

Dokid 52-001

December 29, 1992

NOTE TO: Chet ~~Poslusny~~ DAR, NRR
FROM: Glenn Kelly, SPSB, DSSA, NRR
SUBJECT: UPDATED ABWR PRA PUNCH LIST TRANSMITTAL TO GE

I have enclosed a fax I sent to Jack Duncan, GE that provides my updated punch list for the ABWR PRA issues.

Enclosure: as stated

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see attached ^{zzzz} distribution

The following chart is a summary of the status of issues raised by the staff concerning the ABWR PRA. This chart has been coordinated with GE to assure that it is as accurate as possible in portraying issue status. The chart is current as of December 29, 1992.

An issue is judged "confirmatory" in the chart if GE has submitted (by fax, discussion, meeting handout, or letter) sufficient information for the staff to draw its conclusion regarding the issue. Most of the information submitted by GE has been provided in a preliminary form. All information must be translated by GE into SSAR modifications that capture issue resolution. A few of the issues in the confirmatory list are being tracked there for completeness, although they were written up as "resolved" in the DFSER.

An issue is judged to be "open" in the chart if the staff is awaiting GE's response on staff questions or if the staff still has the issue under review.

Note that I have provided some updated information from R. Palla on back end analyses. It is possible that I may have misinterpreted his intentions. Take his dates with a grain of salt. I think that most of the areas (back end) that I have marked as having a FSER input completion date of 2/26/93 could be moved to the "Confirmatory" list, but Bob is not here to confirm this. He will be back about January 7, 1993.

STATUS OF ABWR PRA ISSUES

December 29, 1992

<u>ISSUE DESCRIPTION</u>	<u>STATUS</u>	<u>ACTION</u>
<u>CONFIRMATORY ISSUES</u>		
1. RPS Reliability		0-1 (Closed in DFSER)
2. GE to update ECCS and other fault trees		FT-1A,- 1B (Closed in DFSER)
3. GE to defend IORV frequency		S-2 (Confirmatory Item 19.1.5.2-1)
4. GE to defend IORV success criteria		C-1 (Confirmatory Item 19.1.5.3-1)
5. GE to defend one unplanned trip per year		S-1 (Closed in DFSER)
6. GE to evaluate support system failures as initiating events		0-2 (Open Item 19.2.1.5.2-1)
7. GE to confirm LOSP frequency and other site-specific parameters		I-1 (COL Action Item 19.1.5.2-1)
8. Confirm ATWS success criteria		C-2 (Closed in DFSER)
9. Confirm RHR success criteria		SC-1 (Closed in DFSER)
10. GE to justify CCF data		C-3 (Open Item 19.1.5.4-1)
11. GE to justify train-level CCF approach is adequate		0-5 (Open Item 19.1.5.4-1)
12. GE to justify test and maintenance data analysis		C-4A (Confirmatory Item 19.1.5.5.2-1)
13. GE to perform CDF sensitivity to outage times and surveillance intervals		C-4B (Confirmatory Item 19.1.5.5.3-1)

14. GE to justify RHR, HPCF pump failure data	G-6 (Closed in DFSER)
15. GE to correct credit taken for fire water	S-11 (Confirmatory Item 19.1.5.4-1)
16. GE to provide write up on PRA as a design tool	O-22a, O-22B (Open Item 19.1.2.2-1)
17. Staff questioned seismic capacity of the following equipment: fuel assembly, flat-bottom tank, diesel generator, electrical equipment	S-5 TO S-8, I-14 (Confirmatory Item 19.1.6.3.2-1 and part of Open Items 19.1.2.2.2-1 and 19.1.6.3.2-2)
18. Staff proposed use of LLNL hazard curves	S-10 (Closed in DFSER)
19. GE to address hazard curve uncertainties	SA-1 (Closed in DFSER)
20. GE to confirm seismic capacities of equipment and incorporate into design specifications	I-10, O-21B (Open Item 19.1.2.2.2-1)
21. GE to modify seismic PRA to account for soil structure failures	I-11 (Closed in DFSER)
22. GE to commit COL applicant to a specific seismic walkdown technique	I-12 (COL Action Item 19.1.6.3.2-1)
23. GE to correct the treatment of firewater in the Seismic Class II CET	S-3 (Confirmatory Item 19.1.5.4-1)
24. GE to link PRA "requirements" and insights to "Interface write up"	IN-1 (Open Items 19.1.2.2-1)

