

Docket 52-001

December 1, 1992

NOTE TO: Chet Postusny, DAR, NRR
FROM: Glenn Kelly, EPSB, DSSA, NRR
SUBJECT: FAX FROM GE/FAX TO GE

I have enclosed a fax I sent to Jack Duncan, GE that updates the status of ABWR PRA issues. I also have enclosed a fax sent to me by Jack Duncan on LOCAs outside of containment.

Enclosure: as stated

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See attached 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 November 30, 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.

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.

STATUS OF ABWR PRA ISSUES

November 30, 1992

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

14. GE to justify RHR, HPCF pump failure data	O-6
15. GE to correct credit taken for fire water	S-11
16. GE to provide write up on PRA as a design tool	O-22a, O-22B
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
18. Staff proposed use of LLNL hazard curves	S-10
19. GE to address hazard curve uncertainties	SA-1
20. GE to confirm seismic capacities of equipment and incorporate into design specifications	I-10, O-21B
21. GE to modify seismic PRA to account for soil structure failures	I-11
22. GE to commit COL applicant to a specific seismic walkdown technique	I-12
23. GE to commit COL applicant to perform a site-specific seismic PRA	I-13
24. GE to correct the treatment of firewater in the Seismic Class II CET	S-3

25. GE to link PRA "requirements" and insights to "Interface write up"		IN-1
26. GE to submit a fire PR.		O-12
27. Determine if CETs need to address wetwell-drywell bypass		O-13B
28. Modify CETs for severe accident phenomena		O-17A, -17B
29. Flashing during venting		C-6
30. Justify aspects of rupture disc set point		O-14
31. Assess the impact of CCI on containment integrity	Structural calculations under review by ECGB and are not a PRA issue.	O-16A, O-18E.
32. Assess the impact of CCI on source terms		O-16B, O-18E.
33. Uncertainty Analysis		O-18A, -18B, -18C
- Identify risk significant issues from previous BWR studies		
- Screen issues for applicability to ABWR		
34. Rupture disc operation before 24 hours		S-9
35. Treatment of ATWS as a late containment failure in CET analysis	In the DSER, ATWS was treated as an early containment failure in the staff's assessment. However, the staff recognized in the DSEP that this should be corrected.	S-12

36. GE to provide
level-1 PRA uncertainty
analysis

O-18A, O-11

37. Drywell Sump
penetration by corium

(SCSB issue) BA-3

38. Credit for COPs

S-4

39. Drywell Head
Ultimate Strength

BA-1 (Bagchi)

40. Service Level C for
Containment

BA-2 (Bagchi)

41. Consequence
Analysis

CA-3

42. EP7 Consequence
Analysis

CA-4

43. Consequence
Analysis and Site
Acceptability -
Appendix 2A

CA-1

ISSUE DESCRIPTION	STATUS	ACTION
<u>OPEN ISSUES</u>		
1. GE needs to take its informal submittals and write them up in the SSAR.	GE has submitted only a few of the SSAR updates. Staff expects GE to provide majority of its SSAR updates on PRA issues in December 1992 and January 1993.	GE's action to submit followed by the staff's review of these submittals.
2. GE is to analyze LOCAs outside of contain (0-4)	GE's previous submittals on these LOCAs were not acceptable to the staff or the ACRS. GE and the staff have discussed what needs to be submitted.	GE submitted reanalysis on 11/5. This analysis also is to address bypass potential for drywell purge and inerting lines (19E.2.3.3). Staff is reviewing. 0-4B
3. 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.	GE to submit requested information. No date has been provided by GE, but it should not be protracted. SC-2
4. 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 to submit. 0-21A

5. 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. Should not take GE a long time to complete. PRA-1A

6. 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. No date given.

7. 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 to provide additional information to support vacuum breaker leak test data. O-18G

8. 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.

Based on 10/1/92 meeting, GE to (1) reassess the potential for flooded cavity at vessel failure and (2) provide chronology for additional cases reported in SSAR (This information was not provided in the November 3, 1992 Fax). NRC-1

9. Accident management	Staff evaluation provided to GE in draft Severe Accident Closure chapter. GE's planned response discussed 10/5/92.	GE to develop and submit additional guidance for COL applicant on aspects of ABWR design which should be addressed by applicant in developing their accident management plan. NRC-2
10. 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. NRC-3
11. 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 O-4.	GE to reevaluate seismic issue after completing analysis of issue for internal events. Now being addressed as part of revised seismic margins analysis. (O-4, O-19)
12. AC Power Recovery		GE submitted reassessment of 0.6 value assumed for probability of recovering AC power on 11/3/92.
13. GE to provide PRA Insights	GE still has to provide a discussion of balance of prevention and mitigation, improved discussion of vulnerabilities.	
14. GE to provide decay heat removal reliability study	The staff has sent GE a list of formal questions.	O-20

15. 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.

1-9

16. Human factors in PRA (C-5, O-7 thru O-10, I-2 thru I-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. C-5 to I-7

17. 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. SA-2

18. 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. PRA-3

19. 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 at this time.
I-8

20. Net risk impact of
passive flooders system

GE confirmed
(11/3/92) alloy
mixtures to be used
in passive flooders
valve. O-15

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

Staff to complete
review. O-18C

22. Uncertainty
Analysis - Treatment of
CCI coolability in CET

Staff to work with
BNL contractors to
address risk
significance of
issue in FSER. (O-
18E, O-16)

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

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.

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.
O-18D

24. 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.

25. 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

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

GE's original submittal
discussed this in
generalities. The staff
wants a comparison of
sequences with an
explanation of why the ABWR
design results in such
significant CDF reductions.

GE submitted its
write up. Under
staff review. 0-1B

27. 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.

Under staff review.
1-15

The following are SPSB issues

28. Fuel-Coolant
Interaction

Staff pursuing independent
analysis of FC explosion.

29. Core Debris
Coolability/Core
Concrete Interaction

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

30. Containment Bypass

Severe accidents
demonstrated .6ft² with
fire water. 0.1ft²
demonstrated w/o fire
water. GE to document
further information on DBA
analysis.

31. Compliance with EPZ
Emergency Plan Criteria
and Methodology

CA-6