ABB
ASEA BROWN BOVERI

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Docket No. 52-002

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Subject: Response to NRC Requests for Additional Information

Reference: Letter, Risk Assessment Branch RAIs, T. V. Wambach (NRC) to E. H. Kennedy (C-E), dated October 30, 1991

Dear Sirs:

The Reference requested additional information for the NRC staff review of the Combustion Engineering Standard Safety Analysis Report - Design Certification (CESSAR-DC). Enclosure I to this letter provides responses to a number of questions of the Reference. Responses to the remaining questions will be provided by separate correspondence.

Should you have any questions on the enclosed material, please contact me or Mr. Stan Ritterbusch of my staff at (203) 285-5206.

Very truly yours,

COMBUSTION ENGINEERING, INC.

E H Kennedy

E. H. Kennedy
Director
Nuclear Systems Licensing

/lw
Enclosures: As Stated

cc: J. Trotter (EPRI)
T. Wambach (NRC)

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RESPONSE TO NRC REQUESTS FOR ADDITIONAL INFORMATION
RISK ASSESSMENT BRANCH

Question 720.1

It is stated on page B-24 of the CESSAR appendix B that for large LOCA sequences involving containment spray system failure, general recovery of components outside the containment was credited. Explain what equipment was recovered, the window of recovery for each piece of equipment credited, and how recovery of this equipment mitigated the large LOCA. List the recovery factors used.

Response 720.1

As described in section 3.1.1.1.4 of Appendix B on page B-23, the sequences of concern are those in which inventory control has been provided by successful safety injection but the decay heat energy is retained within containment due to failure of the containment spray system. It was assumed that if containment heat removal was not restored, the containment would finally fail on overpressure and that the injection pumps would fail with the onset of core damage shortly thereafter. A thermo-hydraulic calculation using MAAP indicated that the containment would remain intact for a minimum of approximately 41 hours if containment heat removal was lost at T=0. Because of the relatively large amount of time available, it was assumed that failed containment spray equipment outside of containment could be repaired. A non-recovery probability (CCRCVR) of 0.1 was applied to all cutsets containing a containment spray system component that was outside containment. The effect of these recovery actions was that containment spray, and thus, containment heat removal, was recovered before containment failure.

Question 720.5

The heat load of the IRWST may vary significantly depending on whether "bleed and feed" mode of cooling is employed with or without prior RCS heat removal using steam generators (compare, for example, sequence 3 and sequence 6 of the small LOCA event tree). How is this difference taken into consideration when determining the success criteria for cooling the IRWST.

Response 720.5

The success criteria for cooling the IRWST was based on loss of secondary heat removal at T=0 such that only "bleed and feed" cooling was used. The same success criteria were used for all "bleed and feed" cooling sequences. This was recognized to be somewhat conservative for those sequences in which "bleed and feed" cooling was initiated late in the transient but it is expected that a more realistic assessment of late feed and bleed would not significantly reduce the System 80+ core damage frequency.

Question 720.7

In the SGTR event tree, the safety function, "deliver feedwater", is taken as the Boolean multiplication of two top events, PAIB1MBX (failure of EFW) and PMIA01BX (failure of startup feedwater). The same approach is also used in the event trees developed for loss of one 125 V dc, other transients (TOTH) and loss of one 4.16 kV vital bus. Were these two zero-level fault trees linked together to calculate the probability of the top event, "deliver feedwater"? Is there any common-mode failure of components that can simultaneously affect the startup FW system and the emergency feedwater system?

Response 720.7

The two zero-level fault trees, PAIB1MBX (failure of EFW) and PMIA01BX (failure of startup feedwater) were linked together to calculate the probability of the top event, "deliver feedwater". The emergency feedwater system and the startup feedwater system do not share any common components and are thus not subject to a common cause failure of components that can affect the two systems simultaneously. The two systems do have some common support system dependencies (e.g. Both can receive power from the permanent non-safety buses). The support system dependencies are directly incorporated in both fault trees so that the fault tree linking process accounts for the common support system dependencies.

Question 720.8

In the logical expression of SGTR accident sequence #4, should ~PAIB1MBX (where ~X means logical "NOT X") be used instead of PAIB1MBX?

Response 720.8

Yes, in the logical expression of SGTR accident sequence #4, ~PAIB1MBX should be used instead of PAIB1MBX. C-E is currently updating the System 80+ PRA. The logical expressions for accident sequence #4 of the SGTR event tree will be corrected in the revised PRA.

