Alarm Management Overview for IADC ART Subcommittee – July 30, 2015

Mike Lyssy

Agenda

- What is Alarm Management?
- What is the Process of Alarm Management?
- What are Benefits of Alarm Management?
- What Services are Offered by General Vendors

What is Alarm Management

- Alarm management is the processes and practices for determining, documenting, designing, operating, monitoring, and maintaining alarm systems. (ANSI/ISA–18.2–2009, Clause 3.1.14)
- Characterized by the application of:
  - System design principles
  - Good engineering practices
  - Human factors principles

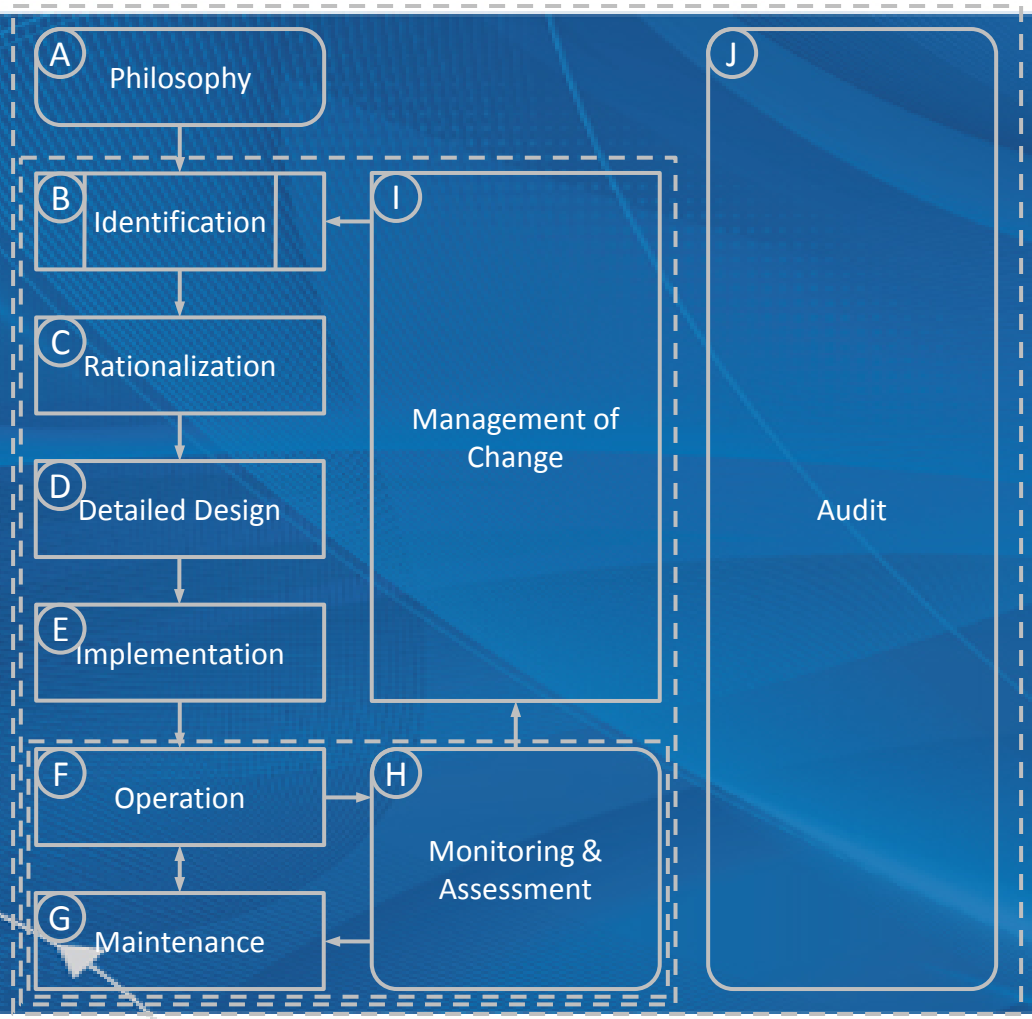
Definition of an Alarm

- An alarm is an audible and/or visual warning **message** to the **operator** to which he **must** respond. It is generated by a process variable crossing a defined threshold into an abnormal, **undesirable**, or hazardous region.

