

LPN Feature: SoCal Edison Credits Training Packages for Successful Planned Outage

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Abstract

Having the right equipment ready at the right time is just the start of planning for a safe and speedy outage. Before work can begin, supervisors, crafts, and temporary people must relearn—or learn for the first time—the optimum use of the equipment. Biach Industries, makers of engineered tooling for outages and routine plant operations, has a spinoff company dedicated to developing customized training materials. This brief case study looks at how we used Biach’s training packages to ensure a successful, swift outage at San Onofre Nuclear Generating Station (SONGS).

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Given the critical nature of an outage and the stress involved with it, nuclear companies have never been willing to assume that operating personnel have “memorized the manual.” Pre-outage training is considered of critical importance at every nuclear facility. Southern California Edison is involved in many industry groups to address performance improvement both during outages and routine operations.

San Onofre’s Nuclear Training Division provides instructional design and development services for Web and computer based training and works with other training suppliers for specific content, such as specialized refueling equipment. Edison’s qualified instructors and training procedures and content for the nuclear environment are recognized throughout the industry as meeting or exceeding INPO guidelines.

San Onofre Nuclear Generating Station, (SONGS), part of the Edison grid, has been in operation for more than 25 years, and facility management is committed to improving procedures.

SONGS is a 3-unit site located approximately 10 miles south of San Clemente, CA. Unit 1, shut down in 1992, was a 425 MWe first generation Westinghouse commercial unit (same as Connecticut Yankee) that operated for 25 years. Units 2 and 3 are of the Combustion Engineering 2 Loop Pressurized Water Reactor design. Unit 2 started up in 1983 and Unit 3 in 1984. Each unit is rated at 1100 MWe.

Pre-outage training is conducted by the core refueling group supervision and management. It involves five to seven days of intensive training on all aspects of the outage work.

Preparing for 2002 Plant Outage

With the 2002 outage coming up, management considered many types of outage critical equipment for intensive review. Among them were a number of highly sophisticated, outage-specific tooling systems from Biach Industries (Cranford, NJ).

The four equipment models involved are all associated with detensioning and tensioning the reactor pressure vessel head. They are: Biach's single-operator Electric Stud Drive Tool (ESDT); Hydraulic Quick Disconnect (QDH) tensioner; EPN series electric/hydraulic pumping system, used to power the tensioners; and Stud Elongation Measurement System (SEMS).

While definitely user-friendly, this equipment can hardly be considered operations-intuitive. Management felt that online self-study and classroom training materials should be prepared to supplement the comprehensive operating and maintenance manuals supplied when the equipment was originally purchased.

Computer based training (CBT) applications with self-quizzes to reinforce the learning, classroom instructor and student materials, ancillary materials like powerpoint presentations, posters and lesson plans, and a sturdy, laminated booklet of key points for use on the job were all to be part of the equipment training package.

These were contracted for and developed by Biach Information Arts (BIA, Cranford, NJ), the training development arm of Biach Industries, in time to prepare for the upcoming outage. The job aids are intended to be attached to the equipment so the operator has a brief, concise step by step operating procedure at the tool in the event he suddenly forgets what to do next.

Pre-Outage Training Focuses on Operations

Outage-specific equipment is only used when the outage occurs, usually every 16 to 18 months. No matter how thorough and intensive the original equipment training was, after so much time has elapsed a refresher course is essential. Pre-outage training is focused on operations: what the equipment does, and how to use it safely and quickly.

Tony Watt is BIA's expert in the development of training materials. He explains that consistency of presentation is a prime goal in developing task-oriented training for operators.

"It is part of information ergonomics: how people assimilate and process information," Watt said. "We work to frame the pictures the same way the operator/learner will see the equipment in operation. The training moves from basic to a higher level. And in developing self-study tools, we work to catch the students' eyes and keep their attention so they don't get 'click-happy.'"

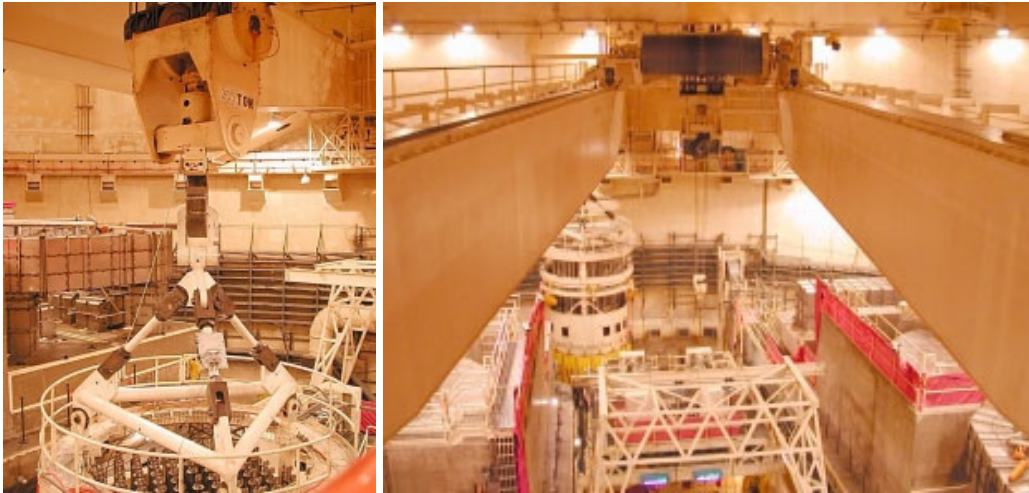
In all, about 55 people were to be trained in a variety of disciplines prior to the 2002 outage. This was a highly variable workforce, including the facility's regular staff of supervisors and crafts, full-time employees from other Edison Departments loaned to San Onofre for the outage work, and 35 to 40 "traveling" building trades people—boilermakers, pipefitters, etc., brought in specifically for implementation work during the outage.

