



DEPARTMENT OF PHYSICS

SANTA BARBARA, CALIFORNIA 93106

April 13, 1979

Dr. Joseph M. Hendrie, Chairman  
U. S. Nuclear Regulatory Commission  
Washington, D. C. 20555

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Dear Joe:

Now that the situation at Three Mile Island seems to have stabilized, I assume that everyone will be beginning the long process of learning and absorbing the lessons of the events, and I hope that you will not think it presumptuous if I share my first try with you. The following are truly first impressions based on fragmentary information, and are hardly original, and I do eagerly await the results of the inevitable thorough and complete elucidation of the course of events. In particular, I hope that you do not read into the following any effort to second guess anybody, since I have neither the facts nor the inclination to do so.

It seems to me that the central lesson is to provide a boost for the concept of flexible response, as was the case at Browns Ferry. The facts seem to be that there were surprises at Three Mile Island, and I see little reason to expect that there will not be surprises if any future accidents go this far down the sequence. Further, you know that I believe that constructive human response is one of our greatest unquantifiable lines of defense, and that was true at Three Mile Island. The concept of flexible response has obvious implications for the training of reactor operators, and for the provision of rather more instrumentation designed to provide information under upset conditions than seems now to be the case. Everyone knows about water level indicators -- are there other examples? In addition, it suggests increasing, rather than decreasing, the flexibility provided to reactor operators, concurrently with an upgrading of their training and testing. The aviation analogy is, as usual, obvious, and one recalls that there are some two thousand commercial aircraft in the United States and only seventy reactors. New reactors cost a billion dollars each. Thus, in addition to the things that the NRC will continue to do to reduce the probability of accidents, this concept would imply that one should:

- 1) expect accidents anyway (that is, after all, what probabilistic risk analysis is all about)
- 2) expect surprises (AUE - anticipated unanticipated events?)
- 3) provide redundant and prolific instrumentation to supply information in upset conditions (even to cover parameter ranges that would be considered "off scale" for normal operations)
- 4) substantially upgrade the training, prestige, and responsibility of senior reactor operators.

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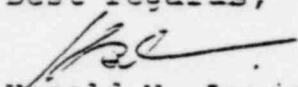
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It also seems to me that this accident was not necessarily a failure for probabilistic risk assessment. Though the probability was apparently calculated by the infamous square-root bounding technique, WASH-1400 did have in it the likelihood that the discharge valves on the auxiliary feed water system might all be inadvertently left closed, as a testing and maintenance error. Obviously, one doesn't take the calculated probability too seriously, nor does one trivially extrapolate the situation at Surry to that at other plants, but it is true that WASH-1400 provided a listing of a large number of credible accident sequences. It would be interesting to go through those, asking whether there are any procedural actions or inspection reallocations that can be taken to reduce their probabilities, or instrumentation enhancements that might help to control the sequences without ambiguity. I still believe in the Review Group recommendation to take probabilistic risk assessment seriously.

Finally, the need to learn as much as possible from the Three Mile Island experience is obvious, and does not require repetition from me. I hope, and assume, that there really will be a serious and objective effort to do so, uncontaminated by the need to place the blame.

Best regards,

  
Harold W. Lewis

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