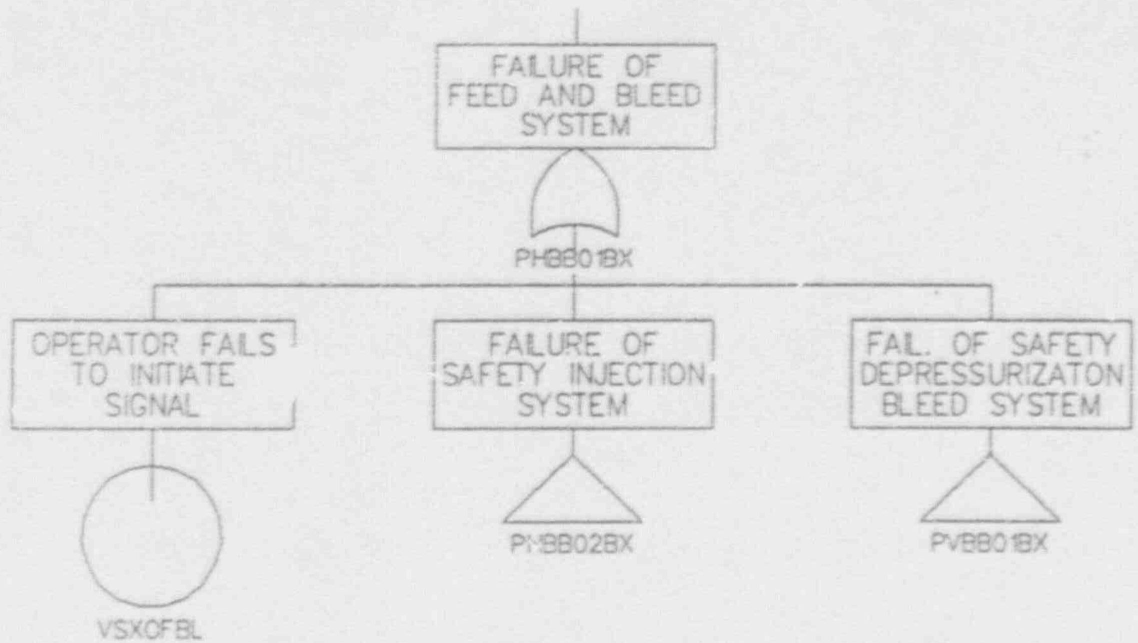
Question 720.11

In the logical expressions of accident sequences #3 and #7 of a large secondary-side break event tree, as well as the event trees for the loss of feedwater and other transients (TOTH), should ~PHBB02BX (where ~X means logical "NOT X") be used instead of ~PHBB01BX?

Response 720.11

The top event, PHBB01BX, is "Failure of the Feed and Bleed System". It includes both PHBB02BX (Failure of Safety Injection System) and PVBB01BX (Failure of the Safety Depressurization Bleed System). Thus, ~PHBB01BX is appropriate for the logical expressions for sequences #3 and #7 of the large secondary side Break, loss of feedwater and other transients (TOTH) event trees. The top event PHBB01BX was inadvertently left out of the System 80+ PRA Report (DCTR-RS-02, Rev 0). A copy of PHBB01BX is attached.

PHBB01BX



FAILURE OF FEED AND BLEED SYSTEM
PHBB01BX
OPERATOR FAILS TO INITIATE SIGNAL
FAILURE OF SAFETY INJECTION SYSTEM
FAIL. OF SAFETY DEPRESSURIZATON BLEED SYSTEM
VSXOFBL
PMBB02BX
PVBB01BX

Question 720.12

For a large secondary side break (overcooling) transient with no EOC stuck-rod, is safety injection needed to prevent core damage? If not needed, how is the reactivity control done? How is the reactor coolant shrinkage made up?