It's hard to predict who will do best with the sophisticated equipment under the pressure of

the actual outage environment. Station management is using the classroom instruction and hands-on training to make an educated assessment before going out to the field.

RPV Head Operation a Success

During the actual outage, each shift work crew for detensioning and tensioning the reactor pressure vessel head consists of an Edison supervisor who runs the EPN pump. That supervisor is also backed up by a Biach service representative, and seven people in the refueling cavity: three two-man teams assigned to each of the three tensioners and an overall circulating supervisor.



The people available to make up the crews include the Edison supervisors, who could be degreed engineers, ex-Navy nuclear personnel or managers in an IT department. The crafts are traveling people, some still basically apprentices despite their experience.

Everyone who took part in the tensioning for the 2002 outage—about 20 people—received pre-outage training on the Biach tooling systems using the new Biach training materials. The training modules helped compress training time into a shorter period—always a big plus in outage-related work.



Using the modules for initial and continuing training for the crafts resulted in a successful operation in the reactor cavity. The crafts understood the equipment and were prepared to operate it even before they moved to the hands-on portion of the pre-outage training, which is conducted with actual equipment.

The modules operate very well for knowledge-based training and also transition easily to skill-based training. Posters, flip charts, and summary books for the field help the crafts learn in the classroom what they will see down on the floor. The modules include both generic information, and custom material specially prepared in conjunction with San Onofre's training people and experienced supervisors to suit the station's specific needs and circumstances.

San Onofre refueling management is extremely happy with the four modules, feeling that the quality and depth of knowledge in the representations fit well with the station's training goals.

With the carefully thought out training sequence and the new modules, "training dose" radiation is minimized because the crews hit the floor ready to begin actual work. There are fewer people in the cavity for a shorter amount of time. This has made a difference in outage time and, even more important, in radiation dose. San Onofre management has been told that its RPV head stud removal and reinstallation is done as fast as anywhere in the industry.



Polar Crane Training Prepared for the Next Outage

BIA also prepared a polar crane training module for use at San Onofre's next outage.

Actual operation of the equipment is not part of this program, as it was for the Biach equipment. The program is designed, not for the five crane operators who are at work during an outage, but for refuel supervisors. And although Biach Industries has nothing to do with cranes, BIA was called in to prepare the package because San Onofre management felt very comfortable with the group, having witnessed its training development methodology in relation to the Biach equipment.

Most potential polar crane incidents occur during the onload stage, where space in the containment building is extremely tight and everyone is under great time pressure. While the RPV is open or being opened and fuel moved around, safe load paths are essential. The goal

is to ensure that the crane will never be in a position where a load could be dropped on any of the safe shutdown equipment.

Of course this is not left entirely up to human judgement. Limit control systems in the crane would automatically stop the equipment before it could reach a restricted zone. This would avoid endangering the critical equipment, but could sheer off drive pins, damage drive motors or result in other problems that could extend outage time.

It is up to the refuel supervisors to observe operations and be sure a crane is not moving into loadpath violation. The training program is a refresher course for the supervisors, with an overview of the key points they need to be aware of. The course will help the supervisors understand enough about the crane operators' job so they can work together in an intelligent way.

Although the crane training material will not be used until the next outage, it is already near completion. San Onofre refueling management is pleased with the work so far and expects to put the new material to good use in its overall mission of ensuring safe and speedy refueling outages.

Conclusion

Management brought BIA in because they liked what was previously developed and trusted in Tony Watt's ability to grasp and understand a new application (even though Biach did not have "polar crane credentials"). The synergy between BIA and SONGS facilitated communicating site needs, bridging the gap of technical issues. BIA's flexibility and broad based understanding of critical industrial activities enabled them to address this new project. Working with a key client in an industry that BIA and Biach have served for decades displayed the confidence and close working relationship that helps maintain training material consistency of format and production within needed timeframes.



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