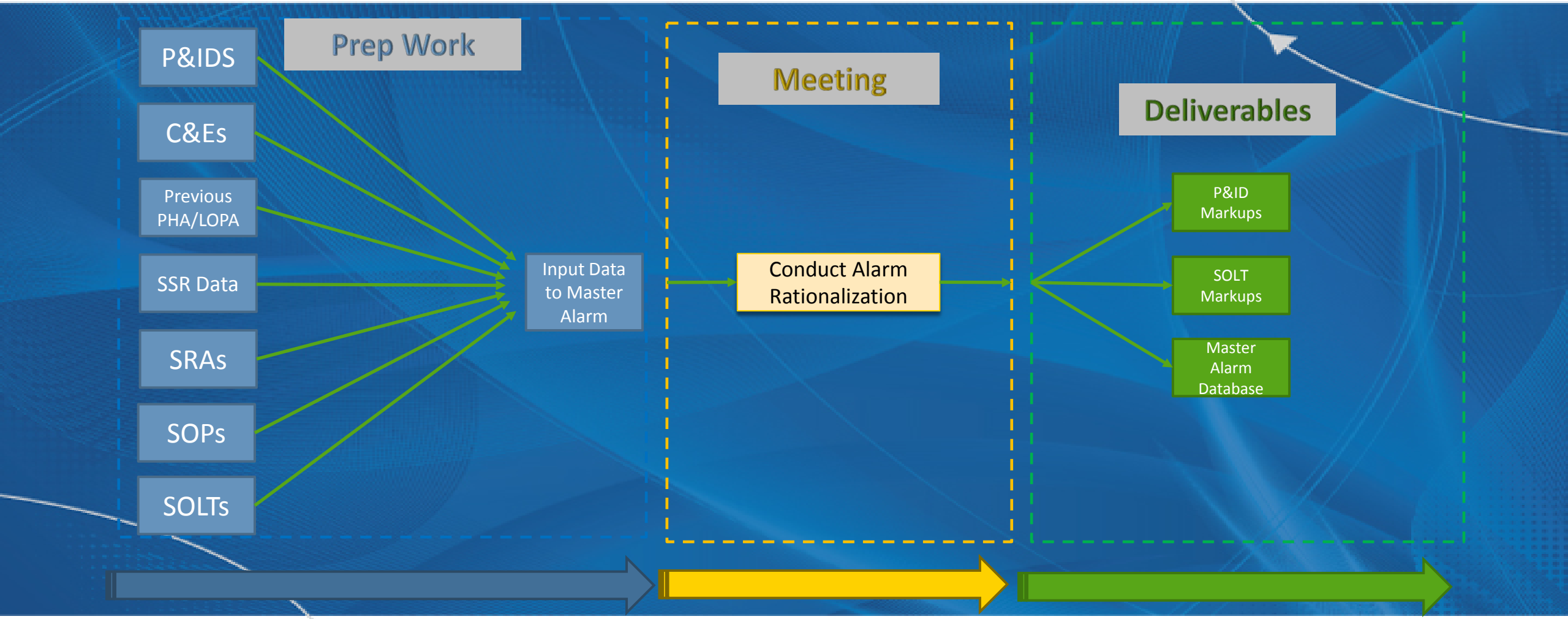
- An alarm is an *intentional interruption* to the operator.

- An alarm is a **demand** for help from the process.