Response 720.12

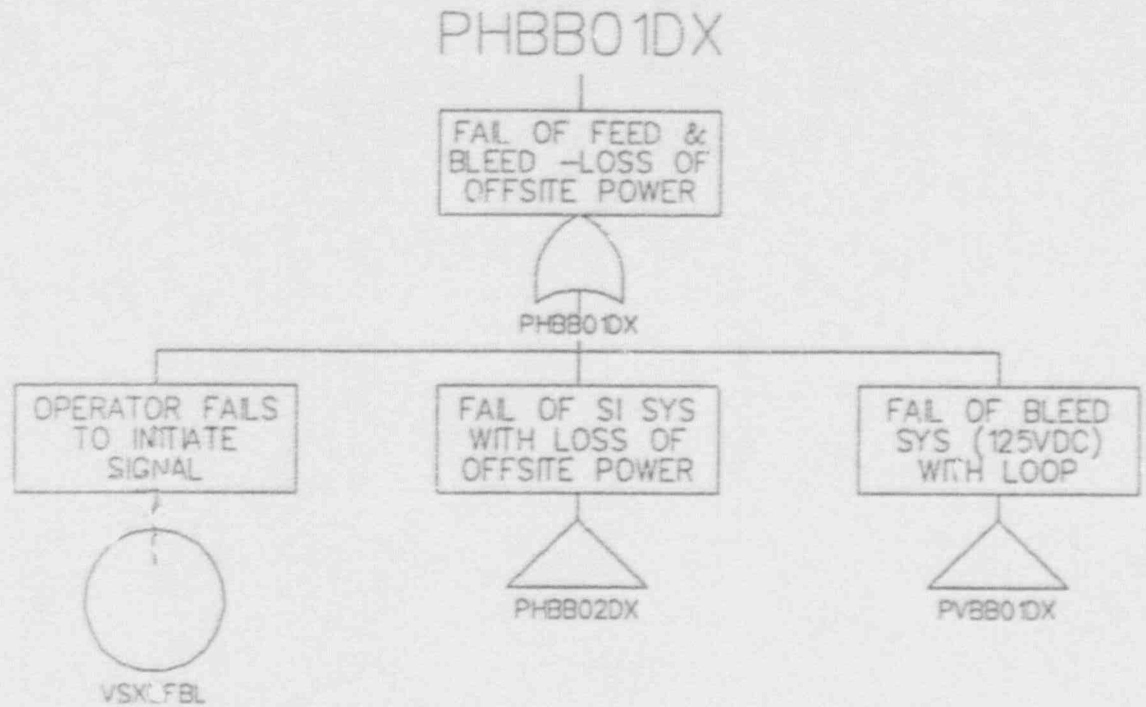
Thermo-hydraulic analyses performed in support of Chapter 15 analyses indicated that for System 80+, the control rods have enough worth to provide adequate reactivity control and prevent a return to power following a large secondary side break. The exception to this is if there is a stuck rod during a large secondary side break near the end of cycle. In this case safety injection is required for reactivity control over a short period of time. These analyses also indicated that the reactor vessel water level remained above the top of the hot leg throughout the transient, even accounting for shrinkage. Therefore, safety injection is not needed for inventory control. This is consistent with the treatment in other transients where safety injection is not required for inventory control when cooling down to shutdown cooling entry conditions.

Question 720.13

In the logical expressions of accident sequences #3, #4, #5, #7, #8, and #9 of the loss of offsite power event tree, should ~SE-PSV (i.e., logical "NOT SE-PSV") be used instead of ~PHSG01DX? Also, for accident sequences #3 and #7, should ~PHBB02DX be used instead of ~PHBB01DX?

Response 720.13

In IRRAS 2.0, the complement logic is used only to delete failure terms that can not be true because of prior system successes. SE-PSV is a single element special event and is not included in any other model. Thus, including the complement of this element in the sequence definitions would not alter the result at all. The complement event, ~PHSG01DX (logical "NOT (Failure to deliver safety injection to 4 of 4 loops with loss of offsite power)") should not be included in the logical expressions at all. Including ~PHSG01DX in the sequences did not affect the sequence results because PHSG01DX is equivalent to PHBB02DX. The top event, PHBB01DX, is "Failure of the Feed and Bleed - Loss of Offsite Power". It includes both PHBB02DX (Failure to deliver sufficient safety injection flow to 4 of 4 loops with loss of offsite power) and PVBB01DX (Failure of Bleed System (125VDC) with loss of offsite power). Thus, ~PHBB01DX is appropriate for the logical expressions for sequences #3 and #7 of the loss of offsite power event tree. The top event PHBB01DX was inadvertently left out of the System 80+ PRA Report (DCTR-RS-02, Rev 0). A copy of PHBB01DX is attached.



PHBB01DX
FAIL OF FEED & BLEED –LOSS OF OFFSITE POWER
PHBB01DX
OPERATOR FAILS TO INITIATE SIGNAL
FAIL OF SI SYS WITH LOSS OF OFFSITE POWER
FAIL OF BLEED SYS (125VDC) WITH LOOP
VSXC_FBL
PHBB02DX
PVBB01DX

Question 720.14

In the logical expressions of the accident sequences, #4, #5, and #7 through #9 of the large secondary-side break event tree, should ~SE-SREOC be used instead of ~PHAH03BX?