25. GE to submit a fire PRA	0-12 (Open Items 19.1.2.2.2-2 and 19.1.2.2.2-3)
26. Determine if CETs need to address wetwell-drywell bypass	0-13B (Open Item 19.1.7.2-1)
27. Modify CETs for severe accident phenomena	0-17A, -17B (Open Items 19.1.7.5-1, 19.1.7.5-2, 19.1.7.6.1-1, 19.1.7.6.2-1, and 19.1.7.6.2-2)
28. Flashing during venting	C-6 (Open Item 19.1.8-1)
29. Justify aspects of rupture disc set point	0-14 (Open Item 19.1.7.3-1)
30. Assess the impact of CCI on source terms	0-16B, 0-18E. (Open Items 19.1.7.5-1 and 19.1.8-1)
31. Uncertainty Analysis <ul style="list-style-type: none"> <li>- Identify risk significant issues from previous BWR studies <li>- Screen issues for applicability to ABWR 	0-18A, -18B, -18C (Open Items 19.1.7.7-1, 19.1.7.3-1, and 19.1.7.4-1)
32. Rupture disc operation before 24 hours	S-9 (Open item 19.1.7.3-2)
33. GE to provide level-1 PRA uncertainty analysis	0-18A, 0-11 (Open Item 19.1.5.11.1-1)
34. Credit for COPs	S-4 (Open Item 19.1.7.3-1)

35. GE to provide PRA Insights

GE has provided a discussion of balance of prevention and mitigation and a discussion of vulnerabilities.

36. GE to compare PRA sequences from operating BWRs to the ABWR PRA sequences and identify why ABWR has lower CDF

0-1B

37. RWCU as a high pressure DHR source

ACRS identified concerns with GE's design and assumptions. GE has agreed to "make the PRA come true." The staff is awaiting information on isolation signals that could isolate the entire RWCU. GE has submitted preliminary modifications to the RWCU to allow it to remove decay heat at high pressure. GE has RWCU-related COL action items to add to its SSAR.

SC-2

ISSUES BELONGING TO OTHER BRANCHES

30. Assess the impact of CCI on containment integrity	Structural calculations under review by ECGB and are not a PRA issue.	0-16A, 0-18E. (Open Item 19.1.7.5-2)
39. Drywell Head Ultimate Strength		BA-1 (Bagchi)
40. Service Level C for Containment		BA-2 (Bagchi)
41. Consequence Analysis		CA-3 (Confirmatory Item 19.1.9-1)
42. EPZ Consequence Analysis		CA-4
43. Consequence Analysis and Site Acceptability - Appendix 2A		CA-1
35. Treatment of ATWS as a late containment failure in CET analysis		S-12
37. Drywell Sump penetration by corium		(SCSB issue) BA-3

ISSUE DESCRIPTION	STATUS	ACTION
OPEN ISSUES		
1. GE needs to take its informal submittals and write them up in the SSAR.	Staff expects GE to provide majority of its SSAR updates on PRA issues in December 1992.	GE's action to submit followed by the staff's review of these submittals. (GE to submit by 12/31/92)
2. GE is to analyze LOCAs outside of containment (0-4)	GE's previous submittals on these LOCAs were not acceptable to the staff or the ACRS.	GE submitted reanalysis on 11/5 and a suppression pool bypass analysis on 12/17/92. Staff is reviewing and will complete its review by January 20, 1993. 0-4B
3. GE is to list assumptions/reliability values for systems that are not part of the certified design, but are modeled in the PRA	Outstanding questions include listing of systems important to safety but not modeled in PRA; Systems modeled in PRA but not part of Design Certification (e.g., UHS and Reactor Service Water Pump House); Awaiting reliability assumptions for those systems modeled in PRA.	GE submittal on 12/14/92. Staff to complete review by 1/15/93. 0-21 A
4. GE to requantify PRA based on an up-to-date plant model	GE has submitted its updated requantification. There are a series of questions outstanding related to this submittal.	GE to submit by 12/29/92. PRA-1A
5. GE to provide seismic capacities of systems not in the certified design	GE has not provided seismic capacity figures for the Reactor Service Water Pump House.	GE to submit. (GE to submit by 12/31/92)
6. Uncertainty Analysis - Treatment of wetwell-drywell bypass in CET	GE to provide data on applicability of vacuum breaker operating experience data to ABWR (10/27/92). GE provided ordering of top events in CET on 11/3.	GE submittal on support vacuum breaker leak test data received on 12/10/92. Staff to complete FSER input on 2/26/93. 0-18G

