

Leveraging Regulatory And Technical Initiatives For Digital Transformation of Limerick Station

John Connelly
Engineering Manager – Limerick Modernization Project

Problem Statement:

- Original construction safety systems are reaching the end of their practical service life - performance issues are becoming more common and costs to maintain these systems is rapidly increasing
- Historical regulatory barriers have largely precluded modernization of safety systems
- The industry is facing unprecedented economic challenges and must find innovative ways to reduce labor and material costs

In 2019, a public / private partnership was formed between Idaho National Labs and Exelon to deconstruct daily activities to determine the real cost of maintaining the I&C status quo and identify opportunities to reduce cost and further improve safety and performance

Transformation Framework

- Both the research and execution of the Limerick Transformation Project is founded on multiple technical and regulatory initiatives including:
 - NRC integrated action plan for digital modernization (SECY-15-01062) including ISG-6, Alternate Review Plan
 - EPRI Digital Engineering Guide (3002011816) and subordinate processes
 - EPRI Nuclear Plant Modernization Strategy (3002018428)
 - DNP Standard Digital Engineering Process (NISP-EN-04)

This strategy was deliberately structured to maximize efficiency, bring advanced analytical tools to bear and make the public facing research transportable to any utility that seeks to pursue similar initiatives

Key Takeaways

- Four safety-related systems at Limerick Station are within project scope:
 - Reactor Protection System (RPS)
 - Redundant Reactivity Control System (RRCS)
 - Nuclear Steam Supply Shutoff System (NSSSS)
 - Emergency Core Cooling System (ECCS)
- Approximately 75% of physical components are displaced by software which does not degrade over time and requires minimal ongoing maintenance
- Significant changes will be made to the control room to improve situational awareness and maximize information available to operators
- All four systems will be upgraded in a single, standard duration refueling outage

Current Control Room Configuration



End-state Control Room Configuration

