Alarm Management Reflections

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About the Presenter

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- **ISA Fellow**
- **Control engineer at DuPont**
- **25 years of experience in chemical plants**
- **Co-chair of ISA18 standard committee**
- **Secretary of IEC 62682 standard committee**
- **Recreational musher**

Outline

- **Safety Moment**
- **Challenges of Alarm Management**
- **Goals of Alarm Management**
- **The Lifecycle**
- **The Program**
- **Reflections**

Safety Moment – Overflow Incidents

In many overflow incidents, alarms were designed to protect against the consequence, but:

- Instrument may not measure

- Alarm may not activate

- Operator may not see alarm

- Operator may not believe alarm requires action

- Operator may not take action in response to the alarm
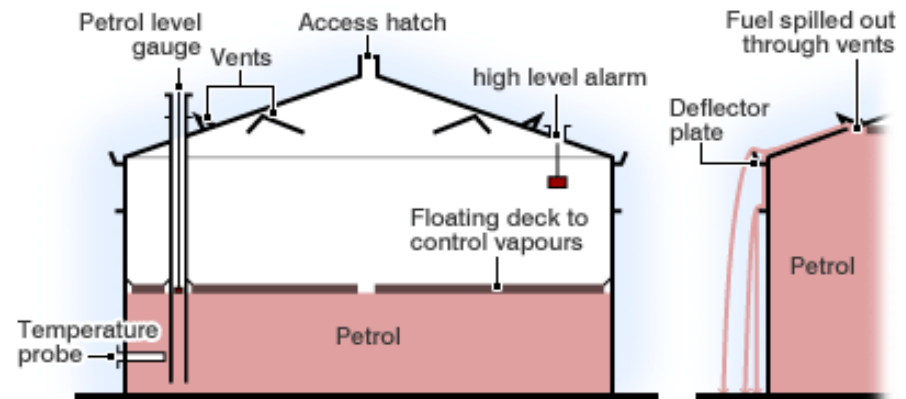
Common Challenges of Alarm Management

- Alarm management is recognized as a common issue in the process industries

- Alarm-related issues have an estimated cost of more than $20 billion per year to U.S. industry

- Poorly performing alarm systems are often a contributing factor in industrial incidents

- Common issues include:
  - Stale alarms
  - Chattering alarms
  - Alarms that do not require a response
  - Other nuisance alarms

Goals of Alarm Management

- Alarms should give the operator an indication of the right time to take the right action to avoid undesired consequences

- Operators should be trained on the right actions

- Alarm system should be monitored to keep performance within limits and not overwhelm the operator

- Nuisance alarms should be identified and corrected to keep the alarm system working

Definition of Alarm

…An audible and/or visible means of indicating to the operator

…An equipment malfunction, process deviation, or abnormal condition requiring a <u>timely</u> response

