

No Nukes: STILL the only “good nukes”!!! By Robert A. Letcher, PhD

This past June, heads of energy companies and heads of Ohio’s State Government came together to announce something that was, for me, both dreadfully unexpected and dreadfully dreadful, too: that they would undertake to build a new nuclear power plant in Piketon, Ohio—a small town in the south central part of the state, where a nuclear enrichment plant had been located until it was closed, some years ago.

Of course, what made this announcement so unexpected was that there hadn’t been a reactor contracted for in the US since 1977, two years before the “accident” at Three Mile Island. And that was *with* the US government socializing a potentially very costly portion of the risk such reactors have shown themselves capable of incurring. (Under the recently reauthorized Price-Anderson Act, in case of an accident—like Three-Mile Island or Chernobyl, the liability of private companies is limited to \$10 BILLION, with irradiated taxpayers and their descendents covering ALL damages above that.)

I have a personal history with nukes... Back in the early 1970s, I worked as an engineer on nuclear power plants. Actually, I worked on developing advanced breeder reactors. My job ran from testing, to methods development, to stress analysis. I hadn’t wanted to work on nukes, but a trusted professor had swayed me by telling me that he had changed his own mind about his previous advice that I **not** get involved with working on nukes, saying that he would feel more comfortable with me working on such risky technology than he would any of his other students: he trusted me not to short-cut safety. I quit when I found out that I couldn’t prevent managers from directing me and my colleagues to take short cuts. The only good thing I took from the experience was a cache of horror stories, which I stashed away for just such a time as this. Let me tell you...

First, though, let me emphasize that although I’ve written these horror stories in primarily technical term, in my view their technological aspect was only an epiphenomenon of deeper and more pervasive management, accounting and financial problems.

I took over a materials test that was intended to specify materials for a lifetime-of-the-reactor component, the “core basket”. To save money, early, “screening” testing had been done in the wrong medium, and every single materials engineer I spoke with said that the results would likely be worse than wrong; that they’d almost certainly be misleading.

At one point, as difficult as this may be to imagine for so important an activity, two different design groups found that the two different codes they were using to analyze their designs gave different results. We traced the difference to the order in which the software added in thermal creep and flux-induced creep [don’t ask!!]

Who knows whether every last mistaken design decision that had been engineered into that plant ever got engineered back out!?

Speaking of materials and safety... Back then, no materials had ever been irradiated to the extent that the materials we were using would be during their claimed design life. That meant that we had to run the codes with constitutive properties we had no choice but to assume—and somehow those properties routinely ended up indicating that the design would avoid long-run irradiation-induced embrittlement which could lead to metal components shattering like glass!

Then, there was the "China Syndrome". One top analytic engineer told me that his original analysis had indicated that an "active core catcher"--that is, pipes with high pressure pumps--would be needed, because the reactor vessel had **not** been dimensioned to leave enough room for all the depleted uranium that a "passive core catcher" would require. According to my then colleague, managers had decided that the "active" design was cost-prohibitive, so they re-specified the design conditions so that--SURPRISE!--the probability of failure and associated risks would assure that the reactor operated within "acceptable risks with no core catcher at all!

What really troubled me about all these anecdotes i've held stashed within me for almost 40 years is that the higher-ups consistently made forward going decisions. They would start design for long design-life components, as well as a follow-on facility months or years before testing nominally supposed to support component decisions and go/no-go decisions had proceeded far enough to provide the information that was supposed to provide that support.

Now, I realize that the reactors I have written about here were developmental, insofar as the US was concerned; and that, back then, France had several breeder reactors operating, so the big difference was the regulatory and oversight environments. But cookie-cutter reactors are NOT cookies.

In response to those who might say that there has been a lot of progress in the past 40 years and no accidents in the last 30 years... I would be surprised if there hadn't been "major advances" on the technology front over the past 40 years. But ,as I argued above, my main point here is not really about technology; rather, it was that the technological shortcomings I described reflected management errors.

To begin with, one critic of my argument argued that there had been no reactor accidents in the past 30 years, a time reference that conveniently ignores both the disaster that actually did occur at Three Mile Island and the far worse disaster that somehow was averted there; the cavalier approach NASA managers took toward the safety of seal rings during cold-weather launches of the Space Shuttle; and more recently, the utterly irresponsible approach managers took to

credit default swaps, and over the whole period, the equally irresponsible approach GM management has taken to developing competitive technology, to the point that they are in effect seeking protection from previous efforts by their legislators to protect them from more forward looking competitors.

Like we used to say back then, "one nuke can ruin your whole day." I am willing to consider substantive arguments that management now pursues safety with the same vigor they used to reserve for making profit, but it would be an uphill effort to persuade me. To which I would add a series of questions...Do those who want nukes seek only a power surge, or cash money from a short-term job? Or to stomp "these radical enviros" to prove how tough they are? I must admit that arguments in favor of nukes grounded in climate change present a greater challenge to anti-nuke people like me, but at least that argument can be grounded in the moral dimension, where so far at least, bad managers don't yet play a role.

I hate to imagine the radioactive mess that an Enron or an AIG "smartest guy in the room" could make if he or she were to treat a nuke as just another opportunity to pocket a few additional million. I imagine that a lot of people will hate to imagine it too—no matter how many jobs a new nuke would most assuredly generate? How could they explain to their grandchildren that they had sold out their grandchildren's planet for however many pieces of silver such jobs that those heads of energy companies and heads of Ohio's State Government came together to announce back in June!?