



## Nuke inspectors focus on 'unusual' wear on tubes

Published February 03, 2012 | Associated Press

LOS ANGELES — The integrity of some equipment installed in 2009 at Southern California's San Onofre Unit 2 nuclear plant is drawing concern after unusual wear was found on hundreds of tubes that carry radioactive water.

Thursday's disclosure came two days after a tube leak at the plant's other unit prompted operators to shut down the reactor as a precaution. A tiny amount of radiation could have escaped, but officials say workers and the public were not endangered.

The problems at Unit 2 were discovered during inspections of a steam generator, after the plant 45 miles north of San Diego was taken off-line for maintenance and refueling. The two huge steam generators at Unit 2, each containing 9,700 tubes, were replaced in fall 2009, and a year later in its twin plant, Unit 3, as part of a \$670 million overhaul.

According to the Nuclear Regulatory Commission, more than a third of the wall had been worn away in two tubes at Unit 2, which will require them to be plugged and taken out of service. At least 20 percent of the tube wall was worn away in 69 other tubes, and in more than 800, the thinning was at least 10 percent.

"The amount of wear that we are seeing on these tubes is unusual for a new steam generator," NRC spokesman Victor Dricks said. "If you have that kind of thinning anywhere along the length of the tube, you have a problem because it degrades the integrity of the tube, which can contribute to leaks."

Plant operator Southern California Edison did not dispute the figures released by the NRC, but cautioned that testing on the tubes is preliminary. Spokesman Gil Alexander called the tests "an initial snapshot" and said more sophisticated tests will take place.

He did not know if the testing would delay the reactor's planned two-month shutdown.

"It's not unprecedented in the industry for there to be accelerated wear in small sections of tubes in early years of usage," he said.

According to company officials, the new steam generators were manufactured by Japan-based Mitsubishi Heavy Industries. The company did not respond to an email sent Wednesday. Alexander said Mitsubishi officials are assisting with the tube analysis at the plant.

Retired NRC engineer and researcher Joram Hopfenfeld said the company will have to determine why the tubing is degrading so quickly "before they do anything else."

"I've never heard of anything like that over so short a period of time," Hopfenfeld said.

"The safety implications could be very, very severe," Hopfenfeld added. "Usually the concern is in older steam generators, when they have cracks all over the place."

According to the regulatory commission, the tubes have an important safety role because they represent one of the primary barriers with the radioactive side of the plant. If a tube breaks, there is the potential that radioactivity from the system that pumps water through the reactor could escape into the atmosphere.

Hot, pressurized water flowing through the tubes, each about 0.75 inch in diameter, is used to heat water outside the tubes, which is not radioactive. The resulting steam is used to turn turbines to make electricity.

The water leak Tuesday at the Unit 3 reactor was initially estimated at a rate of 85 gallons a day — an amount about half of what would require the plant to shut down. The company said the rate of the leak was "much less," but did not provide a figure.


It's not clear what caused that tube to fail, or whether the company was facing an isolated break in a single alloy tube or a manufacturing defect that might be at issue elsewhere in the massive plant tube system.

Radioactive gas that leaked from that tube was vented into a building that contains auxiliary equipment, according to the NRC. The radiation was detected by monitors in that building, which is separate from the sealed structure that houses the reactor.

Because the auxiliary building is not sealed — people come and go through doors — it's possible radiation escaped into the atmosphere.

The company said there was no indication the heavy tubing wear is related to terrorism.

The plant is owned by Southern California Edison, San Diego Gas & Electric and the City of Riverside. Southern California Edison serves nearly 14 million residents with electricity in Central and Southern California.

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