P. R. Davis
P. O. Box 1604
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March 22, 1982

Dr. J. Michael Griesmeyer
Staff Engineer
U. S. Nuclear Regulatory Commission
Advisory Committee on Reactor Safeguards
Washington, D.C. 20555

Dear Dr. Griesmeyer;

Pursuant to your letter to me dated March 9, 1982, I am pleased to submit this list of questions and comments which is condensed from my letter report sent to you on Jan. 15, 1982. My condensed questionas and comments are as follows:

1. Containment Integrity;

   A. How and to what extent has failure to isolate the containment been considered?

   B. Temperature effects in the concrete are dismissed as not important (Vol 7, Sect.4 App. 4.4.1). Is this conclusion valid for all accident sequences, particularly those in which sustained high containment temperatures are likely? Can more detail be provided on concrete temperature calculations, such as liner to concrete heat transfer assumptions, and film heat transfer coefficients used?

   C. How and to what extent has failure of containment penetrations and seals been considered during the high temperature conditions calculated to occur.

   D. How and to what extent have interfacing system integrity failures been considered in the recirculation mode under Class 9 accident conditions of temperature, pressure, and radiation.

   E. How has failure of the containment purge system been considered in the analysis of containment integrity?

   F. How has the possible failure of fan coolers from aerosol plugging of filters been considered?

2. Containment mass and energy loadings;

   A. Additional justification and analysis seems required to justify the optimistic core melt and H_2 combustion and generation results as well as their uncertainties.

   B. MARCH code limitations and non-conservatisms need further consideration.

3. Failure Rates;

   A. What methods were used to evaluate and quantify system dependencies, and what were the results of such methods for specific systems?

B. Some failure rates appear very low compared to other assessments (Table II.4-15) and the differences should be evaluated. These include;
   a. Electrical bus failure
   b. HPIS
   c. Auxiliary Feedwater

4. Other areas;

   A. The V sequence probability is very low for Zion and needs to be reconciled with results from other studies.

   B. Loss and recovery of off-site power seems quite optimistic and requires further justification.

I have supporting information relevant to many of these questions and comments which I will be prepared to discuss during the meetings on March 25 and 26. Let me also emphasize that I have not had time to thoroughly research these concerns in the various sections of the Zion PRA. While I have looked through some of the report to obtain the relevant information, my search has not been exhustive by any means. Thus, it is possible that the report does contain sufficient information for some of the problems identified.

Sincerely,

P. R. Davis

3/24/82
ISRAEL

Meeting with Licensee

1. Walk through turbine trip with loss of offsite power. (Event IIb)
2. Basis for viability of feed & bleed
3. Basis for operability of recirc pumps post core melt
4. Basis for operability of fan coolers post core melt
5. Are PORV block valves opened or closed? What administrative requirements for keeping them open?
6. What specific function needs CCW on ECCS / core spray pumps etc. What is basis for operability of these pumps without CCW?

Additional Questions for IP

① Where do they discuss how they handled FMEA's on primary system values per Denton Order?

② What was their QA on study?

③ Missed References 1.3-10
1.3-15
1.3-26
1.3-27

IP 3-13, 17

Frank Rowsome
4-6-82

Questions on IPPSS
from S. ACHARYA / W. Pasedag

Q1. The "night time" 0-50 mile population estimates (see top of page 6.2-5) provided in Table 6.2-6 presumably is approximately the same as the residential population. As stated in the last two paragraphs in page 6.2-5 and the first paragraph in page 6.2-6, the projected residential population within 0-50 miles for the year 1980 used in the consequence analysis was derived from the 1970 census data. However, the staff notes considerable differences between the 0-50 mile projected population distribution for 1980 provided in Table 6.2-6 and the projected 0-50 mile population that would be obtained using the population information provided in Figures 10.C-3 and 10.C-3a in the licensee's document "Emergency Plan for Indian Point Unit Nos. 1 and 2" updated December 1980. An explanation for substantial differences as noticed above which would likely affect the consequences should be provided.