Alarm Management Lifecycle – ISA 18.2



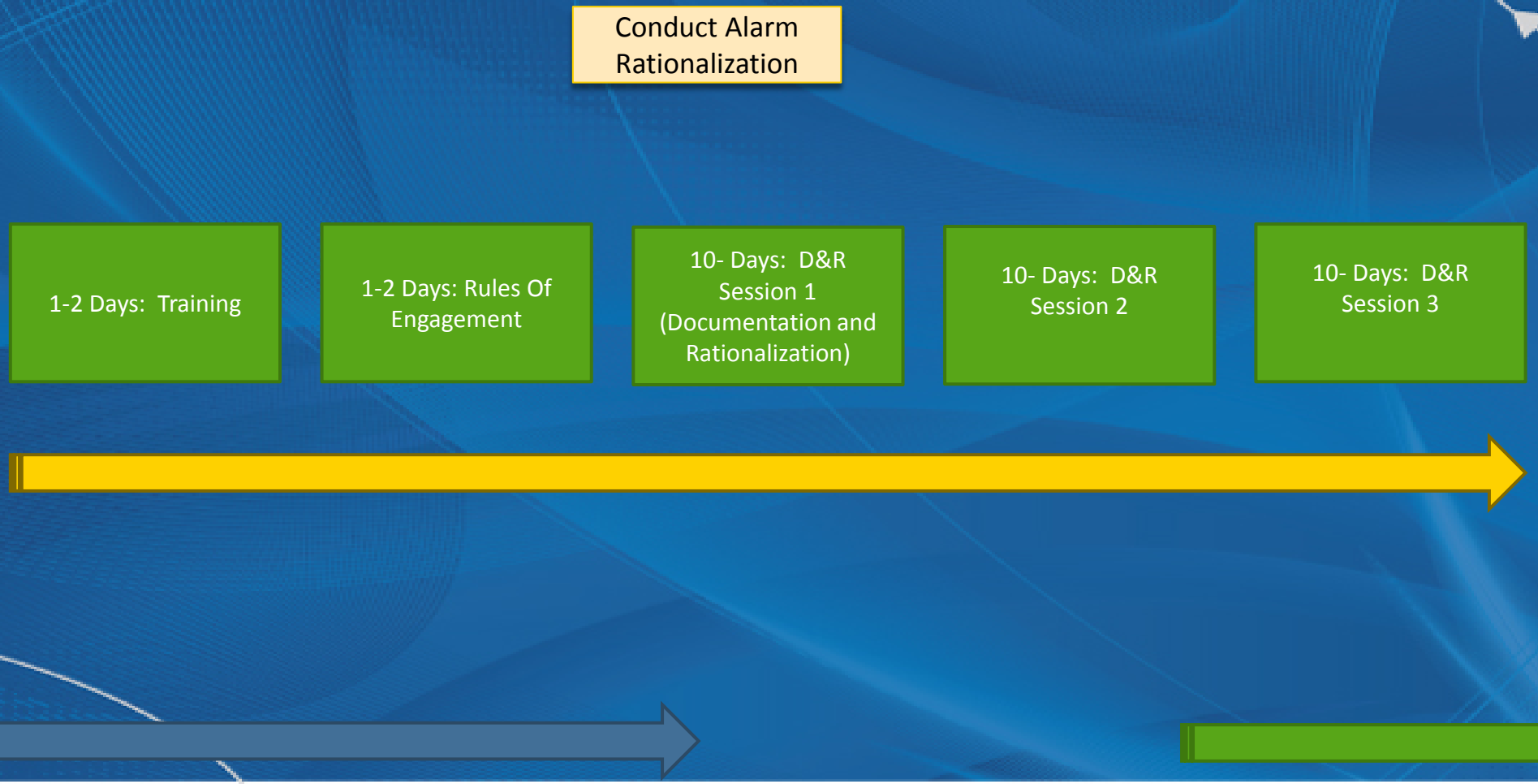
Alarm Rationalization Flowchart



Alarm Rationalization Project Execution

- Determine No. of Tags to Rationalize
- Prep work –
  - Review PHA/LOPA Results
  - Review SOL's/COD's
  - Collect Tag Info and Populate D&R Tool
- Training Session Options
  - Alarm Philosophy Development
  - ISA Standard Familiarization
  - D&R Training
- Rules of Engagement Session

