Challenges of Control System Standardization across a Utility: An Overview of Approaches and Lessons Learned

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with contributions from: Alabama Power, U.S. Army Corps of Engineers and Pacific Gas & Electric
Overview

• Issues Facing Utilities
• Benefits and Challenges of a System-Wide Approach
• Case Studies (programs that lasted ten years or longer)
  • Alabama Power
  • United States Army Corps of Engineers - NWP
  • Pacific Gas & Electric
• Lessons Learned and Tips
Issues Facing Utilities

• Entire Fleet of Equipment is Aging
  • Obsolescence & Availability of Spares
  • Increasing Repair Costs
  • Loss of Experience

• Historically equipment has been rehabilitated individually

• More utilities are taking a system wide approach
Benefits of System Approach

- Engineering Upfront
  - Reduced Total Costs
  - Quicker Lead Times
- Common maintenance practices
- Shared spare parts inventories
- Similar/identical operator interface
- Improved training / more experience
  - Operations / Troubleshooting
  - Quicker RTS
Challenges of System Approach

- Initial Scope Definition
  - Time / Upfront Cost / Consensus
- Scope Creep over time
- Balancing commonality vs site specific requirements
- Equipment obsolescence over course of project
- Staffing changes
- Incorporating lessons learned mid project
Case Studies

- Alabama Power
  - Standard Design
- U.S. Army Corps of Engineers
  - Customized Base Design
- Pacific Gas & Electric
  - Very Similar
• True standard package – Identical equipment between plants
• Benefits
  • Single Design Effort
    • Maximized Benefits Previously Mentioned
  • Complete Commonality between Sites
  • Quick Lead-Time for follow-on units

• Requirements:
  • Strong Similarity between Plants
  • Limited Scope
  • Strong Up-Front Design
Customized Base Design - Identical Core Equipment w/ 80% spare I/O and site specific interfacing hardware
Customized Base Design - Identical Core Equipment w/ 80% spare I/O and site specific interfacing hardware
• Benefits
  • Single Major Design Effort with Following Minor Efforts
  • Flexibility to meet site specific requirements
  • Strong Commonality between sites
  • While not identical, incredibly similar

• Requirements:
  • Loose Similarity between Plants
  • Strong Up-Front Design
  • Consistency in approach for Site Specific Customizations
  • Plan to fill in the gaps for each site
Standardized Sub-Components, Customized Implementation
Standardized Sub-Components, Customized Implementation
Standardized Sub-Components, Customized Implementation
• Benefits
  • Varied Site Specific Requirements Met
  • Similarity between Sites / Familiarity for Staff
  • Commonality of Spare Parts

• Requirements:
  • Complete Engineering Effort per Site
  • Separate “Design Standards” Engineering Effort Upfront
  • Commitment to maintaining commonality where you can
  • Good communications between all involved on present and past sites
Lessons Learned

• Consistency from engineering team is **CRITICAL** on both OEM and customer sides
• Consistency between contracting groups is a challenge
• Constantly ask “what did we do at the last project?”
• Consider equipment obsolescence – what will support be in 10 years?
• Plan for going back to incorporate lessons learned into early installations
Thank you! Any questions?

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