- from IEC 62682 and ANSI/ISA-18.2-2015
- modified from ANSI/ISA-18.2-2009
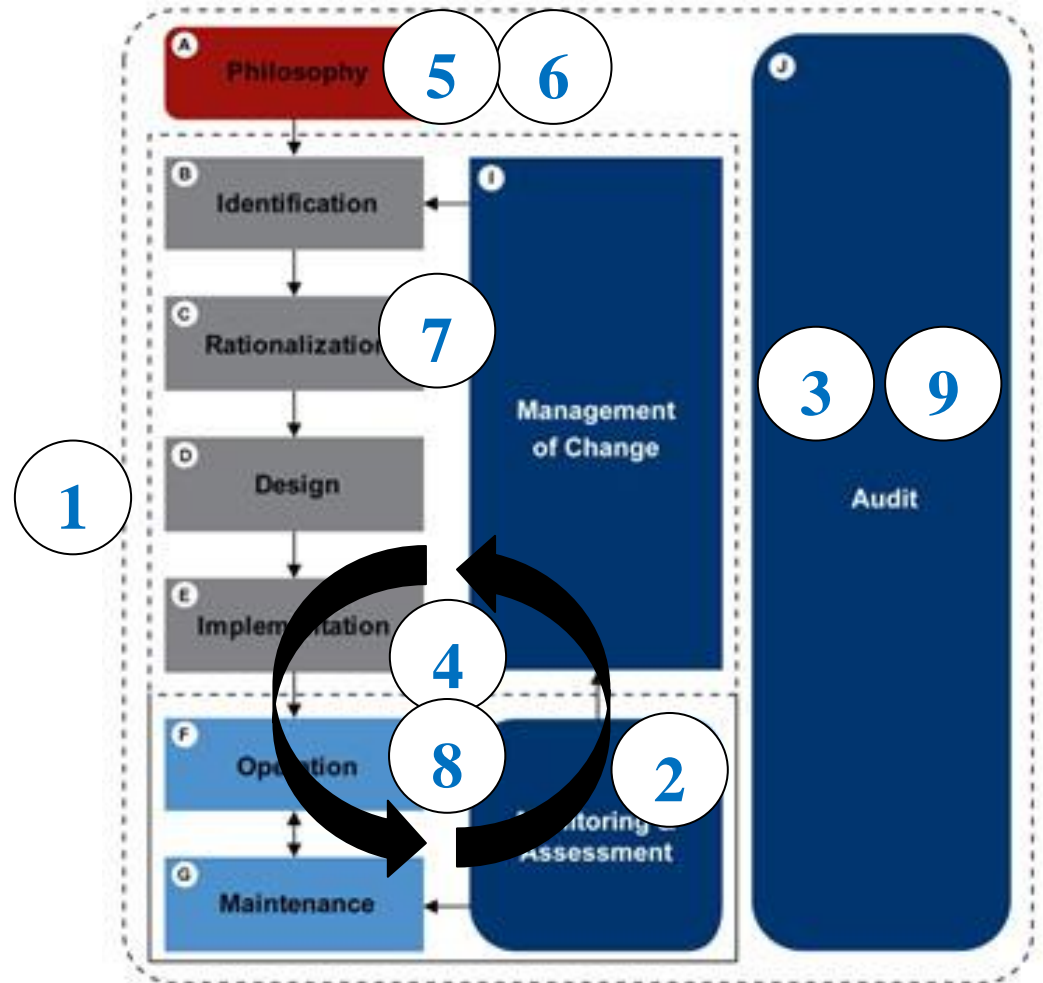
Alarm Management Lifecycle

- ANSI/ISA-18.2 lifecycle model represents the overall process of alarm system management for both new and existing systems

- The same lifecycle is in the IEC62682 standard
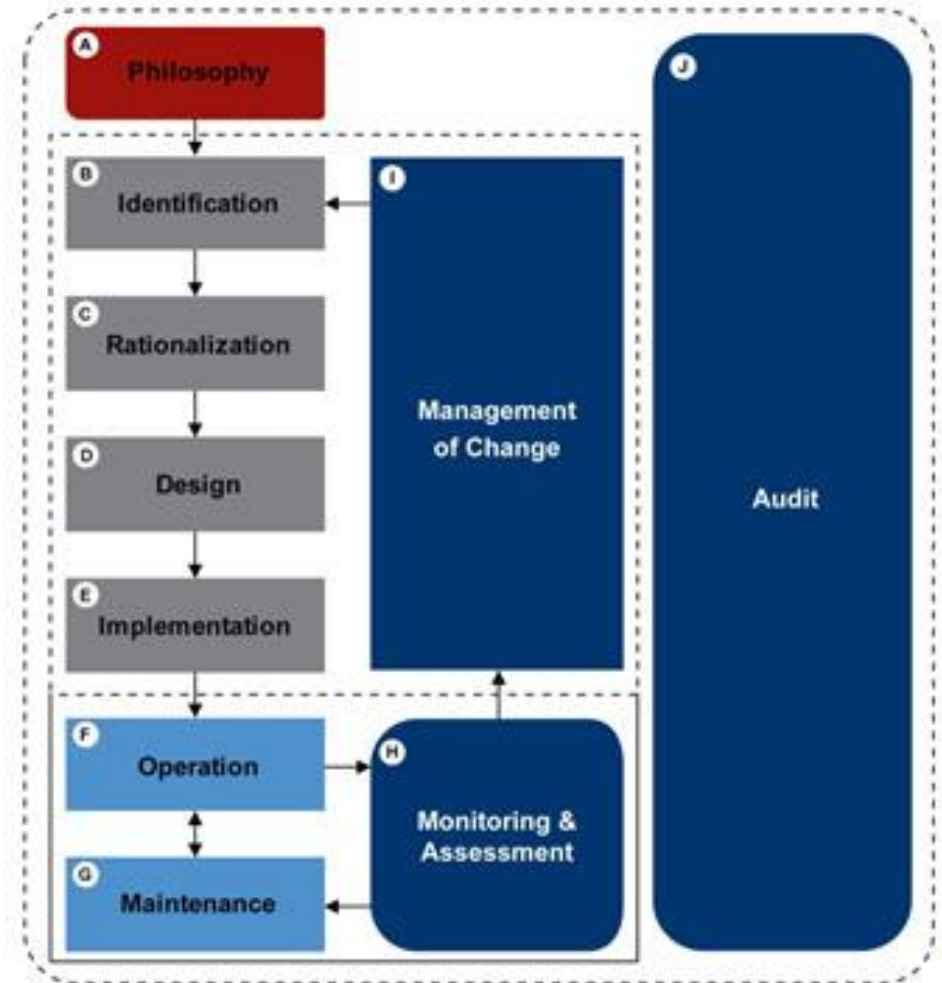
DuPont Alarm Management Plan

