

RFID Ensures Worker Safety at Nuclear Plant Archive

The archive, a storage site for blueprints of nuclear plants, uses active UWB tags to ensure workers are evacuated should a fire-protection system become activated, filling its chambers with nitrogen.

By Rhea Wessel

Dec. 24, 2008—Nuclear plant designer and constructor [Areva NP](#), a division of French multinational conglomerate [Areva](#), is employing active RFID to ensure the safety of its personnel at a high-security document archive in Erlangen, Germany. The facility holds the blueprints and highly confidential documents for nuclear plants operating around the world. These documents must be stored for approximately 90 years in a fire-safe archive, in accordance with the laws of various countries, as well as the company's contractual obligations.

The archive is equipped with a fire-protection system that would flood the facility's rooms with nitrogen within two minutes of detecting a conflagration. The nitrogen would then choke out the fire by displacing much of the oxygen in the rooms. The system would also eliminate the need to use water—which could permanently damage the documents—to extinguish the flames.

"When a fire breaks out in an archive, the water used to extinguish the fire often causes more damage than the fire itself," says Orgent Seydel, who is responsible for safety and quality assurance at the facility.

If a staff member were trapped inside the building when the nitrogen was pumped into it, however, the effect could be harmful and potentially deadly. This risk to personnel was the reason Areva NP approached systems integrator [Dynamic Systems](#) in September 2007, to find a system to track its employees. The company must know where workers are located in the archive at all times, in order to ensure rescue teams can quickly reach them in times of danger.

The 1,600-square-meter (17,200-square-foot) archive is spread out over four separate rooms. Each contains up to 10 shelving blocks comprising 10 to 12 shelves that can be pushed together manually along rails to preserve space. The spatial arrangement of the shelves may change frequently. As employees file documents and complete daily tasks, they must move around the shelf blocks and between shelves.

Since there are four rooms with complex spatial arrangements of shelves, as well as multiple entry and exit points, Areva NP ruled out a system based on portal controls. It opted instead to employ a real-time location system (RTLS) from [Ubisense](#). The company began implementing the project in April 2008, installing 34 interrogators mounted 1 meter (3.3 feet) above the upper edge of the shelves, at various locations around the four rooms. Ubisense completed the deployment in September, according to Terry Phebey, the company's VP of sales in Europe and Asia.

Each worker or guest in the archive wears a Ubisense tag that measures approximately 3 centimeters long by 3 centimeters wide by 1 centimeter thick (1.2 inches long by 1.2 inches wide by 0.4 inch thick) and contains an

active, ultra-wideband (UWB) RFID transponder that sends out a 6 GHz to 8 GHz signal in short pulses. The 10-gram (0.4-ounce) tag can be worn on a belt or slipped inside a badge. Batteries in the tags last for about 12 months. The readers in the four rooms record the signals and calculate the locations of each tag and its wearer using time-of-arrival and angle-of-arrival data. A worker's position in the archive can then be visualized on a screen accessible to rescue teams.

According to Phebey, tests of the system showed that in some cases, it lost sight of workers when they were actually between shelves. To overcome this problem, Ubisense added a few additional interrogators and designed the system to infer that a worker is between two shelves if he or she moves between them but has not yet been detected moving out of the area.

RELATED_ARTICLES Areva NP's German division invested roughly €130,000 (\$180,300) in the application, Phebey says. However, it has not yet calculated a return on investment since the application is currently focused on workers' safety.

"The application is valuable, and it works without problems," Seydel states. "In the event of a fire, we are able to make sure all workers are safe."

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