

DOCKET NUMBER

PROPOSED RULE

PR-Misc Notice (11)  
(Reg. Guide)  
(NUREG-0956)

17 December 1985

Northern Illinois University  
DeKalb, Illinois 60115-2861

Department of Biological Sciences  
Department Office 815 753 1753  
Faculty Phones 815 753 0433

DOCKETED  
12/20/85

Re: Comment on NUREG-0956 "Reassessment of the Technical Bases  
for Estimating Source Terms" <sup>85</sup> DEC 20 A11:05

OFFICE  
DOCKETING & SERVICE  
BRANCH

Attn: Docketing & Service Branch  
Secretary of the Commission  
Nuclear Regulatory Commission  
Washington, D. C. 20555

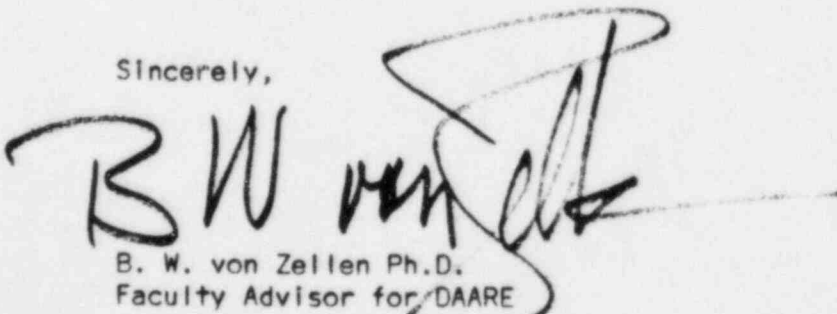
I write as Faculty Advisor to the campus division of the DeKalb Area Alliance for Responsible Energy (DAARE) to oppose the conclusions of NUREG-0956 designed to justify a reduction in nuclear reactor safety standards.

Our opposition is based primarily upon the critical study by the American Physical Society (APS) and reported in Science (American Association for the Advancement of Science).

The APS Report concluded that source term research is inadequate with many fundamental uncertainties remaining. The APS reported that computer codes are unreliable. The assumption about the chemical form of iodine now appears to be incorrect and leads to an underestimation of the release of iodine. How the reactor containment contains the radiopoisons during an accident remains a large source of uncertainty.

For these, and other reasons, we strongly oppose ANY reduction in nuclear reactor safety standards.

Sincerely,

  
B. W. von Zellen Ph.D.  
Faculty Advisor for DAARE

8512310274 8512:7  
PDR NUREG  
0956 C

PDR

enclosures

DSO9 add: M. Silberberg, 1130 SS  
D. Ross, 1130 SS  
Wm. Almstead, 9604 MNBB

DEC 30 1985

Acknowledged by card.....

# Nuclear Agency Estimates Probability of a Meltdown

7 APRIL 1985

By MATTHEW L. WALD

Special to The New York Times

Mathematically, the chance of a meltdown at a nuclear reactor somewhere in America in the next 20 years is almost 50-50, according to the Nuclear Regulatory Commission.

The estimate concerns the chance of a "severe core melt accident," which could be much more serious than the partial core melting at Three Mile Island in March 1979 but would probably not cause immediate fatalities. The estimate is based on examinations of the likelihood of the failure of enough independent components to cause an accident at "close to two dozen" plants, according to the agency. It suggests the typical chance of such an accident at a single reactor in a single year is about one in 3,333.

"You're dealing with the frequency of rare events," said Robert M. Bernero, a safety analyst at the commission who until recently headed the agency's risk estimate effort. "A better way to look at it is it may not happen at all, it may happen once and it may happen twice. It should not be interpreted as an exact clock, ticking somewhere."

If one chance in 3,333 was the industry average, said the commission, "then in a population of 100 reactors operating over a period of 20 years, the crude cumulative probability of such an accident would be 45 percent."

