

# New earthquake data prompt nuclear review



The Independent Spent Fuel Storage Installation at Oconee Nuclear Station sits in the foreground behind the two rows of fencing. Duke Energy says the Oconee plant is designed to withstand the worst earthquake expected in the Upstate, and the three reactors are getting a series of upgrades. FILE/STAFF

## DUKE CONFIDENT OCONEE IS PROTECTED

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**N**ew seismic data could raise the earthquake protection bar for Oconee Nuclear Station and other nuclear plants in eastern and central states, and some experts say costly fixes could force some plants to close.

Duke Energy, which owns and operates Oconee, said the plant is designed to withstand the worst projection and is upgrading for another two decades of operations.

Regulators want Oconee and all nuclear power plants in the eastern and central states to re-evaluate earthquake protection using new seismic calculations.

The U.S. Nuclear Regulatory Commission expects the calculations will show a higher likelihood of earthquake-caused greater ground motion than previously thought.

"The odds are a little worse than we thought," said Mark Cooper, a senior fellow economic analyst at Vermont Law School's Institute for Energy and the Environment. "It costs a lot of money to fix it. Some reactors, the owner will look at the cost and say it's not worth the cost."



Oconee, with three reactors on the shore of Lake Keowee 30 miles from Greenville, is in the midst of a \$2 billion upgrade to prepare the relicensed plant, in operation for nearly four decades, for its next 20 years.

Part of the work increases earthquake protection, said Sandra Magee, spokeswoman at the Duke Energy facility.

Oconee "is designed to withstand the worst-case earthquake in the region and we have even a margin above what our design is based on," Magee said. Duke is "making a significant investment" and is "in

for the long haul."

New poly resin wrap to strengthen buildings and a protective service water system to provide another way to cool reactors, along with other current and past upgrades, give Oconee "a significant margin beyond our seismic design requirement," Magee said.

Oconee will "look at this new report" and "see what other extra equipment we need to have," Magee said. "If analysis determines anything is needed, we will meet the new requirements."

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# NUCLEAR

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Several mild tremors in recent years rattled the dishes in the cabinet at Bob Swank's home on Lake Keowee within two miles of the nuclear plant but haven't shaken the retired engineer's confidence in the plant's protection against earthquakes and other natural disasters.

"Duke's moved in the right direction to improve safety," said Swank, who has a master's degree in nuclear engineering and is president of the Friends of Lake Keowee Society.

"There's no real panic or dire concerns" in the lake community "about the nuclear plant itself," Swank said. "I'm not worried about the reactor."

Swank said he worries more about how an earthquake would impact the huge earthen Jocassee dam.

Because earthen dams have some flexibility built in to withstand ground movement, it's a small concern, Swank said. Magee said the earthen and concrete dam is safe, strong and regularly inspected. It's immediately inspected after any ground motion is detected. Design includes seismic risk, she said.

The NRC, Department of Energy and the Electric Power Research Institute released the new seismic study to replace data used since the late 1980s as part of its response to radiation that escaped from Japan's Fukushima Daiichi plant after a 9.0 magnitude earthquake and tsunami last March.

The new data also will be used for licensing of new nuclear plants.

John Hofmeister, a retired president of Shell Oil Co. and founder and chief executive officer of the non-profit Citizens for Affordable Energy, criticizes "putting Band-Aids and paperclips on 20th century facilities."



Oconee and other nuclear plants on the East Coast are re-evaluating earthquake protection. OWEN RILEY JR./STAFF

It's "best to start with new generation plants rather than continuing with older plants that would have to be shored up at great expense and may not be worth the investment given the overall age and circumstance," Hofmeister said.

New information such as the seismic study "should be an incentive to move the nation forward to the next generation of nuclear electricity generation, which could look very different," Hofmeister said.

Nuclear energy is "clean, provided we deal with nuclear waste, it's efficient, and it's affordable if we would come to grips with the depreciation of plant capital costs," Hofmeister said.

Cooper said the cost in terms of risk is no longer affordable, especially after Fukushima. Nuclear power could be replaced with mountain-top wind-generated power in the Carolinas, he said. "Cost will go up somewhat, but the risk will go down," he said.

It comes down to dollars, said Bob Guild, a Columbia attorney who has handled many cases involving nuclear energy. When the calculations are made, owners must justify the cost of any retrofits against the option of retiring the plant.

Considerations include costs of producing other

sources of power and increased conservation, such as more efficient building design that will lower electric demand, Guild said.

Mitch Singer, spokesman for the Nuclear Energy Institute, which represents the nuclear industry, called it "premature to estimate or guess" about whether any needed improvements "would overwhelm or be prohibitive for existing plants."

Nuclear operators will use the new data "as a basis for evaluations over the next couple of years on seismic hazards. It is premature to speculate on any implications," Singer said.

Sample calculations indicate the largest predicted ground motions could occur in the vicinity of repeated large magnitude earthquake sources — including Charleston, where a 7.3 magnitude earthquake in 1886 is the largest recorded in the eastern U.S.

The new study "can give us new information and we'll combine that with our design and our safety features to determine what if anything else we need to do," Magee said. "We will continue to look at ways we can add new equipment for cooling, back-up power and other safety features."

Oconee has the third-highest risk in the nation of damage from seismic activity beyond what the plant was designed to withstand, according to a Union

of Concerned Scientists analysis of former NRC data.

Magee questioned that status, saying the NRC data isn't a risk ranking and she doesn't know what else was considered in the analysis.

The three Oconee reactors are among 27 in the nation that didn't meet upgraded NRC earthquake standards in 1996, said Dave Lochbaum, director of the nuclear safety project for the Union of Concerned Scientists. The standards were meant for new plants and existing plants weren't required to meet the new standard, Lochbaum said.

Some plants made upgrades that weren't required and for that reason not reported to the NRC and may be better protected than the NRC data suggest, Lochbaum said. The North Anna nuclear plant in Virginia that successfully shut down safely when a 5.8 magnitude earthquake shook the ground last August also was among the 27 and had voluntarily made upgrades to meet the 1996 standards, Lochbaum said.

Oconee also made improvements in the 1990s, including replacement of sensitive electrical relays in back-up power sources with more rugged relays, beefed up supports for trays that hold cables and improved anchoring for bolting down electrical cabinets, Magee said.

"We made sure we had an additional margin of safety to withstand an earthquake significantly beyond our design basis. We continue to evaluate," Magee said.

NRC requirements after Sept. 11, 2001 for portable pumps and generators in the event of a terrorist air attack also help protect U.S. plants against earthquakes, Lochbaum said.

Japan didn't have that requirement, Lochbaum said. It might have led to a different outcome at Fukushima, but that will never be known for sure, he said.