1. Leadership
2. Monitoring
3. Benchmark
4. Quick Hits
5. Training
6. Philosophy
7. Rationalize
8. Improvement
9. Audit

Results

- The 2012 program was completed in December

- Over 250 control systems worldwide are now monitored

- This is a culture change for alarms and alarm systems

- There has been a dramatic reduction in nuisance alarms

- There is progress in overall alarm system performance

Next Steps
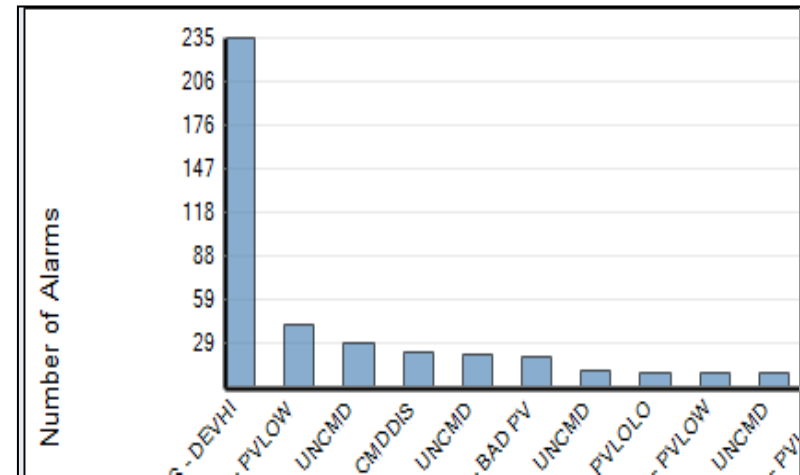
- ## Dynamic Suppression
  - Beyond designed suppression

- ## Providing Guidance
  - Visualization of rationalization information at the operator console
  - Without this, difficult to get a return on investment in rationalization
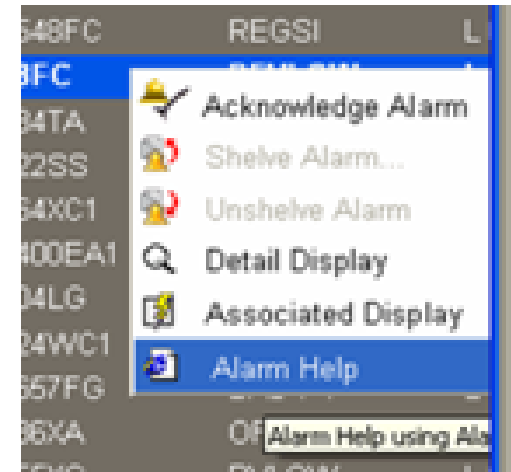
Reflections

