

# Earthquake risk to US reactors larger than thought

DINA CAPPIELLO - Associated Press - Associated Press

The risk that an earthquake would cause a severe accident at a U.S. nuclear plant is greater than previously thought, 24 times as high in one case, according to an Associated Press analysis of preliminary government data. The nation's nuclear regulator believes a quarter of America's reactors may need modifications to make them safer.

The threat came into sharp focus last week, when shaking from the largest earthquake to hit Virginia in 117 years appeared to exceed what the North Anna nuclear power plant northwest of Richmond was built to sustain.

The two North Anna reactors are among 27 in the eastern and central U.S. that a preliminary Nuclear Regulatory Commission review has said may need upgrades. That is because those plants are more likely to get hit with an earthquake larger than the one their design was based on. Just how many nuclear power plants are more vulnerable will not be determined until all operators recalculate their own seismic risk based on new assessments by geologists, which the agency plans to request this year. The NRC on Thursday issued a draft of that request for public comment.

The review, launched well before the East Coast quake and the nuclear disaster in Japan in March, marks the first complete update to seismic risk in years for the 104 existing reactors in the United States, despite research showing greater hazards.

The NRC and the industry say reactors are safe as they are, for now. But emails obtained in a more than 11,000-page records request by The Associated Press show that NRC experts were worried privately this year that plants needed stronger safeguards to account for the higher risk assessments.

The nuclear industry says last week's quake proved reactors are robust. When the rumbling knocked out offsite power to the North Anna plant in Mineral, Virginia, the reactors shut down and cooled successfully, and the plant's four locomotive-sized diesel generators turned on. The quake also shifted about two dozen spent fuel containers, but Dominion Virginia Power said Thursday that all were intact.

Still, based on the AP analysis of NRC data, the plant is 38 percent more likely to suffer core damage from a rare, massive earthquake than it appeared in an analysis 20 years ago.

That increased risk is based on an even bigger earthquake than the one last week. Richard Zuercher, a spokesman for Dominion, the plant operator, says the earlier estimate "remains sound because additional safety margin was built into the design

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when the station was built."

The safety cushion would shrink, though, if the plant's risk were found to be greater.

Federal scientists update seismic assessments every five to six years to revise building codes for some structures. But no similar system is in place for all but two of the nation's 104 reactors, even though improving earthquake science has revealed greater risks than previously realized.

The exception is Diablo Canyon in earthquake-prone California, which has been required to review the risk of an earthquake routinely since 1985. The NRC does not require plants to re-examine their seismic risks to renew operating licenses for 20 years.

After the March earthquake in Japan, which caused the biggest nuclear crisis since the meltdown at Chernobyl, Ukraine, 25 years ago. NRC staffers fretted in emails that the agency's understanding of earthquake risk for existing reactors was out of date.

In a March 15 email, for example, an NRC earthquake expert questioned releasing data to the public that would show how strong an earthquake each plant was designed to withstand. The seismologist, Annie Kammerer, acknowledged that recent science showed stronger quakes could happen. "Frankly, it is not a good story for us," she wrote to agency colleagues.

Kammerer's boss, Brian Sheron, who heads the NRC's Office of Nuclear Regulatory Research, wrote in a March 14 email that updated numbers showed the government "didn't know everything about the seismicity" in the central and the eastern part of the country.

"And isn't there a prediction that the West Coast is likely to get hit with some huge earthquake in the next 30 years or so? Yet we relicense their plants," he wrote.

The NRC flagged the 27 plants for possible upgrades by calculating the likelihood of a severe accident based on 2008 hazard maps from the U.S. Geological Survey and comparing it to the seismic risk estimated in 1989 or 1994. Those data were used the last time existing reactors evaluated their earthquake hazards.

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