



DEPARTMENT OF PHYSICS  
SANTA BARBARA, CALIFORNIA 93106

November 23, 1977

The Honorable Morris K. Udall  
House of Representatives  
Washington, D.C. 20515

Dear Congressman Udall:

Although you know that I chaired the APS study on Reactor Safety, and am currently chairing the NRC look at Risk Assessment and WASH-1400, I wish to emphasize that I am wearing none of these hats in the following.

For some years I have been concerned about safety assurance for nuclear reactors, and have been bothered by the fact that so much of the public attention has been focused upon risk assessment, to the detriment of the former. In some respects it is easier to make contributions to the former than to the latter, and it is in that context that I wish to bring to your attention a suggestion which I have been making for years, and which I obviously believe has some merit. It would probably require some legislative action.

There are many analogies between the problem of reactor safety and that of aviation safety. Each deals with a highly complex mechanism, with potential for mechanical, electrical, and human failure, and with the safety of each predicated upon a "defense in depth". In the aviation case, the analysis of real accidents normally reveals a chain of events coupled with operator error, ultimately leading to an accident, although the record sometimes includes unique events such as the baggage door failure on the DC-10. The analogy I see is that these two technologies each involve extremely complex systems, the analysis of whose behavior, especially under upset conditions, strains our capability to or perhaps past the limit.

How then do we assure, and continue to improve, aviation safety? We recognize that designs are not perfect, that inspection is not perfect, that pilots are not perfect, and that accidents themselves can form a statistical base for safety assurance. In particular (and this is a feature shared with reactors), we exploit the fact that any serious accident must have some less serious precursors, and that the precursors themselves provide statistical keys to the weaknesses in the system.

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The problem is to learn enough from small accidents to make the corrections necessary for the prevention of large ones. Historically, this has been a successful approach, and public acceptance of aviation attests to that fact.

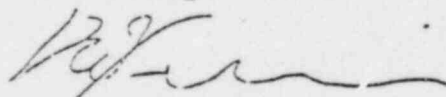
The bureaucratic mechanism used (and I don't mean the term in a pejorative sense) is a quasi-judicial board known as the National Transportation Safety Board, independent of the relevant regulatory agency (in this case the FAA), which makes a responsible analysis, including hearings, of aircraft accidents. The hearings are not intervenor-like proceedings, but are responsible efforts to assign "probable cause" to the accident and the Board's determinations are often followed by recommendations to the FAA for either alterations in procedures or systems or aircraft. The FAA has ultimate responsibility for regulation, and may then issue mandatory retrofits on the relevant aircraft, may adjust its own controllers' procedures, or may do nothing. But it is not responsible for evaluating its own performance.

This procedure, over a period of time, has served to make flying acceptably safe, and indeed many of the mandatory retrofits are initiated by the FAA without NTSB action. The philosophy is simple, and it works.

It seems to me that an analogous procedure with respect to the nuclear industry could be effective (and I say this without any implication about the ability of NRC to do its job). Not only would it help, over a period of time, to close the loopholes on reactor safety, but it would even help in the public domain. For example, a dispassionate external analysis of the Brown's Ferry incident would be valuable even now.

I could spell out this proposal in greater detail, but am not sure that it would be useful. I would be happy to come in to talk to either you or to Henry Myers about this, and even to bring along some sample NTSB reports to give the flavor of that operation. If you are interested, and feel that would be useful, please let me know.

Sincerely,



H. W. Lewis

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