

In Development

Beyond Filing Cabinets and Three-Ring Binders

A Strategy to Eliminate Paper in the Nuclear Industry

By Chris Warren

One of the most common materials traditionally required to build nuclear power plants in the United States is also one of the least expected: paper. Most operating plants in the United States were designed in the pre-personal computer era of the 1970s, when reams of paper were used for the blueprints and equipment manuals. When the builder turned a plant over to its new owners and operators, it came with a massive collection of documents and microfilm reels.

In the 2010s, it's difficult to imagine searching voluminous paper and microfilm repositories to find information necessary for plant operations. Indeed, the nuclear industry has made significant progress transitioning to electronic documents. But much work remains. As part of a multiyear effort to help the nuclear industry move away from its legacy reliance on paper documents, EPRI determined that plant personnel could spend 30–40% of their time searching for and validating information in various documents to ensure the accuracy of data for operations and engineering assessments.



Configuration management can help the nuclear industry move away from its legacy reliance on paper documents.

Saving Time and Money for Nuclear Plants

In a 2014 study, EPRI probed the economic benefits of moving from paper documents to a *data-centric configuration management information system*. Widely used to manage complex projects, such as building and operating weapons systems and oil drilling platforms, *configuration management* is a systems engineering process that can enable quick retrieval of important information related to licensing, design, and operations. For example, 3-D digital models could replace nuclear plant blueprints, making it unnecessary to search through boxes of documents.

According to the EPRI study, fully adopting data-centric configuration management could reap savings of \$8 billion at the 100 existing U.S. nuclear plants over the next 20 years. For the four U.S. plants under construction, the figure is estimated to be \$1 billion over their projected 80-year life.

“We arrived at these figures by accounting for every person impacted by configuration management in nuclear plants,” said EPRI Technical Executive Ken Barry. “We determined how many more hours they could devote to their jobs if they had electronic access to information and didn’t need to look in the binders in the library to find it.”

Consider the replacement or repair of a safety pump if its design were stored in a 3-D model. Instead of searching the library to find the pump’s specifications, a plant operator could go to the model to retrieve information such as the pump’s capacity and power. “The dream scenario: I have a 3-D model of the plant, I

know where the pump is located, and I find it on the model and click,” said Barry. “All the information needed for the replacement pops up on my screen.”

Making Steady Progress

The scenario that Barry describes is already a reality in other industries. Some container ships and submarines are built, operated, and maintained using 3-D models.

Nuclear plants are more complicated to build and operate, but implementing configuration management systems can quickly yield savings and increase efficiency and safety. Many nuclear plant operators have digitized paper documents, synchronizing information once held in separate databases and ensuring that data needed often for operations can be accessed easily and electronically. “Today, most plants use electronic documents,” said Barry. “It’s a step in the right direction, but much more is possible.”

Besides making the business case for configuration management, EPRI is working with the Nuclear Information and Records Management Association (NIRMA) and other industry stakeholders to develop guidelines for improving these systems. Guideline revisions are expected by 2017.

Key EPRI Technical Experts

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