- Monitoring
  - Surprising (to some) data on the average alarm rate
  - Key to continuous improvement
- Benchmark (initial audit)
  - Surprising (to some) number of alarms configured
- Rationalization
  - Excellent knowledge capture from experienced personnel
  - Excellent training information
  - Discovery process for how things actually work
  - Different thinking needed vs PHA

Reflections

- Alarm systems should be recognized as a key indicator of operational excellence

- Well planned and executed alarm management improves:
  - Safety
  - Reliability
  - Quality
  - Efficiency

- Structured, sustainable, standards-based lifecycle approach to alarm management should provide significant operational and cost benefits

Reflections

- A top-down approach is needed
- Suppression methods are key to continuous improvement
- Integrity verification and rationalization information availability are key functionalities

More Information

- ISA-TR18.2.6-2012 Alarm Systems for Batch and Discrete Processes
  - Covers the application of ISA-18.2 lifecycle to batch processes
  - Generally the same with more focus on:
    - Rationalization for different operations and phases
    - Design of alarms with more common designed suppression

Standards on Alarm Management

- EEMUA 191 - Alarm Systems - A Guide to Design, Management and Procurement
    - Guideline, not a standard, updated in 2013
- ANSI/ISA 18.2 Management of Alarm Systems in the Process Industries
    - Updated in 2015
- IEC 62682 Management of Alarm Systems in the Process Industries
    - Based on ANSI/ISA 18.2
    - Published Oct 2014

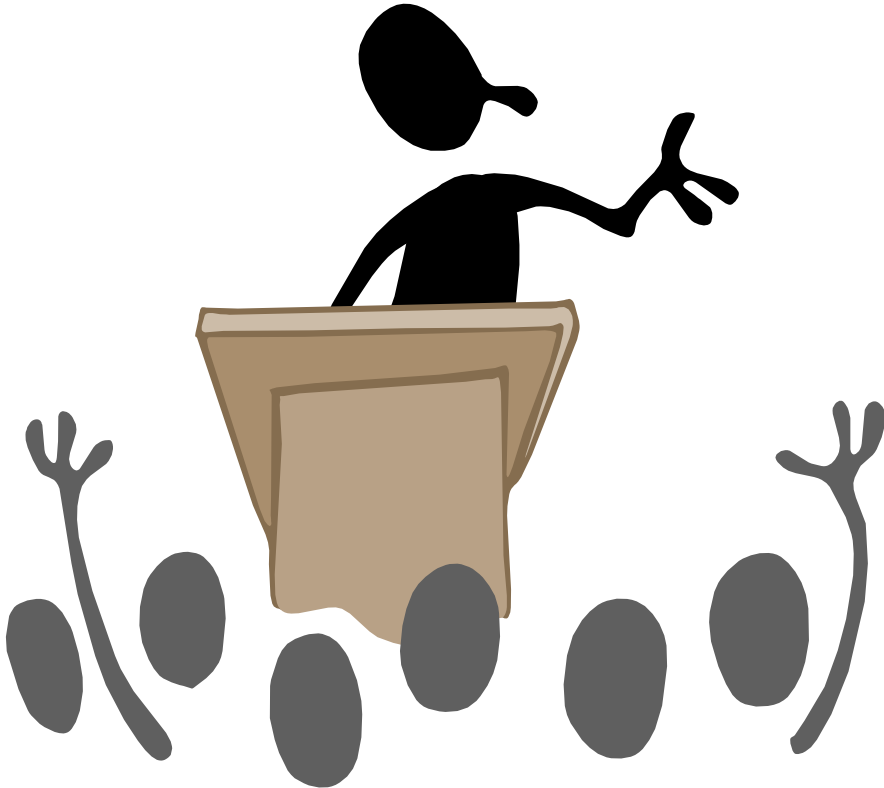Engineering Equipment and Material Users' Association

International Society of Automation

International Electrotechnical Commission

Questions?

Thank you for attending
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