Simulation for Factory Acceptance Testing and Operator Training

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Presenters

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Soda Springs, Idaho
Monsanto, Soda Springs, Idaho

- Elemental Phosphorus Plant
- Started in 1952
- Only elemental phosphorus plant in North and South America
Elemental Phosphorus & Products Made From It
Soda Springs Workforce

- 386 Employees
- 32 Control operators
- Average age of the workforce – 45
- Employees eligible to retire in 2009 – 20%
- Employees eligible to retire within 5 years – 33%
Workshop Objectives

- Process Simulation
  - Why was simulation necessary?
  - Goals and expectations
  - Implementation method
  - Factory Acceptance Testing
  - Operator Training
  - Results
Why Was Simulation Necessary?

- Provox to DeltaV Conversion
  - Systems To Be Converted
    - OWP to DVOP
    - Provox to DeltaV controllers
  - Timeline
    - 2004 – DVOP and one controller
    - 2005 – one controller
    - 2006 – three controllers
    - 2007 – two controllers
    - 2009 – one controller

- Operator Training
  - Operators competent with the DeltaV system
Goals and Expectations

- **Provox to DeltaV Conversion**
  - Offsite verification of database, displays and control logic
  - System reviewed by engineers, operators and trainer
  - Gain operator input and buy-in
  - Smooth onsite system cutover

- **Operator Training**
  - Simulation for operator training prior to system cutover
  - System that duplicates the live process and capable of producing failure scenarios
  - Separate training system for each operator
  - Simulation for ongoing refresher training
Implementation Method

- System configuration handled by an offsite Emerson representative
- Factory Acceptance Testing performed at the Emerson site
- Simulation setup at the plant
- Monsanto onsite operator training conducted
- DeltaV conversion implemented
Factory Acceptance Testing using Simulation

Operator Consensus

Engineer Verification
FAT Offsite Hardware Setup

Operator Stations

Configuration Station

DeltaV ProPlus

Quantum Controller

DeltaV Controller

Mimic Server
FAT Offsite Hardware Setup

DeltaV and PLC

DeltaV VIM, Controller
Factory Acceptance Testing Results

- **Pros**
  - System provided the feel and operation of a live system
  - Complete system verification
  - Interaction between Monsanto engineers and operators, Emerson engineer
  - Control operators were able confer to and agree to necessary changes
  - Final modifications made prior to onsite implementation

- **Cons**
  - Manpower
  - Costs
Operator Training with Simulation
Plant Hardware Setup Operator Training

Location: Central Plant Training Room

Connect via Remote Desktop

Remote Training PC

DeltaV SimulatePro

DeltaV SimulatePro

DeltaV SimulatePro

DeltaV SimulatePro

Workgroup

DeltaV SimulatePro

DeltaV SimulatePro

Mimic Server

Location: Main Building Server Room
Plant Server Setup

Dell 2950 Servers
- One Mimic Server
- Six DeltaV SimulatePro Servers
Operator Training

- Training / Simulation Development
  - Simulation setup using Emerson configuration
  - Modification due to OPC vs VIM
  - Programmed failure scenarios
**Operator Training**

**Pros**
- Head start on training material/work instruction development
- Simulate actual Soda Springs plant process
- Create failure scenarios without impacting the live process
- Operator familiarity with the displays, process and operation
- Enhance the adult learning process
- Reduce classroom training time
- Will use simulation for new operator and refresher training

**Cons**
- Initial setup
- Keep the database current
Operator Training

Future Plans

- More process simulation
- Streamline updates to the simulation systems
- Simulate new processes prior to implementation
- Utilize Mimic Operator Training Manager
Summary

- Simulation successfully used for both FAT and Operator Training
- Configuration verified prior to in-plant implementation
- Operators confident and familiar with the system prior to implementation
- Simulation will continue to be used for future training
Questions?
Where To Get More Information

- MYNAH Technologies
  - http://www.mynah.com/mimic

- Emerson Process Management

- Technology Exhibits