Improving the Material Condition of Your Plant

Disaster at Three Mile Island… On March 28, 1979, the worst accident in U.S. commercial nuclear power plant history happened. A partial meltdown at Three Mile Island's (TMI) unit 2 reactor in Dauphin County, Pennsylvania mounted investigations into the crisis, finding deficiencies in quality assurance and maintenance, operator training, communication, management and overall attitudes. The most alarming fact remains that the sequence of events at TMI-2 were duplicated at Davis-Besse Nuclear Power Station just 18 months earlier, but the details surrounding the Davis-Besse incident weren't transferred to the rest of the industry.

TMI-2 had been online only 13 months before undergoing a 14 year and $1 billion clean-up mission. There was an obvious need for communication between plants as well as improved procedures and safety measures. The mistakes made at TMI-2 resulted in the establishment of the nonprofit organization, Institute of Nuclear Power Operations (INPO).

Formation of INPO… INPO's mission is "to promote the highest levels of safety and reliability – to promote excellence – in the operation of commercial nuclear power plants." Since its inception, the nuclear industry has made significant progress in areas that were once inadequate.

INPO evaluation teams visit and rate all 67 U.S. sites every two years. "They show your gaps against the rest of the industry," says *David Thompson, Manager Nuclear Fleet RP with Duke Energy*. "They help you raise the bar. They make sure you have a clean house (it's called material condition of plant)…that it's well lit, well painted…a clean site versus a dirty or dark site… it all affects your work environment and nuclear safety."

Improving Material Condition… *Earl Jacobson, Founder of NPO*, manufacturer of custom radiation shielding solutions, has visited, assessed and collaborated with engineers and RPMs at virtually every power plant in the U.S. as well as countless other plants across the globe. "I've been doing this for 37 years. The pressures and challenges that nuclear professionals face continually change. They require innovation. They need someone to re-invent the wheel – to approach radiation shielding and problems that create dose with engineered solutions. NPO specializes in turning INPO's recommendations (to improve the material condition of the plant) into solutions."

Luke Kim, database administrator for Exelon's Dresden plant in Morris, IL, has worked in the nuclear industry for more than 30 years. "I remember when the nuclear industry was scrutinized extensively after the Three Mile Island and the Chernobyl nuclear accidents; however, a new breed of nuclear managers and the regulators had the foresight of the "clean – cheaper – unlimited" energy from the nuclear plants if they were managed and operated correctly," Kim states. "Their direction has pumped money and talented resources into nuclear power plants in improving the material conditions, placing good housekeeping measures, and modifying to place permanent shielding to reduce radiological doses."

Under dedicated management, Dresden plant significantly improved the material condition of their plant. "We came a long way from INPO-3 to INPO-1," Kim states, "leading the industry in many areas, including longest running operations without tripping or scram, environmental areas, generation, and outage reductions."

NPO and Dresden… At the end of 2012, Dresden plant came looking for ways to shield their PM12 portal monitors, which were picking up background shine and significantly slowing down processing time at the monitors. Dresden was looking for a solution that was not only more aesthetically pleasing, but one that would prevent the typical tripping hazards that came with the scaffolding previously installed.

The shield wall that NPO built for Dresden was finished in a snowflake white to match the color of the other furniture in the area. The wall is mobile and made of solid lead with all casters connected.

NPO and Duke Energy… All three of the legacy Duke plants (Catawba, McGuire and Oconee) have received INPO-1 top ratings, as well as Harris. "There are significant plans and capital improvements in place for both Brunswick and Robinson plants," Thompson says about his INPO-3 rated plants. "These two need some attention. Part of the improvement plans… part of that money…is in appearance."

Recently, NPO completed a project for Duke's McGuire plant in support of their efforts to improve the material condition of the plant during outage. NPO engineers worked with McGuire to build a modular containment structure that segregated radioactive materials.

“The structure keeps stuff in place. Workers can’t violate the boundary and accidentally pick up a contaminated lead blanket. Some material coming out of containment can be contaminated. Now it’s contained inside walls,” states Thompson. The system itself is kept clean – non-contaminated.

Leonard Campbell, senior technical support at McGuire, referred to their new modular containment building as a Cadillac. “We absolutely love it.”

Strength in Engineering… “It’s all about exchanging ideas,” Jacobson says when asked what the key ingredient is in customizing shielding solutions. “Being transparent with our customers is how we’ve built such lasting partnerships and fitting solutions for so many years. Our customers rely on us to challenge the way they think and for technology that allows them to be safer and work quicker.”

NPO sales engineer Andrew Dockweiler says, “We get a lot of calls from customers who have a shielding problem… aren’t sure how to solve it, but already know there will be budgetary challenges because of high engineering costs and seismic qualifications pertaining to permanent shielding.” Challenges like these, however, are what NPO specializes in. “We understand engineering challenges because we are engineers,” says Dockweiler.

Contact NPO for help reviewing and updating your annual short- and long-term reduction plans.