## First Such Agency Estimate

The estimate, the first one by the commission covering all plants for an extended period, was given last Friday in response to a request made in March by Representative Edward Markey, chairman of a House subcommittee with jurisdiction over the agency. The subcommittee, on Energy Conservation and Power, is scheduled to hold a budget authorization hearing this morning and plans to include discussion of the agency's safety efforts.

The commission has been considering a safety goal to be expressed in terms of probability, and wants to develop a new mechanism for evaluating safety modifications to existing plants. The agency's response to Mr. Markey, a Massachusetts Democrat, notes that at some plants the chance of accident was reduced substantially after probability studies identified weak links in safety systems.

However, the commission majority does not favor large-scale efforts to lower the risk across the board.

The figure given by the commission as typical of the chance of core melt for an American reactor is slightly higher than the figure published in a German study in the late 1970's, according to Mr. Bernero. He said that France, Sweden and Japan had done similar studies but had not published the results.

The commission previously said that the chance of an accident that de-

stroyed only the reactor was 10 times larger than for an accident that also caused substantial damage outside the plant. However, according to experts, the cost of a meltdown, even if there is no release beyond the plant, runs into billions of dollars.

One of the five commissioners said that the studies on which the new estimate was based, which it described as "probabilistic risk assessments," should be viewed with caution. James K. Asselstine, in additional views appended to the commission's response, said that the "substantial uncertainties" of the studies indicate that the risk is between 6 percent and 99 percent.

Existing plants "pose no undue risk to the public," the commission said, but it added that this position was "a conditional judgment requiring orderly conclusion of severe accident work" now in progress. The probabilistic risk assessments, it added, are based on "a variety of pessimistic assumptions" which, in cases of uncertainty, might overstate the hazard.

## 'We Should Be Doing More'

Commissioner Asselstine, in a telephone interview, said he favored more aggressive action. "Is it an acceptable public policy outcome to expect to see a 50 percent chance of another Three Mile Island or worse in the next 20 years?" he said. "My own view is we should be doing more to prevent such accidents."

Mr. Markey said in a statement, "These studies do not show us that nuclear reactors are safe or unsafe. What they do show is that there remain large uncertainties and that the N.R.C. and the nuclear industry cannot afford to become complacent."

"The nuclear industry is faced with the hard fact that there is a significant risk that a billion-dollar asset could become a billion-dollar liability overnight," he said.

But others were critical of the commission's figures. "It's a very simplistic way to go about making such an estimate," said Fred T. Stetson, director of regulatory analysis at NUS Corporation, which writes probabilistic risk analyses for reactor owners. The "typical" estimate cited by the commission is too high, he said, and probably takes into account early, "stop-gap calculations" of risk. On the chance of a severe core damage accident in the remainder of this century, he said, "if you were to put a best estimate on this number, it might be on the order of one in ten, and of those, one in ten might result in serious offsite consequences." The combination, he said, meant a one percent chance of an accident in this century with serious consequences outside the plant.

# Reactor Cooling Systems Faulted as Substandard

By MATTHEW L. WALD

None of the eight nuclear reactors of the same design as the one that failed at Three Mile Island met the Nuclear Regulatory Commission's standard for emergency systems that supply cooling water to a reactor as of April 1984, according to an internal commission memorandum.

The plants were operating legally, however, because the N.R.C. had granted them temporary or permanent exemptions from updated, stricter requirements.

The commission's deputy director of licensing, Hugh Thompson, said on Friday that "some changes probably have occurred since then." But he and others at the commission were unable to say immediately how much progress had been made since the memo was written in improving the systems that supply cooling water.

The N.R.C. has been roundly criticized recently for extending deadlines for utilities to comply with new safety requirements.

In early June, one of the eight reactors, Davis-Besse, in Oak Harbor, Ohio, suffered failures of both the main system supplying cooling water to the reactor and the emergency backup system. This led to an incident that engineers on the commission staff and elsewhere describe as one of the most serious since the accident at Three Mile Island 2 in March 1979.

The failure of the system in question,

called the auxiliary feedwater system, was one of the major causes of the accident at Three Mile Island. In part because of that accident, the worst in the history of the industry in this country, that type of reactor has been recognized by the commission as being especially endangered by feedwater failures. And at many of those plants the feedwater systems have been described by commission staff studies as being too likely to fail.

