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Office Of Nuclear Energy
Sensors and Instrumentation
Annual Review Meeting

Advanced Outage Control Center

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September 16-18, 2014

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Project Overview

Goal, and Objectives

- The goal of this project is to improve management of nuclear power plant outages through development of an advanced Outage Control Center (OCC) that is specifically designed to maximize the usefulness of communication and collaboration technologies for outage coordination and problem resolution activities..
- The objectives of this project are to demonstrate various advanced communication and collaboration technologies to support the high level functions performed by the OCC and to develop methods for improving the physical layout of the OCC accounting for the use of these advanced technologies.

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Project Overview

- **Participants**
  - Idaho National Laboratory (INL)
  - Palo Verde Nuclear Generating Station
  - Joseph M. Farley Nuclear Generating Station
    - Other Southern Company stations likely in FY 2015
  - Sequoyah Nuclear Generating Station
    - Other TVA stations likely in FY 2015
  - Advanced Test Reactor (ATR)
  - Additional interest, but no specific plans at this time for several other utilities.
    - Prairie Island
    - Duke Energy

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Project Overview

Schedule

- FY 2013 – Primarily worked with Palo Verde to develop technologies for an advanced OCC. Established a prototype AOCC in INL's Human System Simulation Laboratory (HSSL). Implemented the use of a standard issues package for emergent issues resolution at Palo Verde.
- FY 2014 – Continued development of AOCC technologies and concepts. Began working with Plant Farley and INL's ATR to implement communication and collaboration technologies. Worked with Palo Verde to implement a video wall to support outage collaboration.
- FY 2015 – Will develop improved graphical displays for an advanced OCC, employing human factors principles for effective real-time collaboration and collective situational awareness.
- FY 2016 – Will develop technology for real-time plant configuration status during outages to improve work coordination, efficiency, and safety margins.

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Accomplishments

- **M2 Milestone Report – Guidelines for Implementation of an Advanced Outage Control Center to Improve Outage Coordination, Problem Resolution, and Outage Risk Management**
  - Provides industry guidance on the selection and implementation of technologies for an advanced OCC.
  - Provides guidance for the physical design of an advanced OCC.

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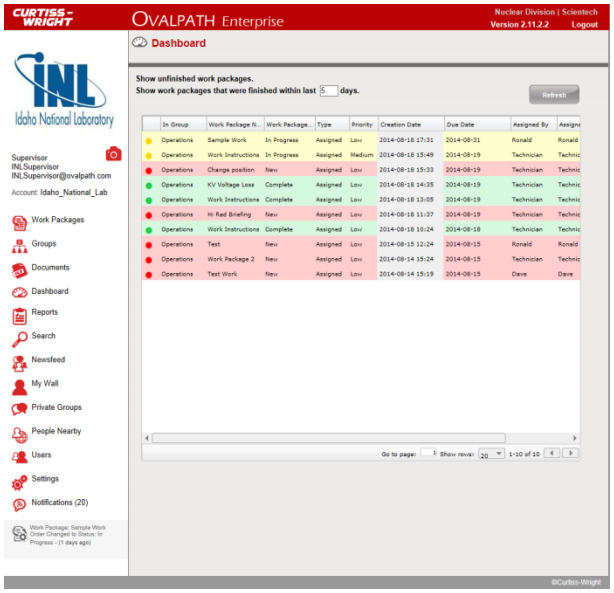
Accomplishments

- **M3 Milestone Report – Status Report on the Development of Micro-Scheduling Software for the Advanced Outage Control Center Project**
  - Describes advanced outage functions and the status of development of a software tool to support the AOCC concepts of real-time status monitoring, micro-scheduling, and automatic support notifications.



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Accomplishments

- **M4 Milestone Report – Benchmark Report on Key Outage Attributes: An Analysis of Outage Improvement Opportunities and Priorities**
  - This report documents the results of a benchmarking effort to evaluate the transferability of technologies demonstrated at Idaho National Laboratory and the primary pilot project partner, Palo Verde Nuclear Generating Station to other utilities.
  - LWRS staff visited St. Lucie, Plant Farley and Sequoyah to ensure that developed technologies would be applicable industry wide and to identify best practices related to outage communication and OCC physical layouts.