Alarm Rationalization Flowchart



Rationalization Process

1
Form Rationalization Team

Rationalization Team

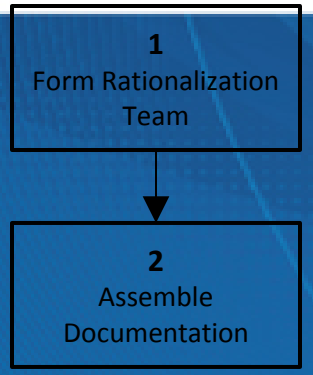
Core

- Facilitator
- Experienced Operators
- Operations Supervisor
- Process Engineer

Supplemental

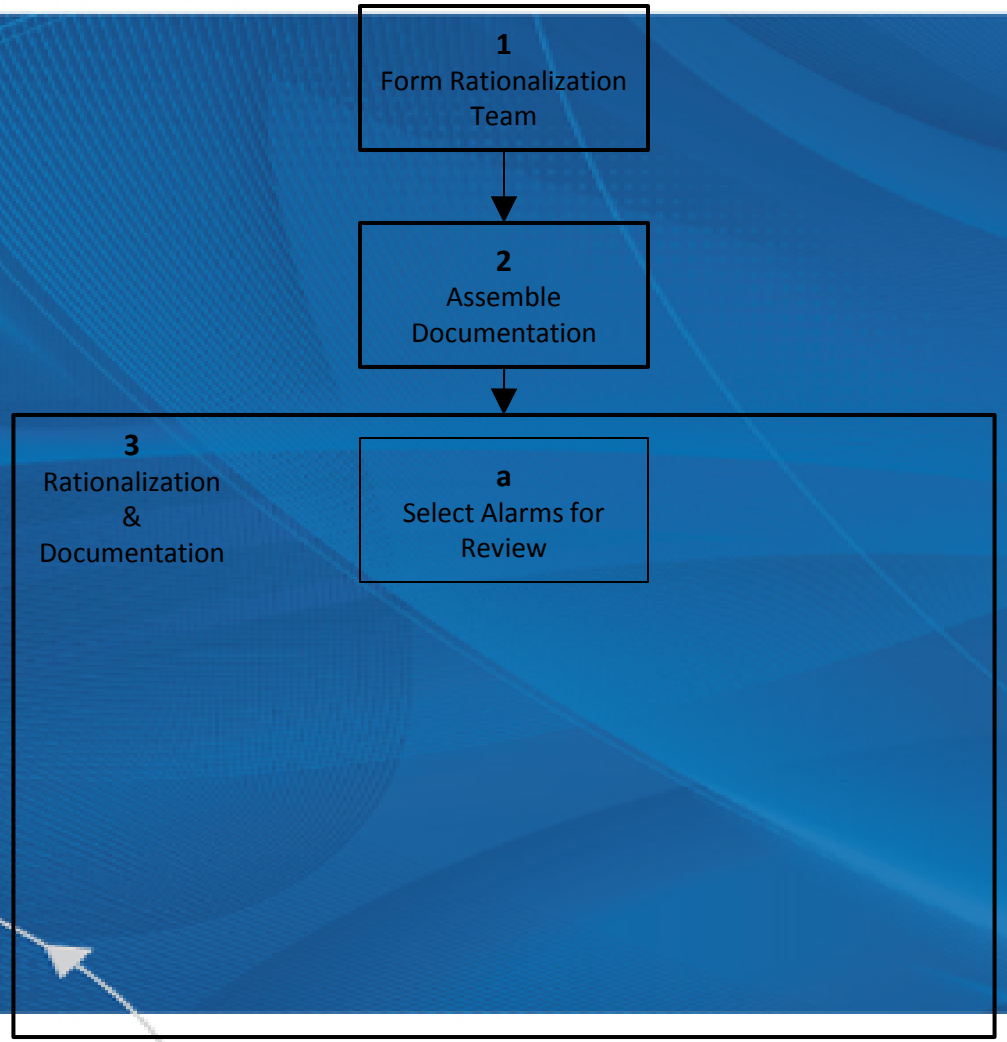
- I&C Engineer / Technician
- Health, Safety (Risk Management), & Environmental
- Risk Management
- Maintenance Supervisor / Technician
- Training Specialist
- Equipment Specialists
- Consultants as needed