7. Severe Accident Closure

The significance of steam explosions in ABWR is reduced by having a dry cavity at the time of vessel failure. Additional information on the frequency of a flooded cavity was requested during 10/1/92 meeting to support closure of this issue.

GE submittal on potential for flooded cavity at vessel failure and chronology for additional cases reported in SSAR provided 12/10/92. Staff to complete FSER input by 2/26/92. NRC-1

8. Accident management

Staff evaluation provided to GE in draft Severe Accident Closure chapter. GE's planned response discussed 10/5/92.

GE submittal on additional guidance for COL applicant on accident management plan received on 12/14/92 as new section 19.9.14. Staff to complete FSER input by 2/26/93. NRC-2

9. SAMDA submittal

Revised SAMDA analysis submitted 6/30/92 and discussed with GE 10/8/92.

GE to modify submittal to address concerns discussed during 10/8/92 meeting. (GE to submit by 12/18/92) NRC-3

10. Containment isolation failure during seismic event

GE has proposed to address this issue by extending analysis of LOCAs outside containment (19E.2.3.3) to seismically-initiated events. The approach for analysis of LOCAs outside containment (for internal events) was subsequently rejected by staff and is now being addressed as issue 0-4.

GE to reevaluate seismic issue after completing analysis of issue for internal events. (GE to submit by 12/31/92) (0-4, 0-19) If all HCLPF sequence values 0.6g, Ge need not perform any further analysis for containment and item will become confirmatory.

11. AC Power Recovery

GE submitted reassessment of 0.6 value assumed for probability of recovering AC power on 11/3/92. Staff to complete FSER input by 2/26/93.

12. GE to provide decay heat removal reliability study

The staff has sent GE a list of formal questions.

(GE submitted on 12/18/92) Staff to complete review by 2/26/93. 0-20

13. GE to provide internal flooding analysis

The staff is awaiting a subcompartment analysis of the effect of high pressure pipe breaks on the walls between divisions. Analysis expected from GE in mid-December.

(GE submitted on 12/18/92) Staff to complete review by 2/26/93. 1-9

14. Human factors in PRA (C-5, 0-7 thru 0-10, 1-2 thru 1-7)

GE made related submittals on sensitivity of CDF to human error (10/16/92 and 6/1/92), identification of human errors in Level 1, Level 2, and seismic analyses (6/25/92), and PRA data uncertainty analysis (6/18/92). Staff requested additional information on 10/27/92.

GE to provide response. (GE to submit by 12/18/92) C-5 to 1-7 To be provided in new 19D.7.

15. GE to provide PRA-based seismic margins analysis

The staff has discussed with GE its concerns with the ABWR seismic margins submittal and has transmitted questions to GE. GE has responded by fax and meeting handouts to many of these questions.

The staff has transmitted guidance on performing a PRA-based margins analysis for evolutionary designs. (GE to submit by 12/23/92, but not received as of 12/29/92) SA-2

16. GE to provide PRA-based input to ITAAC

GE has submitted its version of PRA-based ITAAC insights.

