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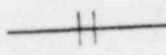
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29 April 1980 NUCLEAR REG. COMM.
ADVISORY COMMITTEE ON
REACTOR SAFEGUARDS

Dr. Max W. Carbon
Advisory Committee on Reactor Safeguards
United States Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Dr. Carbon:

You have asked me to write down an expanded version of my comments at the May 24th Natural Circulation Subcommittee meeting. This request was made in the wake of a brief flurry of conversation at the end of our April 24th meeting in which two problems were discussed:



We first limned out a dilemma that is created by our basic charge of insuring the public's safety. There appears to be a danger that, in seeking such insurance, we close avenues to creating maximum safety. This dilemma was formulated in the following way:

- The NRC works in the light (the sunshine?) of intense public demands for safety.
- Public demands lay a mood of protective conservatism over NRC (and ACRS) activities.
- Conservatism results in high specificity in the reg. guides. They turn into documents that discourage deviations from existing technology. That is not their intent, but a result of their having been written to cover all possibilities.
- It is not worth the trouble for a vendor to seek exceptions to a reg. guide if he feels he can invent a radically safer system.
- One important consequence of this state of affairs is that problem solutions tend to accrue in sequences of minimal "fixes". Sometimes it would be better to throw out an arrangement that has resulted from a series of modifications, and start out again with a new system concept.
- It is possible that the reg. guides thus not only prevent us from arriving at solutions that are truly safe, but that they force the vendors to move toward increasingly unsafe configurations in some cases.

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- Worst of all, the whole procedure tends to entrain the bureaucratic mentality into the works, and to spit out inventive minds.

My comments at the meeting were essentially that I supported this grim view of the situation. I have seen it happen over and over. Four years ago I spent the summer doing a technical audit of EPRI's Nuclear Safety and Analysis Department. In the course of this task I interviewed the managers of 140 contract research projects about their objectives. I discovered that their overwhelming purpose was that of satisfying regulations. It came out far ahead of insuring public safety, improving nuclear energy delivery, or any other of their publically stated objectives.

The second problem that we discussed in Washington was that of identifying the way in which research might more effectively resolve the nagging and recurrent technical thermo-hydraulic safety questions that come up with dreary regularity at ACRS committee meetings.

I proposed that a matrix of low-level, not-so-carefully-controlled, less-mission-oriented research should be funded in the area of analyzing and/or modeling multi-component, two-phase, thermo-hydraulic behavior. I believe very strongly that we can only tap the more creative and inventive mentality if we run it on a longer tether. A perfectly enormous number of inventive mutations could be generated by just 10% of the money invested in LOFT alone, and a few of those mutations would prove useful.

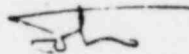
Dr. Theophanous reacted quite negatively when I suggested this. His knowledge of these problems is considerably greater than mine. But perhaps his knowledge has bent him to accept, too easily, the existing bureaucratic constraints. His proposal that these matters be dealt with by a super-committee of very knowledgeable people clearly will not work. Committees diffuse responsibility. Individual workers embrace it.

He was right, of course, in asserting that an intelligent overview is desperately needed. But consider this in the light of our first problem: the overview has to be made from outside of the existing constraints. Yet nobody could hope to make such a statement without first making an enormous committment to learning the hardware, the reg. guides, the recurrent problems, etc. And nobody who has made the committment can help but be bound up by it.

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Our only hope is to create an external nuclear constituency. We must cultivate a class of knowledgeable investigators who function in an independent critical literature -- people who are not privy to company secrets or government documents -- people who are not obliged to stop up specific holes by next Tuesday -- people who can afford to err.

Very truly yours,



John H. Lienhard
Professor

JHL/bc