Rationalization Process



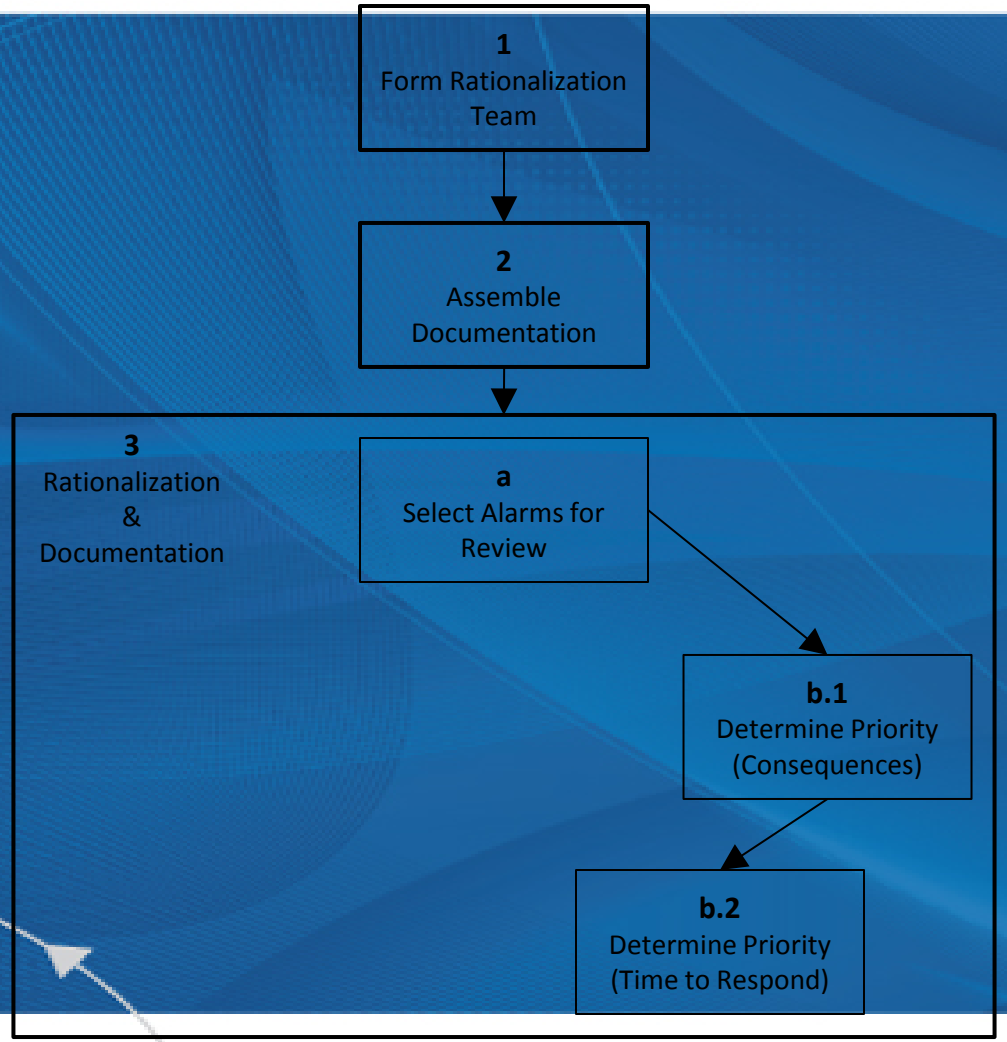
- Documentation & Resources
  - **Alarm Philosophy**
  - P&ID's
  - Logic Diagrams
  - Operating Procedures
  - HAZOP's / Process Safety Analysis (PHA)
  - Failure Mode and Effects Analysis (FMEA)
  - Safety Integrity Level (SIL) Assessments
  - Layer of Protection Analysis (LOPA)
  - Incident Investigations
  - Environmental Permits
  - Current Good Manufacturing Practice (cGMP)
  - ISO Quality Process
  - Packaged Equipment Manufacturer Requirements / Recommendations

Rationalization Process



- Select Alarm(s)
  - MAdB Review
    - Common Elements
    - Method of Flows
    - Method of Elements
  - “Clean Slate”
  - Combination