They are more vulnerable because the vessel in which water is boiled into steam is smaller than at other plants, and will boil dry faster if the water supply fails.

The eight reactors, and the one that failed at Three Mile Island, were manufactured by Babcock & Wilcox, based in New Orleans. According to engineering experts, that design has advantages in the production of steam in normal operation. Babcock & Wilcox does not design or manufacture the feedwater systems, which are purchased separately by the utilities that own the plants. Meeting the N.R.C. requirements is the responsibility of the utilities, not the equipment manufacturers.

In normal operation at those plants, the reactor is immersed in water that is kept under high pressure to prevent boiling. That water, which gradually picks up radioactivity, is pumped through thousands of thin-walled tubes in a vessel called a steam generator, to give off its heat.

Outside the tubes, clean, cold water is pumped in, to be boiled into steam. The steam spins a turbine, which makes electricity. The steam is then condensed back into water, and pumped back to the steam generator, to be boiled again to produce more steam to be sent through the turbine again. That water is called the feedwater.

The heat the feedwater removes is the main product of the reactor, and is needed to make the steam. But once the reactor is started, the heat must be drawn off or overheating will occur.

At some of the plants, if the feedwater system fails and a backup system does not take over, there is no way to prevent overheating of the reactor.

## 'I'm Troubled by the Memo'

A chronology of the steps taken by the commission to improve the feedwater system at Davis-Besse, assembled by a House subcommittee earlier this month, found that some staff engineers had decided almost immediately after the Three Mile Island accident that improvements would be needed at the Ohio plant. But more than six years later, at the time of the June accident, the changes had not been completed.

The chairman of the House panel, Representative Edward J. Markey, a Massachusetts Democrat who made the commission document available, also released a letter to Nunzio J. Paladino, the commission chairman, in which he called for an investigation of the panel's enforcement efforts.

"In my view," he said, "this investigation would be enhanced were it headed by an individual outside of N.R.C. who will be recognized as independent."

One of the five members of the commission, James K. Asselstine, said in a telephone interview on Friday, "I'm troubled by the memo." He noted that the plants met the rules when they were licensed, but that requirements had changed in recent years.

"As a general matter it's not always clear that an older plant has to be brought up to the current interpretations of the commission's regulation in all instances," he said. But he added, "I do think that the auxiliary feedwater systems for Babcock & Wilcox plants are in a different category. Both the Three Mile Island accident and the June 9 Davis-Besse event reemphasize the importance of auxiliary feedwater."

Mr. Asselstine added that he would investigate an "inconsistency" between the memo obtained by the House panel and a memo sent by the commission staff the same month to the five commissioners, which he said indicated that at least some of the plants did meet current guidelines.

The plants in question, in addition to Davis-Besse and to Three Mile Island 1, in Harrisburg, Pa., are Crystal River 3, in Red Level, Fla., Arkansas Nuclear 1, in Russellville, Ark., Oconee 1, 2 and 3, in Lake Keowee, S.C., and Rancho Seco, in Clay Station, Calif.

# Proposed Atom Waste Sites Opposed in Oak Ridge, Tenn.

May 3, 1983

Special to The New York Times

OAK RIDGE, Tenn. — Despite widespread pro-nuclear sentiment in this city that helped build the first atomic bombs, some area residents are opposed to putting a temporary storage facility for the nation's spent nuclear fuel here.

Concerns range from the fear of contamination of the drinking water to the possibility of an accident. The temporary site, which would have to be approved by Congress, would be used to store spent fuel rods from more than 80 nuclear reactors around the country, with three to four trucks a day hauling in the highly radioactive waste.

The Energy Department has announced that its choices for the temporary repository has been narrowed to three sites in Tennessee. Two of them are near this city of 27,600 people, and the department said it preferred the site where the Clinch River Breeder Reactor was to have been built, about 10 miles east of Oak Ridge in Roane County. The reactor, which was supposed to produce more fissionable fuel than it consumed, was canceled after Congress decided in 1983 not to continue financing it.

