0059-2973

Enclosure 1

MFN 07-007

Response to Portion of NRC Request for Additional Information Letter No. 59 Related to ESBWR Design Certification Application ESBWR Probabilistic Risk Assessment RAI Number 19.1-37

NRC RAI 19.1-37

The reactor scram function (event tree heading C) is discussed briefly in NEDO-33201, Section 3. It is stated (page 3.3-10) that "The initiating event for the ATWS [anticipated transient without scram] event tree is a fault tree with the general transient ANDed with the failure of the RPS [reactor protection system] and/or ARI [alternate rod injection]...." However, additional information on the modeling of this function is needed. Please address the following:

A) Provide the fault tree mentioned in the above statement (top event C71-SYS-FF-SCRAM) with adequate explanation to understand how the failure of the reactor scram function was modeled in the PRA.

B) Explain how the assumed probability of 5.8E-7 (reported in Chapter 11, Table 11-2) for failure to scram was calculated

GE Response

A) The logic used in the PRA model for ATWS scenarios has been developed as a point estimate combined with a transient event. The attached fault tree illustrations show examples of the logic used for ATWS after a general transient, and also for ATWS after a small LOCA.

B) NEDO 33201 has been updated to Revision 1. The updated probability of failure for event C71-SYS-FF-SCRAM is 1.0E-8 in Table 5.4-1. This value was derived for the ABWR using a fault tree model of the Control Rods, including the FMCRD. Because the system is the same as the ESBWR design and it is independent of other systems in the ESBWR, the point estimate from the ABWR analysis applies to the ESBWR. The next revision of the PSA intends to include ESBWR specific fault trees of the SCRAM function.

The ABWR Standard Safety Analysis Report (23A6100) Section 19D.6.5.3 states:

> "The fault trees presented in this subsection address the failure of the electro-hydraulic and mechanical portions of the control rod drive system. Three fault trees were constructed on the basis of information available on the ABWR CRD System:
>
> (1) Failure to insert an individual control rod.
>
> (2) Failure of a hydraulic control unit.
>
> (3) Failure of the CRD System to control reactivity. The development relied substantially on extensive earlier analyses performed to assess BWR scram system reliability which are documented in NEDE-21514 (Reference 19D.6-1)."

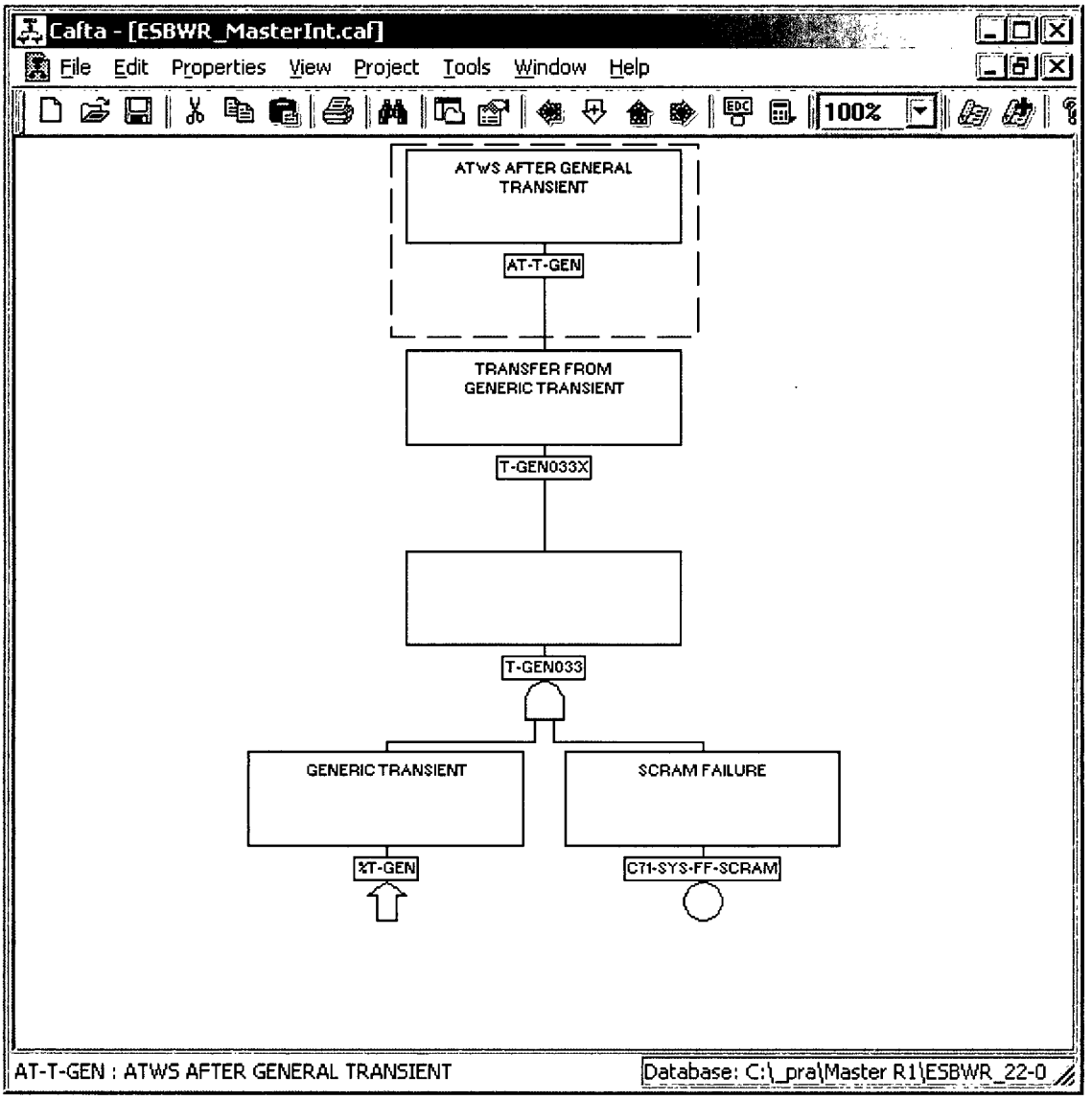
Fault trees representing the above three situations are presented in Figures 19D.6-17, through 19D.6-19. Failure rate data are furnished in Table 19D.6-9.

DCD/LTR Impact

In Revision 2, NEDO 33201 will include ESBWR specific fault trees of the SCRAM function.

There are no DCD revisions as a result of the response to this RAI.

For ATWS after General Transients sequences the following fault tree illustrates the logic used in the PRA model.



Similarly, for ATWS after Small LOCA sequences the following fault tree illustrates the logic used in the PRA model.