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Dear Bill,

My participation in the July 2nd meeting, and review of associated material was an introduction to the Class Nine Accident discussions. I was left with concerns about one major omission, and several misplaced emphases in these considerations.

1. All reactor safety analyses, including the now classical WASH-1400, conclude with estimates of the hazards to the health of the public arising from the release of radioactivity from the reactor containment building. The results are given in the now widely used CCDF curves relating accident probabilities and extent of injuries. It is implicitly assumed that only radiological health insults need be considered.

More subtle health effects are neglected, in particular the mental stress induced in susceptible persons by the continued presence of a substantially degraded core either in the reactor vessel, or spread in the reactor building if the vessel has failed. Continued mental stress, unresolvable by the person subjected to it, is becoming recognized medically and legally as a factor in the health of an individual. It can lead to personality difficulties, somatic illness, alcoholism, even suicide. These effects are far more difficult to identify and measure than man-rem exposures, but they are not negligible.

Thus the traditional safety analysis which assesses the probability of core damage, the efficacy of the RCB in mitigating core release, and finally the radiological hazard to the public under different weather and evacuation conditions, is necessary but not sufficient. It ignores a significant public health hazard which may exist even if indeed the radioactive release is negligible. Some, or many individuals in a community near a reactor building containing a mass of core debris may be subjected to mental stress constituting a health hazard.

My concern about this omission leads me to two conclusions.

A. Major emphasis in improving reactor safety engineering features should be placed on prevention of core damage, rather than on mitigating the results of a degraded core. In the light of TMI, the importance of much better and more extensive, less ambiguous plant instrumentation is evident. Major plant systems must be as forgiving of upset conditions as possible, rather than have characteristics which compress the time scale of an accident, even if such a choice compromises operating efficienty somewhat. The choice of steam generator type is an obvious example.

On the other hand, mitigating features now being considered, in particular controlled venting to the atmosphere to relieve pressure, may in fact be counterproductive and should not be adopted without much deeper study of non-radiological hazards.

B. We need to know much more than we now do about these poorly identified and understood hazards associated with mental stress. We should be as well informed in specifics and in susceptible population statistics about these hazards as we now are about radiological hazards. Reactor safety analyses are seriously incomplete with their present limitations, and misplaced priorities may arise as a result.

2. My second major concern arises from my belief that TMI was as much, if not more, a failure of institutions and people than it was a technological failure. Greater reductions in the potential hazards to the public health and well-being can be expected from better institutions responsible for nuclear power deployment, and from greatly improved operating staffs and procedures, than are likely to result from technical fixes alone. I recommend that Congress, or some entity it selects other than the nuclear industry or the NRC, undertake an innovative study of these institutional issues, with the many political and financial considerations they encompass.

In summary, I am concerned that the Class Nine Accident considerations are constrained by the limitations of the traditional reactor safety analyses, ignore a potentially significant health hazard, and therefore may underemphasize prevention, overemphasize

mitigation. This concern relates to both design fixes which NRC may require, and to future research resource allocations. Secondly, I am concerned that the emphasis will be heavily on technical fixes. These will undoubtedly be beneficial, but greater benefits might accrue from major institutional innovations.

Sincerely yours,

Sidney Siegel