

Advanced Instrumentation, Information, and Control Systems Technologies



Advanced Outage Control Center
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10/29/15

Light Water Reactor Sustainability R&D Program



Project Overview

- **Purpose** – To improve management of NPP outages through development of an Advanced OCC that is specifically designed to maximize the usefulness of communication and collaboration technologies for outage coordination and problem resolution activities to minimize outage duration thereby improving plant availability and reducing operating costs.
- **Participants** - APS (Palo Verde), Southern Company (Plant Farley and Vogtle), TVA (Sequoyah), Xcel Energy (Prairie Island), Duke Energy (Brunswick, Harris, Robinson and Catawba), Exelon (Byron), South Texas Project
- **Schedule** – FY 2013 through FY 2016



Project Overview

- **Approach** – Work with multiple NPPs
 - To ensure the research is transferrable and to improve our understanding of the varied challenges facing utilities
 - To ensure the project team is not working on issues that have been adequately covered by industry
 - Allows us to gather best practices and provide directed support between our industry partners
 - Rather than simply publish the results of research, the project team actively promotes the project to increase the visibility in industry to accelerate adoption of the principles.



Accomplishments

- Developed a utility working group centered around outage improvement.
 - Created an external SharePoint site to support information sharing
 - Bi-Monthly teleconferences to share information and pilot project status
 - Currently representatives from utilities representing over half of the US NPPs are participating



Accomplishments

- Provided direct assistance to several NPPs to implement various AOCC concepts.
 - Each implementation involves new elements to evaluate
 - Follow up with the utility after the outage to document the results
 - Share the results with the pilot project working group and incorporate into guidance reports



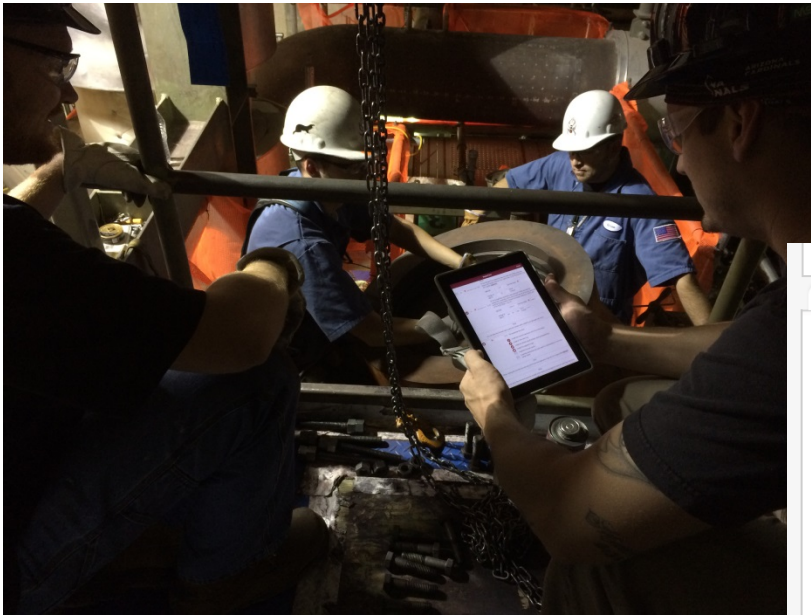
Accomplishments

- Project Promotion
 - Presented at the Winter ANS meeting
 - Presented at the ANS NPIC & HMIT Conference
 - Presented at the Human Performance and Root Cause Trending Conference
 - Presented at the Westinghouse Outage Optimization Workshop



Accomplishments

- Pilot demonstration at Palo Verde for dynamic schedule monitor



Actual Start Date/Time: 04/13/2015 20:36 Actual Completion Date/Time: 04/13/2015 20:36

Task **Log**

4.0 INSTRUCTIONS

HT 04/13/2015 20:36 4.2 Verify the equipment to be worked is specified by the Affected Objects List. Document this verification by initialing next to the applicable DCID(s) on the hardcopy Affected Objects List.

HT 04/13/2015 20:36 4.3 Pre-clean area surrounding bonnet.

Note
A hammer and a block of wood are required to lower the bonnet cap. Do not allow the bonnet cap to become cocked while lowering as damage may occur.

HT 04/14/2015 4:19 4.4 Disassemble the valve

- Remove 1/2 of the bonnet draw bolting and replace with longer 3/4 inch all thread and a nut to allow lowering the bonnet to the bonnet stop.
- Remove the other half of the bonnet draw bolting.
- Lower the bonnet until it sets on the bonnet stops.
- Remove the bonnet carrier.
- Remove the segment rings, using the knockout holes, if stuck.
- Remove the spacer ring (if present)
- Remove the bonnet gasket (if possible)
- Clean the inside of the valve bonnet to allow ease of the bonnet removal.
- Raise and remove the bonnet cap (with gasket if required)

4.5 IF required for further inspection or to drill the hole in the disc THEN remove the hanger cap screws. Remove the hanger/disc assembly and shims (and dowel pins if necessary).

4.6 IF the hole has not been drilled in the disc THEN drill a 0.250 hole in the disc per EDC 2014-00246.

4.7 Support the Qualified check valve (engineer) inspectors to document the 73DP-0X103 inspection results below and provide a copy of the Check Valve Inspection Report for inclusion in the work order package.

Inspection results: SAT: *UNSAT:

RETEST

*Record PVAR number (for UNSAT inspections):

Accomplishments

- Observed/evaluated AOCC supported display and communication concepts at Sequoyah



Accomplishments

- Assist visit at Brunswick, developed new OCC design concepts



Accomplishments

- Completed Milestone Report “Development of Improved Graphical Displays for an Advanced Outage Control Center, Employing Human Factors Principles for Outage Schedule Management”

Technology Impact

- This technology supports the DOE NE mission by improving the performance of NPP outages, the major source of lost electrical capacity, thereby improving the economics and safety of operating a NPP.
- This technology provides tools for NPP staff to more effectively communicate and resolve emergent issues during refueling outages, thereby improving overall outage economics.



Technology Impact

- This technology has been enthusiastically adopted by industry. The project team has had numerous requests for support.
- Utilities we have not worked with have adopted these concepts by benchmarking plants we have worked with, for example Beaver Valley.



Conclusion

- This Pilot project has provided direct process improvements related to outage management to 10 NPP sites
- Additionally, this technology has been adopted by at least an additional 6 NPP sites through utility benchmarking and technology sharing.
- This pilot project produces research to support future capabilities as well as process improvements that are immediately available to US NPPs.

