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

APR 02 1990

MEMORANDUM FOR: Richard J. Barrett, Chief
Risk Applications Branch
Division of Radiation Protection
and Emergency Preparedness

FROM: Cecil O. Thomas, Acting Chief
Human Factors Assessment Branch
Division of Licensee Performance
and Quality Evaluation

SUBJECT: COMMENTS ON THE DRAFT REPORT, "ASSESSMENT OF THE POTENTIAL FOR ISLOCA AT THE DAVIS BESSE NUCLEAR POWER STATION"

The following are comments and questions by the Human Factors Assessment Branch on the subject report, with attention to the human factors/human reliability analysis portions of the report, and to appendix E.

General Comments/Questions:

1. To fully understand and appreciate the study, and the contributions of human error to ISLOCA, the reader must have a strong working knowledge of PRA/HRA principles. It would be beneficial to identify and operationally define key terms and concepts for the reader less versed in PRA/HRA methodologies. Given that human error would contribute significantly to an ISLOCA at Davis Besse according to the report, a more detailed discussion should be included early in the report of the types of human error that would contribute to ISLOCA, why the errors would occur (root causes), and how the errors could be avoided or mitigated. The report should emphasize that the human error probabilities (HEPs) are "indications" or "estimates" and are not to be interpreted as "absolutes".

2. In light of the many uncertainties in HEPs, as indicated by the confidence boundaries and significant differences in core melt probability between the screening (2.8 E-2) and base case HEPS (3.8 E-5), it appears that single value differences among core melt frequencies are misleading. A more appropriate description might be provided by giving the minimum/maximum calculated values of core melt frequency so that the overlap in range can be examined.

3. What is the impact on a PRA if the plant does or does not have a planned preventive or predictive maintenance program?

4. Does the fact that Davis Besse had no leaks for 7 years, did no preventive maintenance, but had a catastrophic valve failure, alter its risk?

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Detailed Comments/Questions:

1. p. V, Paragraph 3. Where in the report is "safety culture" and "situational awareness" defined or discussed?

2. p. 16, second paragraph. Spelling error - "human factory".

3. pp. 48, 49. Though findings indicated (per discussion in Table 4.2-1) that human error-initiated sequences contributed "much more" to core damage frequency than hardware sequences, the human errors and the sources of the human errors are not identified to the reader in the context of this discussion.

4. p. 50. Second sentence doesn't make sense, grammatically.

5. p. 55. Meaning of "sensitivity study" is unclear and should be explained. Are "sensitivity case HEPs" referred to in paragraph 2, second sentence, the same as HEPs "based on detailed plant information (base case)," referred to in paragraph 2, first sentence? Different terms appear to be used to describe the same item.

6. pp. 55, 56. The meaning of "optimized" is unclear. How were the Performance Shaping Factors actually taken into consideration (optimized) in the HRA process to yield some human error probability? Is optimizing a standard practice of HRA?

7. p. 56. Should term, "procedure," be inserted after "stroke test" in item #1? In item #2, "instrumentation" - should the term be "unambiguous" rather than "ambiguous" information?

8. p. 59. Two conclusions are reached -- that lack of awareness of interfacing system LOCAs, and the casual attitude of plant personnel in dealing with pressure isolation boundaries appear to be most significant contributors (to human error in ISLOCAs). How are these two conclusions substantiated by HRA: i.e., where in the sensitivity studies/optimization analysis were these two factors examined? How was the conclusion reached that these two factors, attitude and awareness, are significant contributors to human error?

9. p. E-3. Narrative discussing "initial screening human error probabilities" and a "second set of screening HEPs" doesn't appear to match with the titles in Table 1.

10. p. E-3. What is the nature of the detailed plant information that allowed a "second set" to be generated? How was it generated? Where do the values appear in Table 1?

11. p. E-8. How was the level of stress determined and defined? What influence, if any, did the level of stress have on human error? On HEP values?

12. p. E-27. Does THERP assign stress levels to tasks? How was the level of stress determined to be optimal for tasks?

13. p. E-28. The term "confidence boundaries" is unclear -- how do the outer limits of the boundaries (UCB & LCB) impact the ISLOCA frequency predictions?

14. pp. E-30-36. The narrative does not explain the details of these tables, e.g., from where do the error factors come? How are they determined? How are the four decimal nominal HEPs calculated? What are the basis and validity of the THERP source table values?

15. p. E-39, table 11. How are the nominal values from the HEP tables expanded from four to six decimal points? These values started from two and three decimal point estimations which are poor, at best, and are then expanded to the precision of six decimal points.

16. p. E-41, tables 11, 13. Why is the total failure probability to three decimal places and the total success to four decimal places?

17. p. E-44. The screening values are said to be "based on accepted screening techniques". In light of the three magnitude differences in core melt probability resulting from the use of screening data vs. base case data, who has "accepted" the screening technique? How is plant-specific knowledge converted to base case data, and what makes it the "true best estimate"? What is its validity?

18. pp. F-45, 49. Core melt frequency values appear to be inconsistent.

19. p. E-46. How were the qualitative improvements listed on this page converted to quantitative HEPs?

Cecil O. Thomas, Acting Chief
Human Factors Assessment Branch
Division of Licensee Performance
and Quality Evaluation

cc: J. Roe
F. Coffman (RES)
G. Burdick (RES)
S. Diab
K. Campe

10A2

3/24/90 HIF Comments on ISLOCA Report (D. Bone)

- Qual. vs Quant. → How?
- Questionnaires → Used @ plant?

DRAFT

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General Comments/Questions:

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COT

conc.

j/b, d/s, d/e, COT

cc.