Response 720.14

For real logical expressions, the complement event, ~SE-SREOC, should be included in the logical expressions for accident sequences #4, #5, and #7 through #9 of the large secondary-side break event tree. However, in IRRAS 2.0, the complement logic is used only to delete failure terms that can not be true because of prior system successes. SE-SREOC is a single element special event and is not included in any other model. Thus, including the complement of this element in the sequence definitions would not alter the results at all. The complement event, ~PHAH03BX, should not be included in the logical expressions for accident sequences #4, #5, and #7 through #9 of the large secondary-side break event tree. ABB-CE is currently updating the System 80+ PRA to reflect some system design changes. The logical expressions for accident sequences #4, #5, and #7 through #9 of the large secondary-side break event tree will be corrected in the revised PRA.

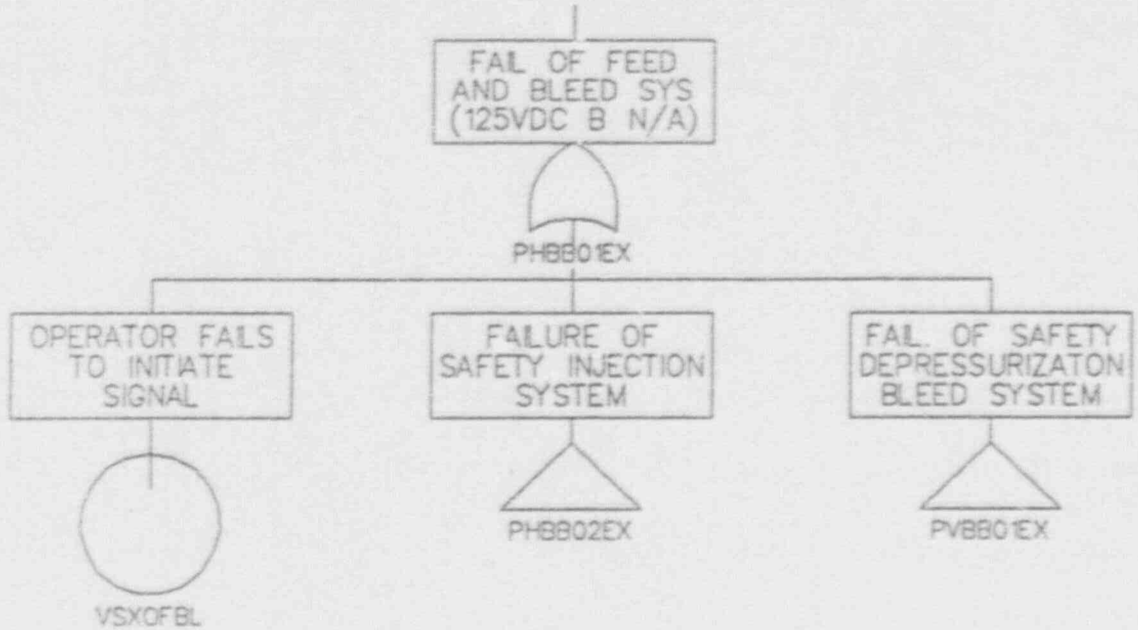
Question 720.15

In the logical expressions of the accident sequences #3 and #7 of the loss of one 125V dc bus event tree, should ~PHBB02EX be used instead of ~PHBB01EX? Also, is there a missing term, ~PVBB01EX in these expressions?

Response 720.15

The top event, PHBB01EX, is "Failure of the Feed and Bleed System with 125V dc bus B not available". It includes both PHBB02EX (Failure of Safety Injection System with 125V dc bus unavailable) and PVBB01EX (Failure of the Safety Depressurization Bleed System(with one 125V dc bus unavailable)). Thus, ~PHBB01EX is appropriate for the logical expressions for sequences #3 and #7 of the loss of one 125V dc bus event tree. The top event PHBB01EX was inadvertently left out of the System 80+ PRA Report (DCTR-RS-02, Rev 0). A copy of PHBB01BX is attached.

PHBB01EX



FAIL OF FEED AND BLEED SYS (125VDC B N/A)
PHBB01EX
OPERATOR FAILS TO INITIATE SIGNAL
VSXOFBL
FAILURE OF SAFETY INJECTION SYSTEM
PHBB02EX
FAIL. OF SAFETY DEPRESSURIZATON BLEED SYSTEM
PVBB01EX

Question 720.16

In the logical expressions of accident sequences #3 and #7 of the loss of offsite power event tree, is there a missing term, ~PVBB01DX?

Response 720.16

Yes, the term, ~PVBB01DX, is missing from the logical expressions for accident sequences #3 and #7 of the loss of offsite power event tree. In IRRAS 2.0, the complement logic is used only to delete failure terms that can not be true because of prior system successes. The only elements that the bleed system, as modeled in PVBB01DX, share with other systems in the sequences are vital power supply components. It was felt that these components were adequately treated by the complement logic of ~PHSG01DX. Thus, the complement term, ~PVBB01DX, was not used to reduce sequence solution time.