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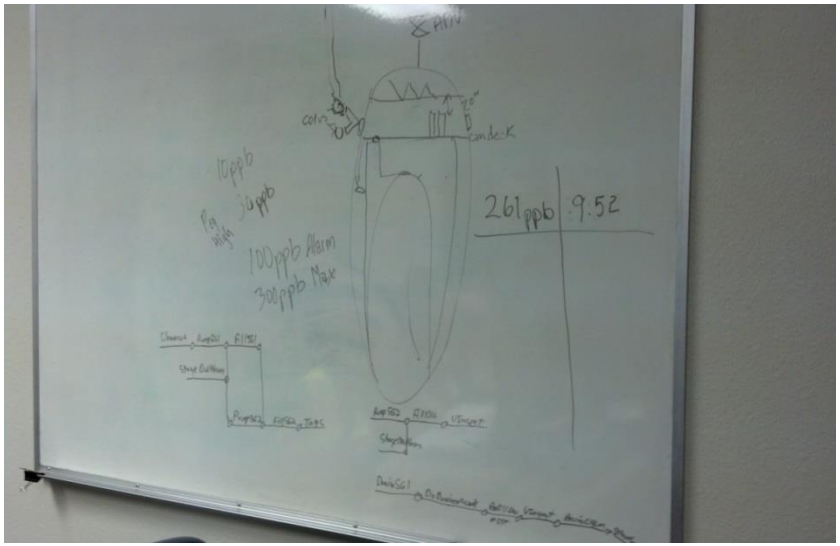
Accomplishments

- **Technology and Process Improvements at Palo Verde**
  - Collaboration tools for emergent issues resolution

Before



After

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Accomplishments

- **Technology and Process Improvements at Palo Verde**
  - Implementation of an OCC video wall using collaboration software for outage status displays

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Accomplishments

- Palo Verde won an NEI Top Industry Practice (TIP) Award for implementation of AOCC concepts during their fall 2014 outage.
- TIP process award for “Leveraging Technology to Improve Outage Coordination and Performance”.
- The award submission was for the use of a standard issues package for emergent issues resolution.

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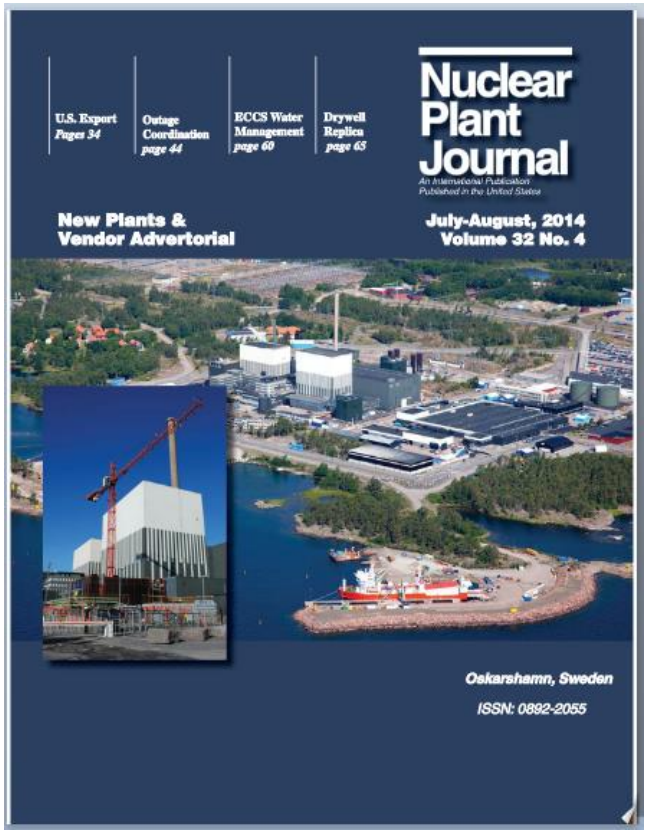
Accomplishments

- **Article published in the July-August 2014 issue of the Nuclear Plant Journal on LWRS AOCC activities and concepts.**



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Technology Impact

- ***The technologies developed for the AOCC project will provide tools for nuclear power plant outage managers to more effectively monitor outage status, coordinate activities, and minimize the impact of emergent issues.***
- ***This project provides guidance for utilities to:***
  - *Systematically evaluate advanced communication and collaboration technologies and advanced outage management outage concepts.*
  - *Develop a change management plan and technology implementation plan.*
  - *Design a physical OCC that maximizes the value of these technologies.*

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Conclusion

- ***In summary, this project supports the NE mission by improving nuclear power plant outage performance by implementation of technologies to support outage coordination, problem resolution, and outage risk management. The project accomplishes this goal through close collaboration with industry partners to ensure concepts are applicable and deployable by the current fleet of light water reactors. This project balances the development of immediately deployable technologies with more advanced concepts that will require additional infrastructure to implement.***