Q2. Basis for the assumption of 1 hour as the base-value of evacuation delay time for all populations for all locations within 10 miles should be provided. Further, basis for numerical values of the modifiers to adjust the delay time for adverse weather and schools in session scenarios and the assigned probabilities for these modifiers should also be provided.

Q3. The assumption of sheltering of 90% of the population between 10-50 miles should be justified. In situations where the emergency response would be the sheltering mode rather than the evacuation or the no-response modes, there would still be a time lag before people would actually be in the sheltering mode (due to delay in notification advising people to shelter). During this time-lag the shielding factors only for the situation of normal activities of people as assumed in WASH-1400 would be appropriate. Further, for not diminishing the benefit from the improved shielding factors (given the sheltering mode) it is also necessary to advise the people to open the windows and enhance ventilation to expel contaminated air trapped inside the buildings for exchange with the outside fresh air after the radioactive plume has left the area. Unless this latter action were taken, the dose from prolonged inhalation of the contaminated air trapped in the buildings would result in higher doses from plume inhalation exposure pathway (see WASH-1400, Appendix VI page 11-8 and Figure VI II-5). Therefore, a discussion of the emergency response scenario involving sheltering between 10-50 miles including the fraction of time during the early exposure period the people would remain in the sheltering mode should be provided.

Q4. Besides the societal consequences of reactor accidents presented in the IPPSS, other societal consequences such as costs of offsite mitigation measures, and individual risks of early and delayed health effects as function of distance are also recognized by probabilistic risk analysts as parts of a fully developed PRA. The latter consequence and risk items are absent in the IPPSS and should be provided.

Q5. Provide justification for assuming that supportive treatment would be available for every individual exposed above the threshold dose for early lethality in the calculation of early fatalities.

Q6. For those accident sequences which you judge could be initiated by an external event with a probability of 10^{-7} per year or greater, how would the accident consequences change compared to events of similar probability not involving external events?

Q7. It appears that a major inventory of radionuclides, i.e., the spent fuel pool, is not included as a potential source of radionuclide releases. Please address the reasons for this omission.

Q8. Section 5.3.4 states that containment isolation failure events were assigned to their respective release categories on the basis of a 4 inch equivalent diameter opening. Does this consideration apply to a failure of the containment isolation systems to close containment purge isolation valves?

Q9. For sequences in which fan-coolers, but not sprays are functional, how was the build-up of aerosols on the particulate filter accounted for? Was a reduction of the heat removal rate resulting from reduced air flow accounted for? Would break-through of the particulate filter media occur? What was the total particulate loading assumed for the filter?

Q10. Section 5.5

a. The second paragraph of section 5.5 states that TMI-2 "observation" resulted in the conclusion that existing source term estimates (i.e., RSS values) for iodine were conservative by "orders of magnitude." The third paragraph states that RSS data and technology would correctly predict the TMI-2 behavior. Which of these conflicting statements is considered correct?

b. The fourth paragraph of section 5.5 states that the available data indicates that source term values used in the study (i.e., RSS values) are conservatively high. In view of the "quite limited" data discussed in the first paragraph, discuss the basis for this statement, and cite any applicable experimental data which leads to this conclusion.

NRC STAFF REVIEW MEETING

INDIAN POINT PROBABLISTIC SAFETY STUDY

Topic	Person Responsible	Time
Introduction	Dr. Hanauer	1:00 - 1:05
Introduction	Con Ed/Pasny	1:05 - 1:15
Summary and Outline of Indian Point 2/3 Study	Con Ed/Pasny	1:15 - 1:30
Plant Specific discusion	Con Ed/Pasny	1:30 - 2:30

a. Turbine trip with loss of offsite power.

b. Basis for feed & bleed

c. Basis for operability of recirc pumps

d. Basis for operability of fan coolers

e. PORV block valve status.

f. ECCS/Core Spray pumps operability without CCW

g. FMEA on primary system valves

h. QA status

i. references

ACRS questions — 2:30 - 3:30

General discussion and questions — 3:30 - 4:30

a. Consequence Calculations

b. Containment Caculations

c. External Events