Question 720.17

In the logical expressions of accident sequences #3 and #7 of the event trees for large secondary side break, loss of feedwater and other transients(TOTH), is there a missing term, ~PVBB01BX (i.e., logical "NOT PVBB01BX")?

Response 720.17

Yes, the term, ~PVBB01BX, is missing from the logical expressions for accident sequences #3 and #7 of the event trees for large secondary side break, loss of feedwater and other transients(TOTH). In IRRAS 2.0, the complement logic is used only to delete failure terms that can not be true because of prior system successes. The only elements that the bleed system, as modeled in PVBB01BX, share with other systems in the sequences are vital power supply components. It was felt that these components were adequately treated by the other complement events in the sequences. Thus, the complement term, ~PVBB01BX, was not used to reduce sequence solution time.

Question 720.18

In the logical expressions of accident sequences, #3, #4, #5, #7, #8, and #9 of the ATWS event tree, why are the complements of SE-MTC and SE-PSV not included?

Response 720.18

In IRRAS 2.0, the complement logic is used only to delete failure terms that can not be true because of prior system successes. SE-MTC and SE-PSV are single element special events and are not included in any other models in the ATWS sequences. Thus, including the complement of these events in the sequence definitions would not alter the result at all.

Question 720.19

Is there a missing top event, PGIB01CX, in the logical expression of sequence #7 of the loss one ccw/sw event tree?

Response 720.19

Yes, the top event, PGIB01CX, should be included in the logical expression for sequence #7 of the loss of one ccw/sw event tree. This element was inadvertently left out of the logical expression for the sequence. ABB-CE is currently updating the System 80+ PRA. The logical expressions for accident sequence #7 of the loss of one ccw/sw break event tree will be corrected in the revised PRA. Including PGIB01CX ("failure to Cool the IRWST given loss of one CCW train") will result in a decrease in the core damage frequency for sequence #7. Thus, the reported results are slightly conservative.

Question 720.21

Please describe how you estimated the core damage frequency due to accident sequences involving station blackout, including how the initiating event frequency of station blackout was calculated? What modifications to the loss of offsite power fault trees were made?

Response 720.21

Station Blackout was not treated as a separate initiator in the System 80+ PRA. A station blackout involves a loss of offsite power with failure of the diesel generators and failure of the alternate AC power source. All of the frontline system fault tree models in the loss of offsite power event tree have all of the appropriate support system models linked into them. The electrical distribution system models include failure of the diesel generators. Failure of the alternate AC power source was considered during the recovery analysis. Thus, all of the loss of offsite power sequences include consideration of station blackout. The only blackout sequence not embedded in the loss of offsite power sequences is the battery depletion case. This case was explicitly modeled as described in section 4.8.3 of the System 80+ PRA Report (DCTR-RS-02) and section 3.1.8.6 of Appendix B to CESSAR-DC.

Question 720.22

For a station blackout with a stuck-open primary safety valve (PSV), no safety injection is available to make up the RCS inventory loss. Similarly, for a station blackout with failure of the turbine driven emergency feedwater pump to start, SG will dry out and RCS pressure will rise rapidly, causing the PSVs to open, With no safety injection available to make up the RCS inventory loss, core damage will soon occur. Where are these sequences modeled in the PRA?

Response 720.22

Yes. As described in the response to Question 720.20, station blackout scenarios are treated implicitly within other sequences. A station blackout involves a loss of offsite power with failure of the diesel generators and failure of the alternate AC power source. All of the frontline system fault tree models in the loss of offsite power event tree have all of the appropriate support system models linked into them. The electrical distribution system models include failure of the diesel generators. Failure of the alternate AC power source was considered during the recovery analysis. Thus, all of the loss of offsite power sequences include consideration of station blackout. The station blackout sequence with a stuck open PSV is included within loss of offsite power sequence #12. The station blackout sequences involving failure of the turbine-driven emergency feedwater pumps are covered in loss of offsite power sequences #7, #8, and #9.

Question 720.23

In all the transient event trees, "failure to scram" event is not explicitly modeled as an event-tree top event. Please explain how the frequency of ATWS was calculated, including the transient initiator involved and how the scram failure probability was estimated.

Response 720.23

The calculation of the ATWS frequency is described in section 3.3.8 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0).

Question 720.24

In the Boolean expression of ATWS sequences, #3 through #5 and #7 through #9, the complement of the top event, SE-CSGTR is not included. Please explain why. In view of the large probability (0.5) of the event SE-CSGTR, this omission has caused a factor of two difference in the frequencies calculated for these sequences.