Rationalization Process



Priority – **Relative** Importance

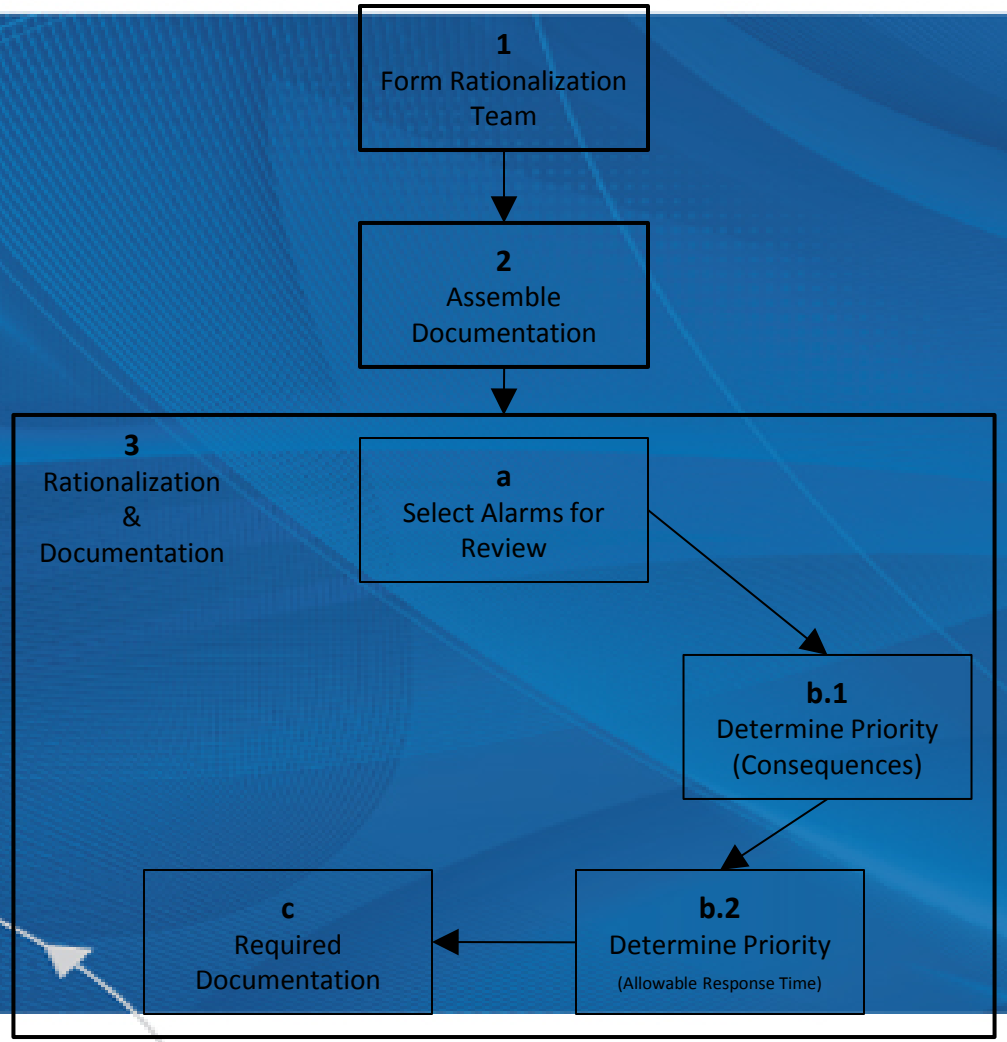
- Consequence
  - Impact
  - Severity
- Maximum Time to Respond
  - Set point must be determined in order to give the operator sufficient time to respond.

Consequence / Urgency	Minor	Moderate	Major	Extreme
Now (< 5 min)	Medium	Medium	High	Critical
Next (5-15 min)	Low	Medium	High	Critical
Later (>15 min)	Low	Low	Medium	Critical

