The Risk of a Meltdown

By Demetrios L. Basdekas

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Washington—There is a high, increasing likelihood that someday soon, during a seemingly minor malfunction at any of a dozen or more nuclear power plants around the United States, the steel vessel that houses the radioactive core is going to crack like a piece of glass. The result will be a core meltdown, the most serious kind of accident, which will injure many people, destroy the plant, and probably destroy the nuclear industry with it.

On the third anniversary of the Three Mile Island Accident, the Government and industry are unable or unwilling to deal honestly and urgently with far-reaching nuclear-safety problems.

Another serious accident is very likely because the wrong metal was used in the reactor vessels, and with each day of operation, neutron radiation is making the metal more brittle, and more prone to crack in case of sudden temperature change under pressure.

One manufacturer of nuclear reactors has reported to the Nuclear Regulatory Commission that in three to five more years, the vessels in some plants will be too brittle to operate safely. But this estimate is wishful thinking, based on unrealistic assumptions about plant operators' actions and accident sequences. Some plants are already too dangerous to operate without corrective measures.

The commission could do a great deal to prevent such an accident, and stretch out the lives of many of these brittle vessels, if it ordered the type of corrective steps already taken at some European reactors. But the commission, regulating an industry that has serious financial and technical problems, instead of taking initiatives tends to sweep difficult technical problems under the rug, reacting to crises only after they occur.

The commission must realize that this crisis is upon us. A temperature change severe enough to crack a brittle reactor vessel already has occurred, in California, but not at one of the older, more vulnerable plants. The commercial nuclear industry's admirable safety record – no deaths caused by radiation – still is intact, but this cannot last much longer, because the reactor vessels and other critical components are aging.

For many years, it has been known that vessels are becoming brittle. What makes the problem urgent is that the metal is aging more rapidly than expected, and the circumstances that would cause such an accident now seem more likely.

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At the Rancho Seco plant, near Sacramento, Calif., in March 1978 a worker dropped a small light bulb into an instrument panel, causing an electrical short circuit. The short wreaked havoc on the plant's control systems – a variety of instruments that run crucial pumps and valves – and the result was that too much water was pumped through the reactor, chilling it suddenly. It is very doubtful that some of the older plants operating today would be able to withstand the same shock. Fortunately, Ranch Seco had been in operation less than two years; had it been in operation for 10, its pressure vessel most likely would have ruptured.

The kinds of control systems that went haywire at Rancho Seco are very likely to fail at crucial times in other nuclear power plants. When a pipe bursts, or a seal fails, or a valve sticks, automatic control and safety systems almost instantly take action to compensate, but they do not always take the right action.

Control systems are not reviewed by the Nuclear Regulatory Commission. They are not immune to fire or power failure; they often have no backups, so are prone to simple failure. They are not even earthquake-proof.

The N.R.C. staff has taken the position that if a plant gets into trouble because of control-system malfunctions, it has safety systems to take care of any problems. But this is not so, as events of the last few years show. At Rancho Seco, at Three Mile Island, and at other plants, control systems not thought vital to the safe operation of a plant ended up causing serious problems.

The Nuclear Regulatory Commission is charged with ensuring that nuclear plants are operated "with adequate protection" of the public health and safety. But bureaucratic foot-dragging and preoccupation with public relations and financial problems of the industry are contributing to a shortsighted view – that technical problems can wait or do not exist. Some members of the staff acknowledge the safety problems associated with control systems, but the agency has yet to demand from utilities operating nuclear power plants the technical data on control systems necessary to assess the systems' safety fully.

It may be that we need nuclear power to maintain our standard of living. But there is a vast difference between having to accept something, and making it acceptable. We can make nuclear power acceptable.

The Nuclear Regulatory Commission chairman, Nuncio Palladino, has spoken of cleaning up our nuclear act. As a private citizen, I hope that we do so, beginning with vigilance at the N.R.C. One more accident the size of Three Mile Island's, and the public's reaction almost certainly will foreclose the nuclear option.

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