Response 720.24

In IRRAS 2.0, the complement logic is used only to delete failure terms (cutsets) that can not be true because of prior system successes. Single element special events such as SE-CSGTR are not included in any other models. Thus, including the complement of these events in the sequence definitions would not alter the IRRAS calculations. The complement of SE-CSGTR should have been included in the sequences manually as part of the recovery analysis. However, this was overlooked in the final quantification. The core damage frequencies presented for these sequences are, therefore, high by a factor of two (and thus conservative). C-E is currently updating the System 80+ PRA. This will be corrected in the revised PRA.

Question 720.25

For a loss of main feedwater ATWS initiated at high reactor power, turbine trip is generally required to avoid further addition of positive reactivity that may lead to core damage. Failure of turbine trip does not appear to be modeled in the ATWS event tree? Is this an oversight? If so, please model it; if not, please explain your failure to model failure of turbine trip.

Response 720.25

In SECY 83-293, a loss of main feedwater with failure of the turbine to trip was stated to be the most limiting ATWS initiator. Based on this, a loss of main feedwater with failure of the turbine to trip was used as the initiating event when evaluating the System 80+ thermo-dynamic response to an ATWS to ascertain the minimum MTC value for which level C stress limits would be exceeded in the RCS. Thus, failure of the turbine to trip is implicitly assumed to have occurred for all ATWS sequences.

Question 720.28

In the logical expression of ATWS sequence #8, should PHOG01BX be used instead of PHBB02BX? Similarly, for ATWS sequence #25, should PHBB02BX be used instead of PHOG01BX?

Response 720.28

One of the primary differences between the models PHOG01BX and PHBB02BX is that PHOG101BX includes "failure of the SIAS" for actuation failure while PHBB02BX includes "failure of the operator to initiate feed and bleed cooling" for actuation failure. For situations in which feed and bleed cooling was to be employed, it was assumed that opening of the bleed valves and starting of the safety injection system would be closely coupled actions, and that the operators would not rely on SIAS to start the safety injection pumps. Thus, PHBB02BX was judged to be the appropriate model for sequence #8. This was also felt to hold true for sequence #25. On further review of sequence #25, it appears that perhaps PHOG01BX might be the more appropriate model because feed and bleed was not being initiated. C-E is currently updating the System 80+ PRA. The logical expression for ATWS sequence #25 will be revised as part of this update. This change should result in a slight decrease in core damage frequency as the injection system unavailability for PHOG01BX is approximately 1.3E-4 while the injection system unavailability for PHBB02BX is approximately 3.8E-3. (See tables 6.3.6-7 and 6.3.6.10 in the System 80+ PRA Report, DCTR-RS-02, Rev. 0.)

Question 720.29

Based on CE calculations, the most dominant contributor to the core damage frequency attributable to ATWS is the sequence involving an ATWS followed by an adverse moderator temperature coefficient (MTC). Please explain how you calculated the probability of having an adverse MTC given an ATWS.