The staff has transmitted its comments to GE on GE's ITAAC submittal based on PRA insights. GE has not provided a completion date for ITAAC. GE and the staff are still discussing the particulars of PRA-based ITAAC. PRA-3

17. Site specific design verification: external floods, transportation hazards

The staff's draft SECY paper on Design Certification and Licensing Policy Issues Pertaining to Passive and Evolutionary Advanced Light Water Reactor Designs states that 10 CFR 52.47 requires the analysis of both internal and external events. At the Design Certification stage, site-specific events such as tornadoes and extreme wind may be enveloped using bounding analyses to show that the events are insignificant. In performing the COL review, the staff will review the site-specific characteristics to ensure that events enveloped by the bounding analyses have been properly addressed.

The staff's action is to modify the siting criteria for the ABWR since no site-specific external flooding analysis has been provided. The siting criteria will exclude sites where it would be possible for external floods to exceed the height of the site grade level and where other non-enveloped external events are a threat. GE believes that it need not take any action and seeks staff confirmation. The staff is awaiting Commission action on staff recommendations. I-8

18. Net risk impact of passive flooder system

GE confirmed (11/3/92) alloy mixtures to be used in passive flooder valve. The staff will complete its FSER input by 2/26/93. 0-15

19. Backend Uncertainty
Analysis - Perform
sensitivity analyses
for issues of potential
risk significance to
ABWR

20. Uncertainty
Analysis - Treatment of
CCI coolability in CET

21. Uncertainty
Analysis - Treatment of
direct containment
heating in CET

The staff will
complete its FSER
input by 2/26/93.
0-18C

Staff to work with
BNL contractors to
address risk
significance of
issue in FSER. Staff
to complete its FSER
input by 2/26/93.
(0-18E, 0-16)

GE to provide
justification that
reactor
depressurization
system is highly
reliable during
seismic events
(CEB92-41-2). GE
submittal on 11/3/92
only partly
addressed this. GE
still has to address
reliability/
vulnerability of ADS
function in seismic.
Also has to address
wetwell spray
availability and
containment
response. (GE to
submit by 12/31/92)

Based on 10/1/92
meeting, staff to
review information
provided in
19E.2.1.2.2 re:
ability to
depressurize Class
IB sequences. Staff
to document
evaluation in FSER.
0-18D

22. Consequence related issues (CA-1,2,3)

Significant differences observed between BNL and GE consequence calculations for apparently similar source terms were noted during 10/1/92 meeting. Based on follow up discussion on 10/28/92 differences appear to be due to use of MACCS versus CRAC2.

Staff to work with BNL contractors to reflect differences between codes in FSER. Staff work to be completed by 2/26/93. Staff believes that no further action required by GE.

23. GE is to analyze interfacing LOCAs

The Reactor Systems Branch is not satisfied with the resolution proposed by GE for its upgrading of low pressure system piping. This issue will remain open until GE/staff agree on upgrade criteria and the staff PRA people can review it to determine if the resolution has any negative effect on its conclusions. GE has submitted its proposed resolution to this issue.

SRXB. 0-3

24. GE to use PRA insights to suggest areas to be added to the ABWR reliability assurance program

GE submitted its revised RAP input on November 11, 1992. Rest of revision due 12/4/92.

GE submitted revised Appendix K 12/92. Staff review to be complete by 1/30/93.
I-15

The following are SCSB or other branch issues

28. Fuel-Coolant Interaction

Staff pursuing independent analysis of FC explosion.

SPSB finds for the purposes of the ABWR PRA review that GE has provided sufficient information in this area.

29. Core Debris Coolability/Core Concrete Interaction

MACE 1B had heat fluxes greater than 100 kW/m² for first nine hours. Staff evaluating less than that for upper heat flux. Staff evaluating sump design. Pedestal structural integrity under discussion.

GE has indicated that it has provided SCSB with additional information justifying min heat flux of 100kW/m² for the reactor case. GE believes all of its actions are complete. From SPSB's perspective, this is true.

30. Containment Bypass

Severe accidents demonstrated .6ft' with fire water. 0.1ft' demonstrated w/o fire water. GE to document further information on DBA analysis.

31. Compliance with EPZ Emergency Plan Criteria and Methodology