

The ISA-18.2 Alarm Management Lifecycle

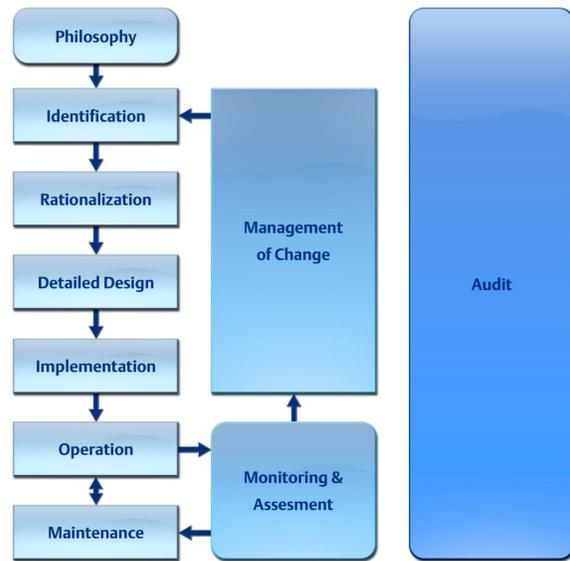
What is an Alarm? (per ISA-18.2)

An alarm is an audible and/or visible means of indicating - There must be an indication of the alarm.
An alarm limit can be configured to generate control actions or log data without it being an alarm.

to the operator - The indication must be targeted to the operator to be an alarm, not to provide information to an engineer, maintenance technician, or manager.

an equipment malfunction, process deviation, or abnormal condition - The alarm must indicate a problem, not a normal process condition. (e.g., pump stopped, valve closed)..

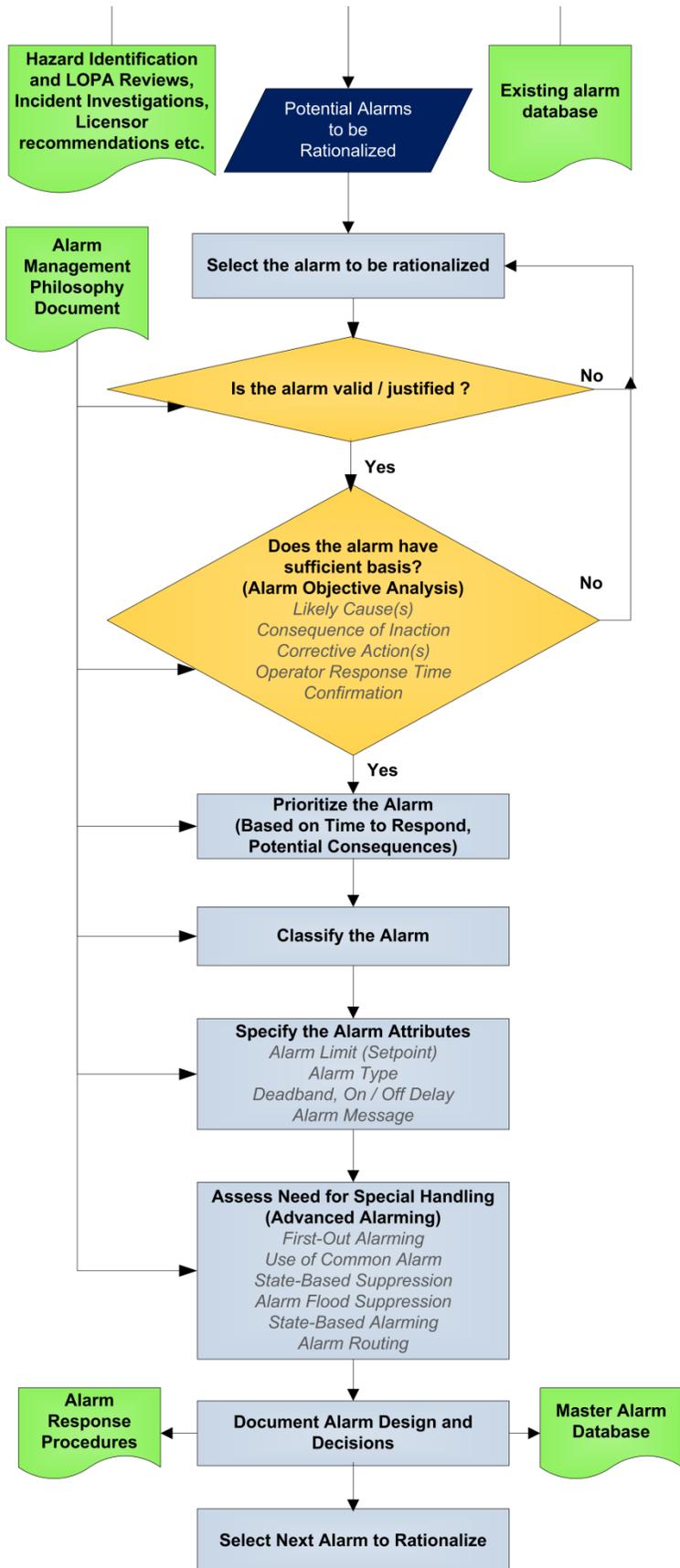
requiring a response. - There must be a defined operator response to correct the condition and bring the process back to a desired (safe and/or productive) state. If the operator does not need to respond, then the condition should not be an alarm.



