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Corrosive Culture: The Davis Besse lesson: You just can't trust the NRC

The hole in the reactor vessel head at FirstEnergy's Davis-Besse nuclear power plant in Ohio, discovered March 7, 2002, casts suspicion on the entire culture at the Nuclear Regulatory Commission, and is grounds for halting the NRC's current practice of rushing through license renewals and power uprates.

Boric acid corroded a six-inch hole in the reactor vessel head at Davis-Besse, leaving only a 3/8-inch metal cladding as protection against a reactor breach and a possibly devastating chain of events that might have culminated in a reactor meltdown. The corrosion was discovered in March. Just four months earlier, FirstEnergy, responding to a Nuclear Regulatory Commission request, notified the agency that prior visual inspections of the reactor had detected boric acid deposits. But those deposits were not cause for concern, and a more complete inspection could wait until the plant's scheduled refueling months later, the company assured the NRC. The NRC, as is its custom, agreed with industry.

At FirstEnergy's convenience, the reactor was finally inspected, and workers were surprised when a mechanism to control fuel rods "displaced (or tipped) in the downhill direction... until its flange contacted the flange of the adjacent" mechanism, according to NRC documents. In other words, it fell over. That in turn prompted dismantlement of components and a more thorough inspection, leading to the discovery of the six-inch hole in the head of the reactor vessel. That the hole was discovered at all was something of a fluke.

Since the discovery, the NRC and FirstEnergy have alternately cast blame on each other and issued various mea culpas, but while there have been many theatrical displays of shock and reassurances that such a thing will never recur, little seems to slow bureaucratic inertia towards a restart of the Davis-Besse reactor. Apparently, it will take more than the recent findings by NRC's own Inspector General, that "NRC appears to have informally established an unreasonably high burden of requiring absolute proof of a safety problem, versus lack of reasonable assurance of maintaining public health and safety, before it will act to shut down a power plant." And sadly, it will probably also take more than the recent results of an independent survey of NRC employees, many of whom were concerned "that NRC is becoming influenced by private industry," that there is "a compromise of the 'safety culture'" at NRC, and that safety training leaves "the security of the nuclear sites within the United States vulnerable to sabotage." It is troubling to think of what it might really take for the NRC to deny the restart of Davis-Besse, or withdraw FirstEnergy's license to operate the reactor. It is troubling to know that FirstEnergy is also licensed to operate three other reactors in the United States. But as long as the NRC functions primarily to protect and promote the nuclear industry, the public should not expect NRC to do more than give FirstEnergy insignificant penalties, if that.

More power

The NRC takes tremendous pride in the trend toward nuclear plants running at higher energy levels and for longer periods of time between maintenance. The agency is thus on guard to avoid any unscheduled shutdown. The commercial nuclear establishment, which sadly includes not just industry but the NRC and politicians of both parties, has been beaming about the nation's nuclear plants running longer and running hotter. Reports of acid deposits notwithstanding, the NRC agreed with FirstEnergy that a more thorough inspection of possible degradation of reactor components could wait until the plant's scheduled maintenance, thus allowing the reactor to continue to operate- with, as is now known, a six-inch hole in the reactor vessel head.

In addition to avoiding shutdowns, plant efficiency is enhanced by increasing power output at the reactor, with accompanying increases in heat, steam and pressure and additional stress on reactor components. The NRC routinely approves applications to increase power output at reactors- 22 power uprates were approved in 2001 alone. The agency is currently considering a dozen more applications for uprates from operators, and the NRC anticipates receiving nearly three-dozen more applications in the near future including an application from Davis-Besse.

The easygoing regulatory response to acid deposits at Davis-Besse suggests that the NRC's institutional push to increase plant efficiency is achieved at enormous risk to public safety. But the NRC must put public protection ahead of nuclear industry profit. The NRC must err on the side of safety and demand that operators shut down their plants for inspection and maintenance at the first signs of degradation, not when it is convenient for corporate earnings estimates. And all power uprate proceedings should be halted.

Longer licensing

The operators of Davis-Besse and other reactors were asked to look for nozzle cracks after such cracks were discovered at Duke Energy's Oconee nuclear plant in South Carolina. Prior to that discovery Oconee had undergone presumably arduous technical and safety reviews as part of Duke's application to extend Oconee's license for an additional 20 years. In May 2000, the Oconee plant was among the first to win an extended license. Only months later, the nozzle cracks were discovered. By extending the license at an aging reactor with operational problems so great as to prompt reviews of reactors nationwide, the NRC put its regulatory negligence on blazing display.

In addition to Oconee, cracks were also discovered at Entergy's Arkansas Nuclear One- again, after the plant's license had been extended for another 20 years of operation. Two other plants where cracks were found, Duke's North Anna and Surry plants in Virginia, are currently going through the relicensing process. NRC Chairman Richard Meserve has repeatedly gushed that he expects the operator of every nuclear reactor in the nation to apply for an extended operating license. The NRC's projected schedule of renewal applications envisions Davis-Besse beginning the license renewal process in 2004.

The NRC, having no new plants to license, is bursting with enthusiasm at the opportunity to do what is, for nuclear proponents, the next best thing: relicense old ones. Four plants have been relicensed thus far, and eight more applications are active. The NRC's relicensing program should be brought to a halt. Licenses do not expire in most instances for another 15 or 20 years, and the only reason for plants to relicense now is to amortize plant debt further into the future, effectively padding corporate revenues today. The more pernicious, long-term effect of relicensing is that old nuclear power plants such as Davis-Besse will operate even longer, under a regulatory regime that has proven itself quite capable of being blindsided by unanticipated dilapidation of nuclear reactors.

Stop regulatory rush jobs

At Davis-Besse, the NRC demonstrated conclusively that it cares more about corporate profits than public safety. The same motives are driving the NRC's big hurry to relicense old power plants, rubber-stamp power uprates and allow plants to operate with known signs of reactor degradation. If the NRC can't or won't acknowledge how far the agency has strayed from its obligation to protect the public, then Congress or the President should step in and bring the NRC's dangerous regulatory rush jobs to a screeching halt.