

Comanche Peak Nuclear Power Plant Modernization

Idaho National Laboratory Collaboration

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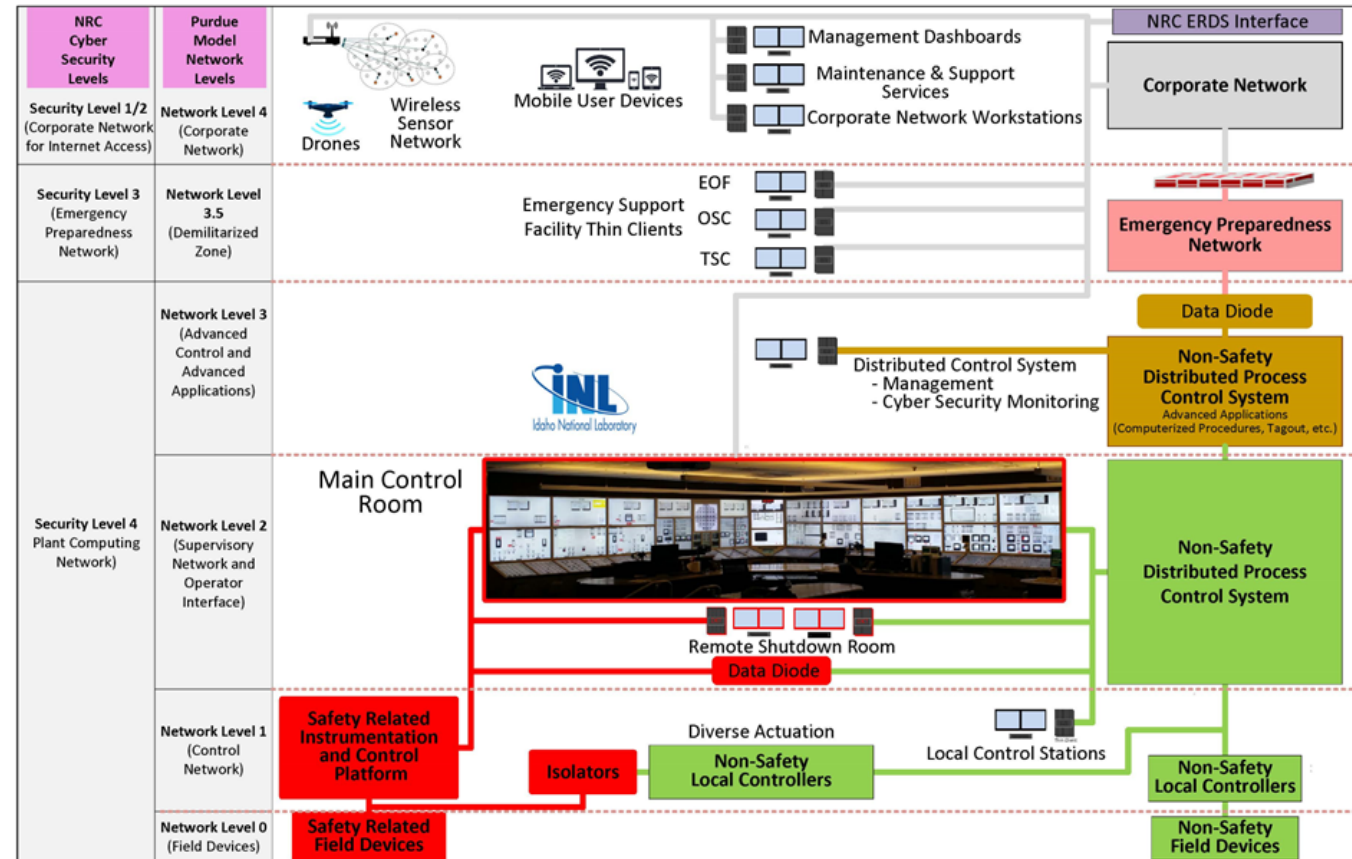
License Renewal Lead

Long Term Operations

Engineering Manager

Digital Upgrades At Vistra: Scope & Strategic Direction

- Comanche Peak initial license renewal (2030-2050).
- Safety-related and non-safety I&C systems at are obsolete and need to be upgraded.
- Vistra is establishing a fleet-wide modernization approach (6 units) led by Comanche Peak as initial pilot
- Vistra is engaging INL Plant Modernization Pathway expertise to maximize the aggregate impact of plant modernization efforts to lower nuclear plant costs:
 - Digital Infrastructure (DI)
 - Data Architecture & Analytics (DA&A),
 - Human Factors Engineering (HFE)
 - Integrated Operations for Nuclear (ION).
- Vistra and INL are finalizing a Cooperative Research and Development Agreement to formalize collaborative efforts going forward.