ISA-18.2 Alarm Management Lifecycle

Stage	Activity	Inputs	Outputs
Philosophy	Document the objectives, guidelines, and work processes for the alarm system.	Objectives and standards.	Alarm philosophy and Alarm System Reqmnt Specification (ASRS).
Identification	Determine potential alarms.	PHA report, SRS, P&IDs, operating procedures, etc	List of potential alarms.
Rationalization	Work process that determines which alarms are necessary, establishes their design settings (e.g., priority, limit, classification), and documents their basis (cause, consequence, corrective action, time to respond, etc) in a Master Alarm Database.	Alarm philosophy, and list of potential alarms.	Master alarm database, alarm design requirements.
Detailed Design	Designing the system to meet the requirements defined in rationalization and philosophy. Includes Basic alarm design, HMI design, and advanced alarming design.	Master alarm database, alarm design requirements.	Completed alarm design.
Implementation	Alarm system is put into operation (installation & commissioning, initial testing, and initial training).	Completed alarm design and master alarm database.	Operational alarms, Alarm response procedures.
Operation	Alarm system is functional. Operators use available tools (e.g., shelving and alarm response procedures) to diagnose and respond to alarms.	Operational alarms, alarm response procedures.	Alarm data.
Maintenance	Alarms are taken out of service for repair and replacement, periodic testing.	Alarm monitoring reports and alarm philosophy.	Alarm data.
Monitoring & Assessment	Alarm system performance is measured and compared against KPIs from the philosophy. Problem alarms are identified (nuisance alarms, frequently occurring alarms).	Alarm data and alarm philosophy.	Alarm monitoring reports, proposed changes.
Management of Change	Process to authorize additions, modifications, and deletions of alarms.	Alarm philosophy, proposed changes.	Authorized alarm changes.
Audit	Periodic audit of alarm management processes (e.g., comparing DCS alarm settings to the Master Alarm Database)	Standards, alarm philosophy, and audit protocol	Recommendations for improvement

The Alarm Rationalization Process



Alarm Rationalization

- The process of reviewing potential (candidate) alarms against the criteria defined in the alarm philosophy to ensure they are necessary, and to define / document their design in a master alarm database (MADB).

Alarm Validity Checklist

- Does it indicate a malfunction, deviation or abnormal condition?
- Does it require a timely operator action in order to avoid defined consequences?
- Is it unique (or are there other alarms that indicate the same condition)?
- Is it the best indicator of the root cause of the abnormal situation?

Alarm Objective Analysis

- Consequence – *The immediate & direct result of the abnormal situation identified by the alarm and not a possible consequence requiring other failures*
- Corrective Action – *Steps to be taken to correct the abnormal situation (acknowledging the alarm does not count)*
- Confirmation – *Document other process measurements that the operator can look at to confirm / verify that the alarm is real*
- Operator Response Time – *The time from the activation of the alarm until the last moment the operator action will prevent the consequence*

Alarm Classification

- A method for organizing (grouping) alarms based on common characteristics and requirements (e.g. training, testing, MOC, reporting)

Alarm Limit (Setpoint) Determination

- Far enough away from the consequence threshold so that operator has adequate time to respond
- Not too close to normal operating conditions that alarms are triggered as a result of normal process variation

Advanced Alarming

- Advanced Alarming – *Additional layers of logic, programming, or modelling used to modify alarm attributes (dynamically)*
- Document the states, conditions, products or phases where...
 - Alarm attributes (limit, priority) should be different from steady state
 - Alarm should be suppressed from the operator

Master Alarm Database (MADB)

- The authorized list of rationalized alarms and associated attributes

