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Dec. 23, 2002, 7:57AM

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## Nuclear reactors could withstand impact of jetliner, tests show

By H. JOSEF HEBERT  
Associated Press

WASHINGTON -- Tests using engineering models support the nuclear industry's arguments that a reactor could withstand a direct hit by a jetliner, an industry-sponsored report said.

While the tests by engineers independent of the industry provide valuable data, federal regulators briefed on the findings say they are waiting for completion of their own tests before drawing conclusions.

The vulnerability of the 4-foot-thick concrete containment domes of reactors to an airborne attack has been of major concern since the Sept. 11 attacks.

Reactors are designed to withstand many natural disasters, from hurricanes to earthquakes. They never were designed specifically to be protected against a direct hit by a large aircraft such as the planes flown into the Pentagon and World Trade Center.

Findings to be released this week concluded that if a Boeing 767-400 jetliner, fully loaded with 28,980 gallons of fuel, were flown directly into the center of a reactor at 350 mph, the plane would not penetrate the structure.

"The analysis indicates that no part of the engine, the fuselage or the wings -- nor the

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jet fuel -- entered the containment building," said the report prepared by two consulting firms for the Electric Power Research Institute at the request of the nuclear industry.

The computer analysis evaluated both a direct impact on the containment structure of one of the plane's engines and "the global impact" of the entire aircraft mass on the structure.

The analysis concluded that damage would be limited to "some spalling" -- crushing of material -- of the concrete but with minimal penetration.

A summary of the report produced no detailed test calculations but said conservative assumptions were used.

For example, the computer runs assumed a fuel-loaded aircraft making a direct hit at the center of the containment building where impact forces would be greatest.

It assumed use of a Boeing 767-400 because that wide-bodied jet best represents the commercial aircraft fleets, and the report used a speed of 350 mph because that is believed to be the speed at which two jetliners hit their targets on Sept. 11.

Higher speeds would make an aircraft too hard to control at low altitude and make a hit on a reactor extremely difficult, especially by an inexperienced pilot, the study said.

The tests were conducted by ABS Consulting, which specializes in quantifying losses from natural and man-made hazards including fires, earthquakes and missile impacts, and ANATECH Corp., a San Diego engineering firm that specializes in evaluating structural failures.

The sponsoring Electric Power Research Institute, based in Palo Alto, Calif., is a nonprofit energy research consortium of the electric power industry. After the Sept. 11 attacks, the Nuclear Energy Institute asked the consortium to develop the study.

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