Example: Consequence vs. Priority

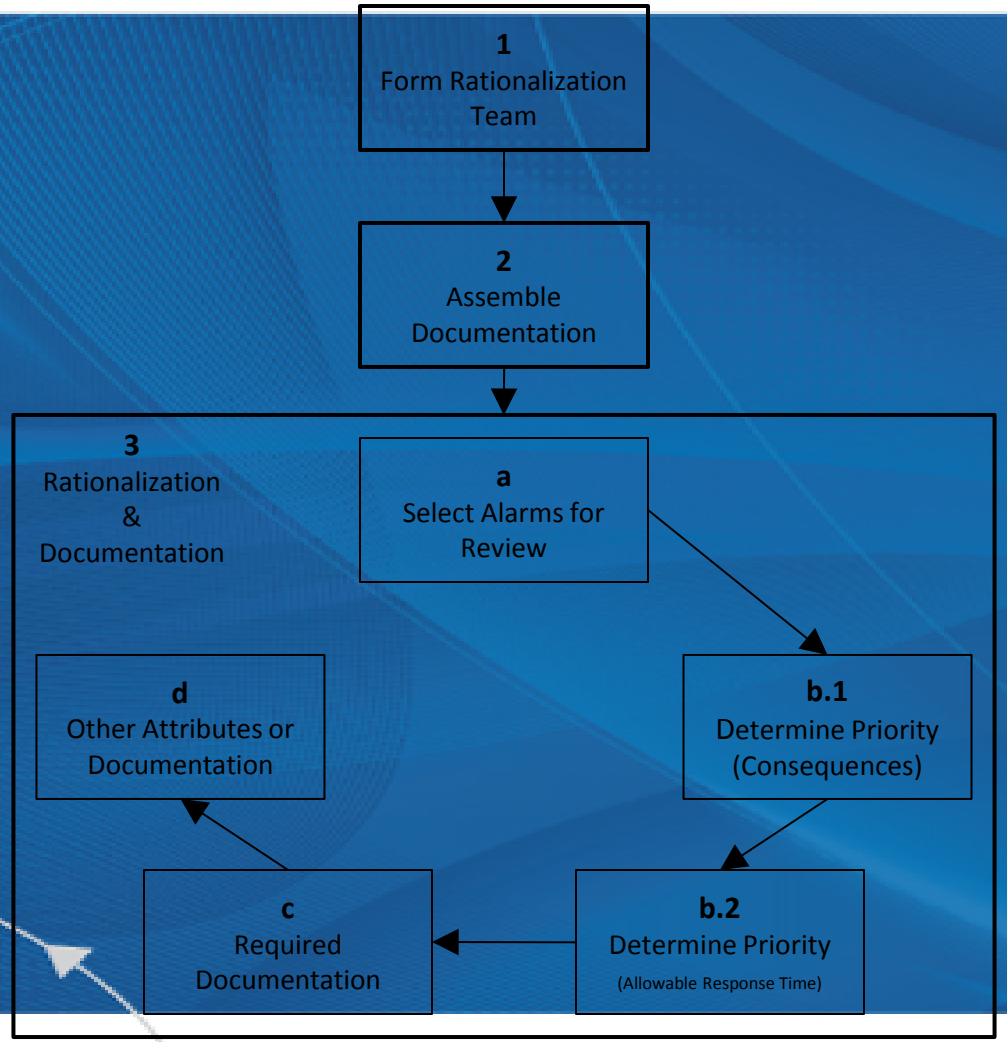
Safety	-	-	Safety Shower	Potential MTI or worse
Environmental	-	Minor release inside boundary	Significant release inside boundary	Notifiable release
Production loss (examples)	Lower efficiency, Increased fouling	Non-spared equipment has tripped	Non-spared equipment will trip	Downtime more than 1 week
Equipment damage (examples)	Pump damage (spare on	Pump damage (no spare)	Damage to major equipment	Critical equipment destroyed
Inefficient operation	< $50k	$50 to 100k	> $100k	-
Consequence Urgency	Minor	Moderate	Major	Extreme
Now (< 5 min)	Medium	Medium	High	Critical
Next (5-15 min)	Low	Medium	High	Critical
Later (>15 min)	Low	Low	Medium	Critical

