Advanced Instrumentation, Information, and Control Systems Technologies

Advanced Outage Control Center
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Light Water Reactor Sustainability R&D Program

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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
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.