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## Is a New Reactor Rust-Prone?

By *MATTHEW L. WALD*

Courtesy of Arnold Gunderson, Fairewinds Associates An expert warns that an air pathway in a new reactor design could open the way for the release of radioactive materials.

Approval of the design for the Westinghouse AP 1000 reactor is slowly moving forward at the Nuclear Regulatory Commission, as are financial arrangements for building the nation's first one, near Augusta, Ga. Yet the argument about whether its design is safer than past models is advancing, too.

On June 18, the Southern Company, the utility holding company that is building it, and the Department of Energy announced that they had come to final terms on a [federal loan guarantee](#) that would allow the project to go forward. The guarantee is for **70 percent** of the company's costs, not to exceed \$3.4 billion. (Georgia Power, the Southern subsidiary building the plant, owns 45.7 percent of it; other partners also got loan guarantees.)

Lots of details have yet to be agreed upon, though. One is that the reactor is surrounded by a shield building meant to protect it from hazards like crashing airplanes, and the Nuclear Regulatory Commission is not convinced that the shield building would survive [earthquakes and other natural hazards](#). Westinghouse, a subsidiary of Toshiba, is doing new analytical work to try to convince the commission staff of its safety.

Also under attack is a thick metal shell inside that shield building that [critics say](#) might not withstand an accident.

The theory behind separating the shell from the surrounding wall is to avoid a problem in existing reactors, which use a strong concrete building with a metal liner. In case of a serious accident, some argue, that combination of concrete and steel could become a thermos bottle, allowing heat to build up. In the AP 1000 design, the metal is not a liner but an entire separate shell, with a concrete building surrounding it and an air gap in between.

In the event of an accident, the thinking goes, heat flows through the shell and out into the environment rather than getting bottled up and letting the building's interior get dangerously hot.

But a nuclear engineer, Arnie Gunderson, told a commission committee last week that keeping the metal and the concrete together presents an advantage: essentially, it would be harder for a flaw to appear in both and create a leak. If they are separated, he argued, rust could attack the metal shell in a place that is hard to inspect. What is more, creating a pathway between the metal and concrete that works like a chimney could allow for the release of [radioactive materials](#).

The Nuclear Regulatory Commission's [Advisory Committee on Reactor Safeguards](#), a panel of about a dozen senior experts drawn mostly from academia, gave Mr. Gundersen an hour and fifteen minutes on Friday to make his case, a long period. He outlined rust problems and other containment problems at existing reactors, including [Beaver Valley](#) near Shippingport, Pa., [Salem](#) in southern New Jersey, and [DC Cook](#) in Michigan, on Lake Michigan's eastern shore.

Still, he said, the metal in those reactors is usually only a liner. "Up until now, it's been a containment system," he told the committee. "You've got the liner and the concrete and they work together."

"The difference with the AP 1000 is, it's one thing; it's two inches thick, but it's one thing," he said. In existing reactor containments, the liners are usually considerably less than two inches thick.

Are there any failures in thicker metal, the committee wanted to know? On Monday morning, Mr. Gundersen dredged one up, at the FitzPatrick reactor in upstate New York. While the geometry of the FitzPatrick plant is very different from the design of the AP 1000, a thick metal part rusted through. The Union of Concerned Scientists [explained the problem](#) in 2005.

The committee did not reach a verdict on the AP 1000 design and has not yet been called upon by the Nuclear Regulatory Commission to sign off on it. "Your input to us is helpful in focusing attention," said Harold B. Ray, a committee member and a retired chairman of Southern California Edison.