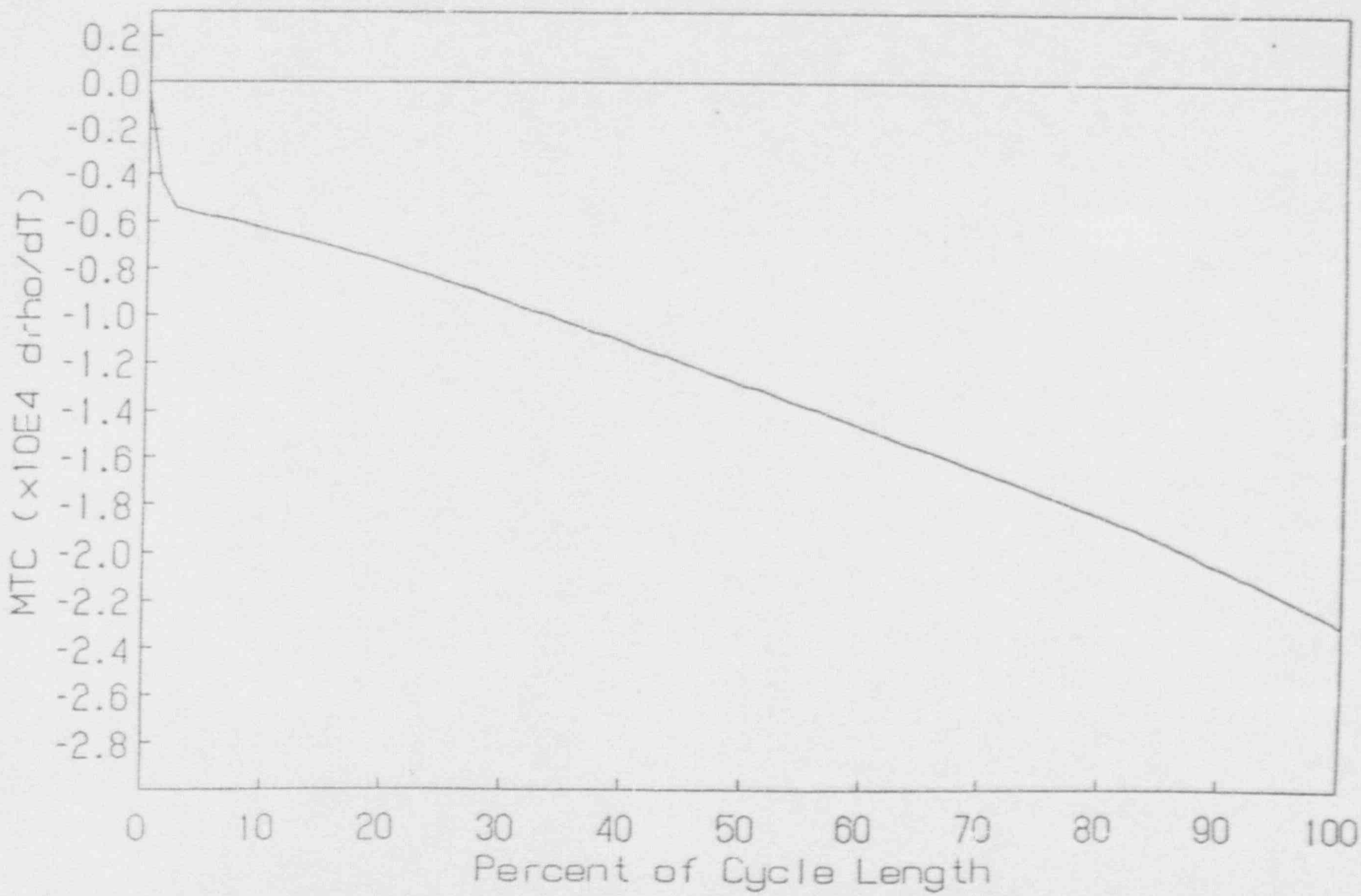
Response 720.29

More clearly stated, ATWS sequence #26 is an ATWS that occurs while the MTC is adverse. The peak RCS pressure that is reached during an ATWS is partly a function of the MTC. The less negative the MTC, the higher the peak RCS pressure. The primary concern with an ATWS is the peak RCS pressure will be such that the RCS pressure boundary will be breached and the injection system check valves will be backseated such that there is an unmitigated LOCA. In SECY-83-293, it was stated that this should be assumed to occur if the peak RCS pressure exceeded the ASME level C stress limit pressure. Secy-83-293 used a value of 3200 psia for the level C stress limit. For this analysis, a set of thermo-hydraulic transient analysis runs were made, varying the MTC to determine the largest (least negative) value of MTC for which the RCS peak pressure would not exceed the level C stress limit pressure. (3200 psia was used as the level C stress limit pressure for the analysis.) The transient that was used for these analyses was a loss of main feedwater without turbine trip. MTCs more positive than the critical MTC thus determined were deemed adverse MTCs while MTCs more negative than this were deemed to be not adverse. A curve showing MTC versus core burnup (life) for an equilibrium System 80+ core was used to determine for what fraction of core life the MTC would be adverse. A copy of the MTC vs core burnup is attached. The response to RAI 440.11 provides the final revised ATWS analyses, but the conclusions are not changed.

Figure 19

VARIATION OF MTC DURING CYCLE

For Base Load Operation



Question 720.32

Where is the accident sequence involving loss of offsite power (LOOP), followed by failure to scram considered in the PRA?

Response 720.32

The plant response to a loss of offsite power followed by a failure to scram is essentially the same as a transient with failure to scram followed by a loss of offsite power on turbine trip. Loss of offsite power on turbine trip is included in the Electrical Distribution System (EDS) model, and therefore is propagated into the frontline system models for all ATWS sequences. Loss-Of-Offsite Power (LOOP) was inadvertently left out of the list of ATWS initiators in figure 3.3-1 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0, January 1991). However, the LOOP frequency of 2.5E-3/yr is much lower than the overall ATWS initiator frequency of 3.24/yr.

Question 720.34

Please provide a list of references (or data source) for all of the basic events used in quantifying the fault trees used in the CESSAR PRA.