Another proposed site is a few miles away, on the Energy Department's

38,000-acre reservation in Roane and Anderson Counties, and the other is in Hartsville, 142 miles away, where the Tennessee Valley Authority canceled one of its nuclear power plants.

The three sites were chosen from a list of 11 in six Southeastern states.

The Energy Department says it hopes to have a permanent nuclear repository completed by 1998 at one of three proposed sites in Texas, Nevada or Washington.

One of the concerns of state and local officials is that the temporary facility could become permanent.

"It is possible they won't be able to agree on a site for a permanent repository," said Richard K. Evans, a lawyer in nearby Kingston, a town of about 5,000 people. "In that case, we've got 90 percent of the radioactive waste in the country just eight miles away."

Mr. Evans was circulating a petition in opposition to the plant in Roane County, and he said he had 100 signatures.

Mayor Ruby Luckey of Kingston said some residents were worried about the safety of their drinking water because the town's water filtration plant is at the point where the Clinch River flows into the Tennessee River. She said she would prefer that the facility be built on one of the other two sites.

What would be a Turner-managed CBS.

the

... can only do hat

## The Next Nuclear Meltdown

May 8, 1983

What are the chances of a meltdown at one of America's 100-odd nuclear reactors in the next 20 years? Nearly 50-50, or 45 percent, is the surprising figure the Nuclear Regulatory Commission recently gave Congress. How can the commission also declare that it finds the risk acceptable? Are the odds of catastrophe really so bad?

The short answer is that the commission's estimate is a conservatively biased shot in the dark. Meltdowns are probably less likely than the raw numbers suggest, but there's still no room for nuclear utilities to relax.

For an individual reactor, in the commission's latest estimate, the odds of severe core damage are 3 in 10,000 per year. That may seem a small risk, but for 100 reactors over 20 years it accumulates to a 45 percent risk of a meltdown. A severe core melt would sorely endanger the health of the reactor's owner, which could see a \$2 billion asset abruptly converted into a \$2 billion liability. But to harm the public, radiation must escape from the site. That's less likely because even after a core melt most of the radioactivity is likely to be contained.

The risk-assessment technique depends on identifying chains of accidents that could lead to a core melt. But the uncertainties accumulate down the chain. That means the technique is a quite useful guide to the probability of accidents early in a chain, but close to meaningless for the bottom-line disaster of a core melt. Also, as the commission notes, the risk assessments are biased toward the pessimistic. Many more early signs of accident would have been reported if the odds of meltdown were any worse than the assessments suggest.

Up to a point, the commission's professed satisfaction with the status quo is understandable. Although the perceived risks of a meltdown have been edging slightly higher in the last decade, the perceived risks of containment failure and radiation escape are now being quite sharply reduced. Far less radioactivity escaped from the damaged Three Mile Island reactor than was predicted for such an accident, largely because the radioactive material turned liquid or solid instead of leaking out as a gas.

But even if meltdown should turn out to be a smaller public threat than assumed, the risk to the nuclear industry itself seems uncomfortably high. A second accident like Three Mile Island's could do terminal damage to the industry's public standing. The failure of the automatic shutdown system at the Salem I plant in New Jersey in 1983 exposed another perilous hole in nuclear safety defenses.

The nuclear industry takes the predictions of disaster calmly because it regards risk assessment as a useful but self-invalidating tool. By acting to forestall the most likely accident chains, the utilities can reduce the predicted risk. The Nuclear Regulatory Commission too would like to reduce the chances of a meltdown. Though it says 3 chances in 10,000 per year is acceptably low, it is considering a safety goal that aims for a risk of 1 in 10,000.

One way to attain that goal would be for all plants to conduct their own risk assessments to identify the most likely paths to a meltdown. At present only plants under construction are required to undertake such an analysis. Another way would be for the commission to focus on the few riskiest plants that drag up the industry average. The public may already be safe enough, but nuclear power is too valuable to let its suppliers live dangerously.