Rationalization Process



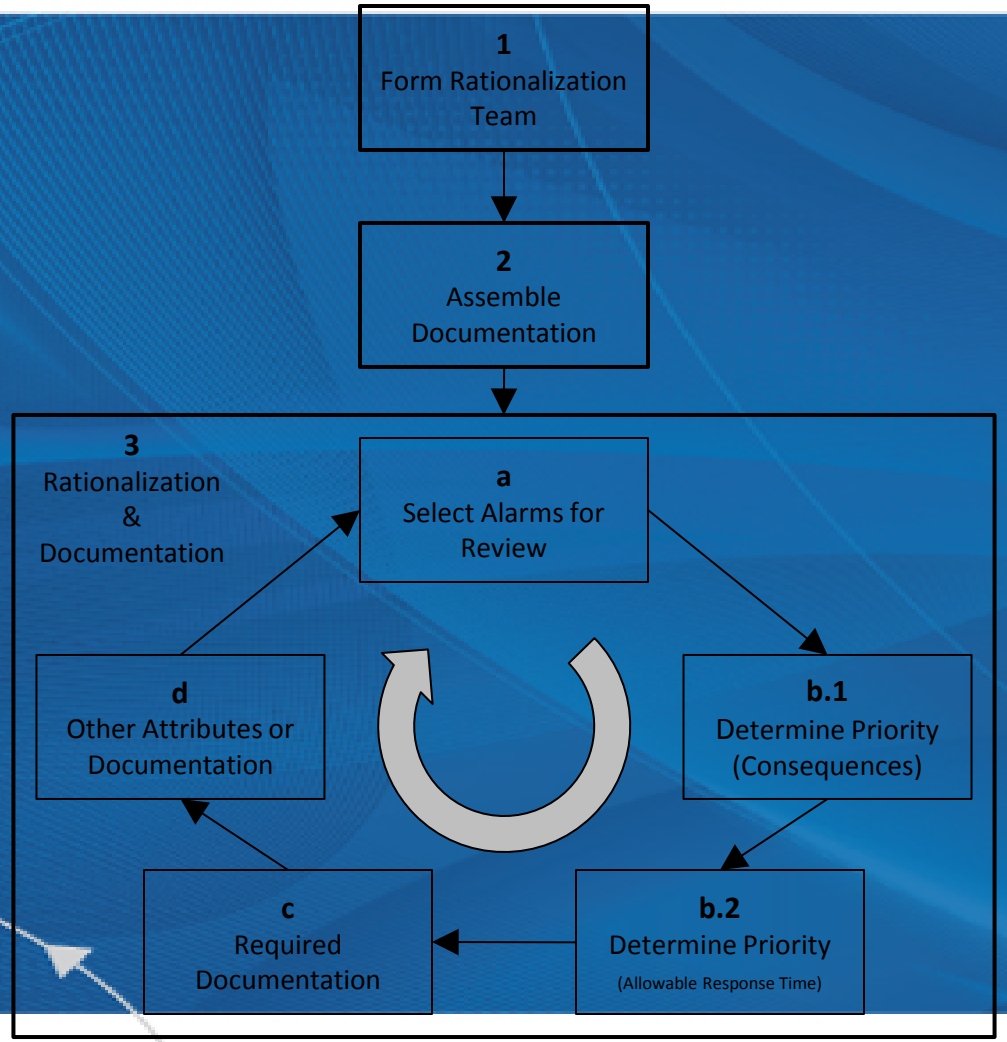
- Alarm Response
  - Cause
  - Corrective Action
  - Confirmation / Verification

Rationalization Process



- Other Alarm Attributes
  - Class
  - Description
  - Alarm Message
  - Destination / Routing
  - Linkage to other documents

Rationalization Process



Alarm Rationalization Steps

- Intersection of Safety & Alarm Management
  - Develop Consequence and risk ranking for Health/Safety, Environmental and Commercial impacts
    - From Alarm Philosophy Document
  - Primary Cause
  - Operator Corrective Action
- ORT (Operator Response Time)
- TTE (Time To Event)
  - ORT Explained.pptx
- Alarm setpoint
- Priority
- Advanced Alarming
  - Masking
  - Grouping
  - Overriding and Reason

Alarm Rationalization Steps

- ORT (Operator Response Time)
- TTE (Time To Event)
  - ORT Explained.pptx
- Alarm setpoint
- Priority
- Advanced Alarming
  - Masking
  - Grouping
  - Overriding and reason

Typical Alarm Management Services

- Training
  - Principles of Alarm Management
  - Rationalization Process
- Alarm Philosophy development
- Alarm Philosophy Gap analysis
- Alarm Rationalization Facilitation
- Updating and harmonization of PSI documentation

Questions?