DEFENSE NUCLEAR FACILITIES
SAFETY BOARD

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Mr. Mark A Cunningham, Chief
Probabilistic Risk Assessment Branch
Division of Safety Issue Resolution
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Dear Mark:

Attached are my comments to date on the latest draft of the PRA
Working Group's report.

I look forward to seeing you in Albuquerque.

Sincerely,

Herbert Kouts

cc John Weeks

I have two very general comments on the draft report.

The first is that it does serve the purpose intended for it, in that it provides the desired guidance to the staff on the use of probabilistic risk assessment in activities of the Nuclear Regulatory Commission.

Second, I doubt that there will be another PRA activity within NRC with the magnitude of effort that was needed to generate NUREG-1150. The parts that are unlikely to be repeated on a grand scale are the formal solicitation of expert opinion as a basis for generating distribution functions for branch probabilities, and the very large repetition of computer runs using hypercube sampling to generate distribution functions in final results. If this is true, there is a change in the objective of guidance that is to be given, in sections of the report containing discussions of the techniques used in NUREG-1150. Instead of telling how NUREG-1150 was done so that repetition is done right, the report tells how NUREG-1150 was done so that the products of that study can be used in the future with good understanding of the methods used to develop them. The products most likely to be found useful in future applications are the complete PRAs themselves, and the distribution functions for branch points found by whatever means. The former would serve as surrogate PRAs in other cases, and the latter would be

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useful in new PRAs conducted when surrogate methods are unsuitable.

Main body of the report: The following are my general comments
on the main body of the report. Very specific comments in the
form of editorial corrections are reserved until the Albuquerque
meeting,

Page 6, under Task 3.1: The sentence says that general guidance
has been developed for two PRA uses. The sentence mentions three
uses. Presumably the first two are the ones referred to in
connection with general guidance, but the sentence is not clear.

Page 22,where there is a list of items constituting general
guidance for screening and prioritizing issues and events:
   •Under the first bullet, I do not see why or how uses should
   be made of PRA logic diagrams such as sequence diagrams,
   fault trees, and event trees, in screening and assigning
   priorities. This seems to be mechanical and without
   purpose. Can it be looked at?
   •The fourth bullet, on whether realistic or conservative
   analysis should be used, seems self contradictory. It
   suggests that both avenues be used in screening calculations
   and therefore gives no guidance.
   •In the first bullet on page 23, the adjective "low" in
   reference to truncation level is unclear. Can this be

stated differently?

•The review mentioned in the second bullet on this page should take place at an early stage, preferably in the course of the analysis.

•There should be another item of guidance, saying that in any comparison of sets of events, such as in prioritization, issues should be assigned importance in a classification coarse enough to reflect the uncertainties in the analysis (e.g. high, medium, low).

I thought the very important section 4.5 on pp 35-36 was very well presented.

The timetable in Table 4.2 on page 37 is very ambitious, and I would be surprised if it could be adhered to.

Appendix A: I have no special comments. The Appendix only reports what was done.

Appendix B: My principal comment is that this Appendix badly needs editing. The writing is such as to obscure the meaning to one not already familiar with the subject and the jargon of the field. For instance, and just to extract a few examples, I stumble over "PRA-based margins methods" (page B-4, third paragraph, fourth line). Are these PRA-based margins or PRA-based methods? Likewise I boggle at "point estimate conditional

core damage probabilities" (page B-12, line 4). And "severe accident research issue analysis" (two-thirds down page B-14). Is this analysis of research issues pertinent to severe accidents? Or analysis of issues arising in severe accident research? They are not the same. The fact that I have extracted only a few examples should not be construed as meaning these are the only editorial problems. They are found throughout.

Some specific comments on the material in this Appendix:

Page B-10, next to last line: To what does the word "they" at the end of the line refer?

Page B-11, paragraph at center beginning with "Essential PRA Elements:": I do not see how sensitivity studies on key variables would be used in prioritizing generic issues.

Page B-12: There are five paragraphs before the line saying Operational Data Analysis. The third and fifth paragraphs are so badly written that the meaning is almost completely obscured. In the second paragraph following the underlined heading, surely it is estimates of core damage frequency that is meant. In the third to last line on the page, I do not know the meaning of "amenable for".

Page B-13: second paragraph—again it should be estimated core

damage frequency. In the recommendation at the middle of the page, the term should be "similar to" rather than "resemble". In the second line of the last full paragraph, it should say "risk associated with <u>resolution of</u> the issue.

Page B-14, next to last line: What is meant by "the risk of an entire nuclear plant"?

Page B-15, first full paragraph: The purpose of the Reactor Safety Study was to respond to a question from the Joint Committee on Atomic Energy of the US Congress; this question was, "How safe are nuclear power plants?" The question needed answering for guidance in Price-Anderson legislation. In the next to last paragraph, are these the purposes as stated by the Commission at the time?

Page B-16, second line of last paragraph: "permits the Agency to <u>require</u> backfit".

Page B-17, first full paragraph: the staff is giving guidance to the staff?

Page B-19, fifth line of second paragraph: <u>misadministrative</u>?

Page B-21, first full paragraph: I do not understand the assertion in the second sentence.

Page B-23, last full paragraph: Chapter 15 events are never interesting from a PRA point of view, because they are by definition in the design basis and have associated protective features that reduce consequences to essentially trivial levels from the standpoint of risk. The only interesting sequences in a PRA are those beyond the design basis which generate risk. Also note that gap release would only take place if there were fuel failure, which is not a consequence of steam generator tube failure. The radioactivity released in this scenario would only be that in the coolant from tramp uranium or from leaking fuel.

Page B-24, the section on "affected facilities": US plants differ enough one from another (especially in balance-of-plant) that priorities are likely to be different even for plants that are similar.

Page B-25, the partial paragraph at the top of the page: another way in which the early PRAs are inadequate is their lack of inclusion of external events. First full paragraph, second line: what change? Finally, I believe the discussion in the last full paragraph is faulty, and we will discuss it in Albuquerque.

Page B-26, first sentence: Ideally, this is the intent.

Throughout, I prefer to use "frequency" to describe a rate determined from historical information, and "probability" for one

so infrequent that it has never occurred. I believe this reflects common usage.

Section C.4: This is an excellent section that serves to instruct how the analyses were done for WASH-1400 and NUREG-1150. I somehow feel, however, that more is needed on adaptation of existing PRAs. Also, what about the future when plants may be substantially different. Will we be able to extract great benefit from existing PRAS?

The discussion of APETs on page C-85 should recognize that this is an area of the PRA where there is wide lack of data and substantial dependence on judgement. Therefore the uncertainty is high. The point should be made that the level of detail in the APET should reflect this level of uncertainty.

Page C-117: I suspect that most PRA usage in NRC will depend on surrogate PRAs. How is uncertainty to be estimated in such cases? No guidance is given on this point.