

September 25, 1996

MEMORANDUM TO: Mark A. Cunningham, Chief
Probabilistic Risk Analysis Branch
Division of Systems Technology
Office of Nuclear Regulatory Research

FROM: Patrick W. Baranowsky, Chief
Reliability and Risk Analysis Branch
Safety Programs Division
Office for Analysis and Evaluation
Of Operational Data

SUBJECT: COMMENTS ON SELECTION CRITERIA FOR LOW POWER/SHUTDOWN EVENTS

As requested in your April 5, 1996, memo, we have reviewed the event selection criteria you propose for use in the Accident Sequence Precursor (ASP) Program. These include criteria for use in: (1) the computerized screening of internal events during low power/shutdown operation by the Sequence Coding and Search System (SCSS), (2) the engineering review of internal events occurring during low power/shutdown operations, and (3) the engineering review of external events occurring during either low power/shutdown or full power operation. During the course of our review, we had several discussions with J. S. Hyslop of your staff.

Based on the results of our review, we find that the proposed selection criteria are suitable for use in the ASP Program, provided that clarifying information is added to the bases for certain criteria. Our specific comments are contained in the Attachment. If you have any questions about our review, please contact Pat O'Reilly of my staff on 415-7570.

Attachment: As stated

Distribution:

RRAB RF EJordan
Central Files DRoss
PDR
RBarrett
DHickman
CERossi

DOCUMENT NAME: H:\SDLPCRIT.ASP

To receive a copy of this document, indicate in the box "C" copy w/o attach/enc1 "E" copy w/attach/enc1 "N" no copy

OFFICE	RRAS/RRAB	E	RRAS/RRAB	C	RRAB	E
NAME	PO'Reilly	RDO	SMays	Sm	PBaranowsky	PMB
DATE	9/4/96		9/5/96		9/25/96	

300043

9609300177 960925
PDR ORG NEXD
PDR

96-113

DF03 1/1

ID#R-5-1 operating experience

X MH65-16-5

X 4-1, PT 50

Shutdown
Low Power
operations

ATTACHMENT

SPECIFIC COMMENTS REGARDING PROPOSED SELECTION CRITERIA FOR IDENTIFYING POTENTIAL PRECURSOR EVENTS

3.3. Selection Criteria Development

3.3.1 Description of Existing Selection Criteria

The description of the existing ASP Program screening/review processes does not clearly portray the engineering review as being conducted against criteria for rejecting the event from further consideration. Figure 2.1 on page 2-3 of the 1994 Precursor Report, NUREG/CR-4674, Volume 21 presents a clearer picture of the ASP Program screening/review process.

The category of events designated by the ASP Program as "Impractical to Analyze" has other criteria besides "an event that cannot be treated with the existing ASP probabilistic risk assessment models." The actual designation of this category of events is "Potentially Significant Events Considered Impractical to Analyze." These events are considered capable of impacting core damage sequences. However, they are impractical to analyze due to a lack of information or the inability to reasonably model the event within a probabilistic risk assessment framework, considering the level of detail typically available in PRA models and the resources available to the ASP Program. Such events usually involve component degradations in which the extent of the degradation could not be determined or the impact of the degradation on plant response could not be ascertained.

3.4. SCSS Event Selection Criteria

3.4.1 LP/SD Screening Criteria

The eighth bullet does not make sense. It states that "events....challenge conditions."

The tenth and eleventh bullets specify that events involving the actual or potential loss of spent fuel pool cooling and fuel handling events should be selected by the SCSS screening for engineering review. However, according to Table 2 on page 10, these types of events are not currently addressed by ASP models, nor are there plans to do so in the future. Given this information, we suggest that these events be classified in the "Interesting Event" category, and not subjected to an engineering review.

Table 2, Page 10 Summary of ASP model coverage for various event categories

This table indicates that large and medium LOCAs are not addressed by current ASP models and that there are no plans to do so in the future. This is not correct. Table 3 on page 10 of Revision 1 of the Integrated Accident Sequence Program Plan (October 1995), under Improvement of Existing Models, identifies an effort to develop an expanded set of event trees to include an event tree for each of the most important initiating events considered in a PRA. These important initiating events include large and medium LOCAs. Therefore, large and medium LOCAs should be moved under the heading, "Event categories expected to be addressed by ASP models (currently or in the future)."

3.5 Guidelines for Engineer Review

3.5.2.1 PWR Cold Shutdown Reviewer Guidelines

Guideline (5) for initiating event assessments on page 11 specifies that an event should be identified for detailed analysis if there was "less than a 15 minute margin between the completion of the restoration of normal shutdown cooling and the time that boiling was predicted to occur..." The report does not provide a basis for this criterion. What is the significance of the 15 minute margin?

Guideline (1) for condition assessments on page 11 states that the condition event should be retained for detailed analysis if "the product of the frequency and the condition duration was greater than $1.0E-3$, although plant-specific considerations of alternate decay heat removal failure probabilities affect this suggested value of $1.0E-3$." The report does not provide a basis for this criterion. What is the significance of the value $1.0E-3$?

3.5.2.2 BWR Cold Shutdown Reviewer Guidelines

Guideline (1) for condition assessments on page 13 states that the condition event should be retained for detailed analysis if "the product of the frequency and the condition duration was greater than $1.0E-3$, although plant-specific considerations of alternate decay heat removal failure probabilities affect this suggested value of $1.0E-3$." The report does not provide a basis for this criterion. What is the significance of the value $1.0E-3$?

3.5.3 Full Power External Events Guidelines

For events involving conditions, the guideline contained in the third bullet (top of page 15) states that the condition event should be selected for detailed analysis if the

duration of the condition was one week or more, and the condition brought the plant within two failures of core damage given a fire or a flood in the affected area. In the discussion of bases for the guidelines that follows the bulletized items, the bases for the guidelines of one day or less and greater six months are clearly explained. However, there is no basis given for the one week or longer criterion. What is the significance of the one week or longer duration? It is noted that the discussion of the bases for the seismic condition review guidelines on page 15 does address the one week case. Does the fire/flood case have a similar basis?

3.5.4 Shutdown External Events Reviewer Guidelines

The guideline for selection of initiating events involving external events which occur during shutdown contained in the fifth bullet on page 16 specifies that the event be selected for detailed analysis if there was less than a 15-minute margin between completion of the restoration of normal shutdown cooling and the time that boiling was predicted to occur based on operator estimates of the time to boiling (PWRs only). The report gives no basis for the 15-minute criterion. What is the significance of the 15-minute margin?