Response 720.34

Chapter 5 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0, January, 1991) describes the data analysis for the System 80+ PRA. The tables in chapter 5 list all of the basic event data used in the PRA. Table 5-1 provides a list of the generic failure rates used in the System 80+ PRA and identifies the source of the failure rate.

Question 720.37

Justify why common-cause failure of check valves were not included in the fault tree analysis.

Response 720.37

At the time that the System 80+ level 1 analysis was begun, common cause failure of check valves as not considered to be credible and was not typically treated in PRAs. More recent information indicates that common cause failure of check valves may, in fact, be of concern. C-E is currently updating the System 80+ PRA. Common-cause failures of check valves will be included in the fault trees as part of this update.

Question 720.39

The cutsets generated from the quantification of the 65 zero-level fault trees were used to successfully quantify 95 of the 101 accident sequences delineated by the event trees. Although some of the quantified sequence frequencies agree reasonably well with those presented in the CESSAR Appendix B, discrepancies were found in some of the sequences. One reason for this is that the staff's requantification did not include recovery actions. Very large discrepancies, however, were found for some of the sequences initiated from loss of CCW and loss of one division of HVAC. The cause for the discrepancy was traced to the failure probability of 1.0 obtained in quantifying the zero-level fault tree, POLX01CX. Is this failure probability for the top event POLC01CX correct?

Response 720.39

The mean failure probability for the top event POLX01CX, as listed in Table 6.4.1-1 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0, January, 1991), is 3.34E-05 with an error factor of 3.4. The cutsets for this top event are provided in Table 6.4.1-5 of the PRA Report.

Question 720.40

Please explain how the initiating event frequency (1 event/year) was obtained for the event tree, Other Transients (TOTH).

Response 720.40

The initiating event frequency used for Other Transients (TOTH) was 2.8 events/year with an error factor of 3.0. As described in section 3.3.4 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0, January, 1991), this value was taken from the EPRI ALWR PRA Key Assumptions and Groundrules (Appendix A to

Chapter 1 of Volume II of the ALWR Uti_ity Requirements document).

Question 720.42

Does the tornado strike event tree (shown in Figure B4.2.3-1) implicitly imply there is a prolonged loss of offsite power following a tornado strike? Are the zero-level fault trees developed for LOOP (internal events) directly applicable to this event tree?

Response 720.42

As stated in Section B4.2.3.1 of CESSAR-DC, "The Tornado Strike Event Tree (Figure B4.2.3-1) covers all events initiated by a tornado strike on the plant site. This event is assumed to result in a loss of offsite power with a duration of greater than 24 hours." The zero-level fault trees developed for LOOP are not directly applicable to the tornado strike event tree. The Service Water System model was modified to include common cause blockage of the intake structures by tornado generated debris.

Question 720.43

In the accident sequence #10 of the tornado strike event tree, a Stuck-open PSV with successful safety injection and IRWST cooling is considered to lead to success (i.e., no core damage). Since SG is not used to cool down the reactor, the IRWST serves as a sole heat sink for the decay heat. How many trains of the containment spray system are required to successfully cool the IRWST?

Response 720.43

One train of the Containment Spray System, with CCW flow to the Containment Spray heat exchanger, is required for cooling the IRWST during feed and bleed core cooling.

Question 720.44

Was the core damage frequency due to tornado-induced station blackout calculated by simply quantifying the fault tree shown in Figure B4.2.3-7? Please List the probabilities or unavailabilities of all the basic events appearing in this figure.

Response 720.44

The fault tree presented in Figure B4.2.3-7 was used to quantify the core damage frequency only for the station blackout scenario with battery depletion. Station blackout involves a Loss of Offsite Power and failure of the onsite AC power systems, in this case, the diesel generators and the alternate AC source. Failure of the diesel generators are included in the Electrical Distribution system fault tree models. Thus, station blackout, other than the battery depletion case, is treated within the other sequences. The probabilities and unavailabilities for the basic events presented in figure B4.2.3-7 are:

BASIC EVENT UNAVAILABILITIES AND PROBABILITIES FOR FIGURE B4.2.3-7		
BASIC EVENT NAME	UNAVAILABILITY/PROBABILITY	ERROR FACTOR
IE-TORNADO	1.07E-5/year	
RCVRSBAC	5.00E-02	5.00
EDGAINDD	2.98E-02/demand	2.77
EDDXDG	3.00E-04/demand	5.00
EDGBINDD	2.el-02/demand	2.89

The elements, PC3N01MX and PC4N01MX, are support system models of the component cooling water system. They are presented in figures 6.3.3-4 and 6.3.3-5 in section 6.3.3 of the System 80+ PRA Report (DCTR-RS-02, Rev. 0, January, 1991).