UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

AUG 2 2 1983

MEMORANDUM FOR: Roger J. Mattson, Director
Division of Systems Integration

FROM: Themis P. Speis, Director
Division of Safety Technology

SUBJECT: REVIEW OF BROOKHAVEN ZION PROBABILISTIC SAFETY STUDY EVALUATION (VOL. II)

A review of the Brookhaven evaluation has been completed by Scott Newberry who is also coordinating the overall review of the Zion Probabilistic Safety Study. We have included our specific editorial, typographical, and technical comments in the enclosure. In general, Volume II is well written and organized.

Review of Volume I by the staff and utility is not yet complete. Errors in quantification or modeling, and any other aspects of the Vol. I review which effect Vol. II, will be passed on to Rich Barrett or Jim Meyer expeditiously.

Themis P. Speis, Director
Division of Safety Technology

Enclosure: As stated

cc: F. Rowsome
[redacted]

A/E-63

ENCLOSURE

Detailed Comments on Vol. II, NUREG/CR-3300 Draft

Page	Comment
General	There is a need to provide more specific information regarding which accident sequences are contributing to the plant damage states being used or referenced by BNL. This is not so much a BNL problem, but a problem that results from using two separate National laboratories to do a PRA review. For example, rather than refering to damage state SE or TE, it would help a reader to know which sequences (loss of offsite power, loss of component cooling water, etc.) contribute to the damage states being discussed. It is recommended that Scott meet with Jim Meyer to discuss the best way to improve this area.
General	Volume II (and its summary) primarily use mean risk values to compare results. The use of means in the format found in Section 4 is very useful for tracking through to the plant damage state contributors for each risk index. While this approach is very useful, we also think that some CCDFs from Appendix B should be included in the summary to provide a more complete risk perspective. It is also recommended that the significance of the Level 1 vs. Level 2 risk estimates in the Zion Probabilistic Safety Study be shown using CCDFs. (Perhaps the CCDFs could be reduced substantially in size so that several could be fit on a page, if space is a concern.) The summary report needs a discussion of uncertainties. Also, additional referencing in Section II-4 of the summary would help a reader find such things as the revised BNL C Matrix or release categories back in the main report.
General	Recommend switching section II.2 and II.3 around - II.2 Site II.3 Release Fractions

II-10	In last paragraph it should be made clear that Table II.3 only refers to internal events.
General	Risk Tables should have units of per year should they not?
II-11, Table II.3/II.4	Indicate on Table II.4 (Internal and External) that this is the Best Estimate.
II-12	"... largely composed of small break LOCA." Add-due to RCP seal LOCA from seismic event.
II-12	First complete paragraph describing Table II.3. At end of 1st sentence add, "for internal events."
II-13	Next to last paragraph in Section II.5.1 - change last two sentences to read: "However, monthly verification of the room cooling function has been instituted at Zion, and the sensitivity study only serves to indicate why verification is important. Commonwealth Edison has included this verification in their testing program"
II-13	Change 1st sentence in last paragraph to read, "The fire analysis sensitivity study and ..."
Main Report Table 2.3	What is the difference between plant damage state SE, Class 2 and plant damage state SE Class 6 (external)? The rest of Volume II seems to indicate that SE (external) is the same except for the evacuation assumption used to estimate consequences with the NRC site model.
2.35	Ref. 9 - Typo: Mazekis should be Mazetis.
Section 2	A picture of the Zion core vessel internal section would be helpful - as would a cross section of the containment with major features - sumps, cavity, fan coolers, vessel, etc.
2.28, Section 2.3.2	The discussion of sequences with no sprays operating is said to include SLF and ALF which are not in containment group 3 as discussed. Containment group 5 (SLF and ALF) frequencies are much higher and the fraction of core melt frequencies is definitely not negligible as suggested.

Page	Comment
Pg. 2.31	Typo. 3rd paragraph line 13 "rise" not "risk".
2.32, Section 2.3.4	Similar to above comment - sprays are not operating in SLF and ALF yet Section 2.3.4 says it applies to cagetory 5 sequences. Is this important?
3.7	The section 3.2.1 description of the gradual overpressure failure is in error. For a loss of offsite power steam generator relief valves do not fail.
3.9 - Top	In the discussion on plume energy and duration, justification should be given for the BNL differences. No discussion is included on assumed size of opening.
3.11	Second paragraph - should read Table 3.3 not 3.4.
	Why is the height of the event V release the same as containment overpressure.
Table 3.3	Justification should be given for differences in the ZPPS/BNL release parameters.
3.19 and A.3	Difference between the release categories is not explained for inputing into Table 3.4 and A.3 for comparison.
	Why are so many people effected (10^3 to 10^4 man-rem) for release categories 8A and 8B?
3.20	It would be helpful to define B1, B2I, B3 and B2E at the bottom of the page.
B.5 and B.10	It seems odd that the total man-rem curves for the revised POINT ESTIMATE are the same for the "external and internal" and "internal" cases.
4.2	The description of figure A-11 through A-15 is not clear. What is missing in the ZPSS?
Pg. 4.9 - Table 4.5	**Footnote - recommend deleting the word "increased"
	It would be convenient to have percentage tables for the revised means as well (like Tables 4.6 and 4.7).

Page	Comment
4.12	Typo - 1.65 vs. 1.64 in Table 4.14.
4.13	The conclusion regarding the reason for increasing the plant damage state SE is incorrect. SE in this case comes from the internal event analysis (See Vol. I). Sandia did not increase seismic SE.

		Internal	Internal & External
ZPSS	SE	1.9×10^{-8}	1.6×10^{-4}
SNL	SE	1.36×10^{-4}	2.9×10^{-4}

(From Tables 4.13, 4.10, 4.4, 4.5)

4.23	Should probably comment on why release category 7 was deleted from the simplified C Matrix.
4.28 - Bottom	Should state why NRC staff and ZPPS site models yield different consequences for 2 and 2R releases.
4.29	Should state difference is from 8 hr. and 24 hr. release time for seismic event shown in Table 3.4. State the evacuation assumptions.
4.34	What is really meant by "consistent with the RSS methods" when referring to the B2 release and aerosol deposition?
4.41	Reference to Table 4.38 should include that its only for internal events.
4.42	3rd paragraph - States that the increase in acute fatalities comes from seismically induced SE increase. The increase is only from the evacuation assumption is it not? Sandia did not increase the SE frequency in Volume I.
5.1	Second paragraph - Section 5.1. Change the last sentence to read, "However, since Commonwealth Edison has revised their surveillance procedures to verify the room cooling function monthly, the sensitivity study in Section 5.1.2 ...."

Page	Comment
Pg. 5. 8, Table 5.4	Need to say somewhere that the plant damage states are Best Estimates (internal and external) - Could also include up front in section 5.0.
Pg. 5.9, Table 5.5	It is not clear from reviewing the CCW sensitivity study why acute fatalities go to "0", since there still is some seismic risk coming from TE instead of SE. This may have not been made clear by SNL in Vol. I.
Page 5.2, Section 5.1.3	Add statement - "due to the Commonwealth Edison commitment to verify cooler operation monthly."