INL Digital Infrastructure Migration Framework.

Integrating New Digital Technologies and Operational Concepts to Reduce Plants Costs

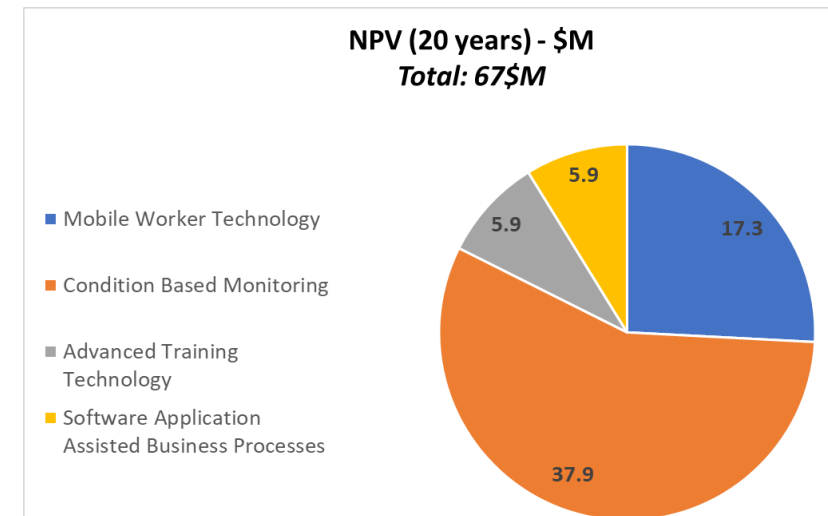
Vistra and LWRS Program researchers performed a DI Business Case Analysis (BCA) at Comanche Peak.

- Existing safety-related (SR) and non-SR-related instrumentation and control (I&C) system were evaluated.
- The Comanche Peak BCA includes lost generation impacts if I&C upgrades are not performed, contributing to a more realistic result.
- The team is also integrating ION with DI research to maximize the aggregate impact of digital upgrades to lower nuclear plant costs.
- By integrating ION concepts into the DI, Vistra identified priority work reduction opportunities to pursue for significant cost reductions.

INL's efforts directly contributed to including the full I&C upgrade project scope in the Vistra Long-Range Plan. Without INL, our station would not have seen the big picture and the benefits of common platform I&C systems. Industry will also benefit as the methods and techniques used in this effort have been made [publicly available](#).

Scenario Title	Payback Period	Net Present Value (NPV)
Baseline (30 years of continued operation)	17.8 years	\$74M
Baseline (50 years of continued operations)	17.8 years	\$685M

NPV of I&C Digital Modernizations. Digital I&C upgrades pay for themselves and provide increasing returns as plant life is extended.



Net Present Value of Priority Work Reduction Opportunities (Vistra Comanche Peak Plant)

Current Efforts: Select Work Reduction Opportunity Demonstration

- Vistra and INL are investigating select DI-enabled ION related Work Reduction Opportunities
 - **Lifecycle support services for modernized I&C Systems**
 - Identify and document the scope of vendor offered, design enabled, lifecycle support services.
 - Determine services with most cost saving potential to drive a business case analysis.
 - **Artificial intelligence tool practical application:**
 - Populate and configure an available AI (LLM) Platform with nuclear plant data sets used to perform work.
 - Engage station personnel to evaluate the AI tool practicality/usefulness to reduce workload.
 - Identify most promising AI tool use cases for search capabilities, document drafting, and content recommendations.
 - Enable business case analyses for those use cases.

Questions?

Thank you.