

Management of Change

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In this section we will ...

- ▶ Spirit of MOC
- ▶ Review of 1910.119(l)
- ▶ Linkage with other elements of the standard
- ▶ Review of OSHA-issued interpretations related to MOCs
- ▶ Recommendations from CCPS & others

Motivation for MOC



- ▶ Regulatory [1910.119(l)]
- ▶ No plant or system is ever static
- ▶ Properly managing the system as it changes over its life is ESSENTIAL
- ▶ We cannot overlook a functioning MOC program
 - One of the critical elements of PSM
 - Easily is short changed in the normal day-to-day rush of operating and maintaining a plant

PSM Standard Preamble Excerpt

- ▶ *“OSHA believes that one of the most important and necessary aspects of a process safety management program is appropriately managing changes to the process.”*



Management of Change (MOC)

Reference: 1910.119(l)



- (1) The employer shall establish and implement **written** procedures to manage changes (except “replacement in kind”) to process chemicals, technology, equipment, and procedures and changes to facilities that affect a covered process.

Management of Change (MOC)

Reference: 1910.119(l)

- (2) The procedures shall assure that the following considerations are addressed prior to any change:
 - (i) the technical basis for the proposed change;
 - (ii) impact of the change on safety and health
 - (iii) modifications to operating procedures
 - (iv) necessary time period for the change and
 - (v) authorization requirements for the proposed change

Management of Change (MOC)

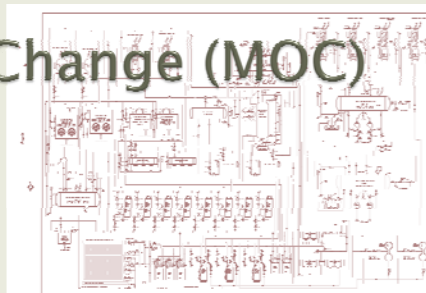
Reference: 1910.119(l)



- (3) Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process.

Management of Change (MOC)

Reference: 1910.119(l)



- (4) If a change [in a] covered [process within the scope of] this paragraph results in a change in the process safety information required by paragraph (d), such information shall be updated accordingly.

Let's look at the MOC requirements more carefully!



Management of Change (MOC)

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- (1) The employer shall **establish and implement** **written** procedures to manage changes (except "replacement in kind") to process chemicals, technology, equipment, and procedures and changes to facilities that affect a covered process.

Replacement in kind (RIK)

- ▶ 1910.119(b) defines **RIK** as:
 - *"a replacement which satisfies the design specification."*

Replacement in kind (RIK)

- ▶ CCPS Guidelines for MOC defines **RIK** as:
 - *"an identical replacement or any other alternative specifically provided for in the design specification, as long as the alternative does not in any way adversely affect the function or safety of the item or associated items..."*

Replacement in kind (RIK)

- ▶ What definition of “replacement in-kind” do you have in your MOC program?

RIK Examples

Description	RIK?	
	Yes	No
Replacing a Hansen HS8A ½” solenoid with a new Hansen HS8A ½” solenoid		
Replace Hansen HS8A solenoid with R/S S8F ½” solenoid		
Replacing a section of 6” schedule 40 A106 high temperature piping with a 6” schedule 40 A53 pipe		
Adding a pump-out connection to a valve group		
Adding a Bourdon tube pressure gauge to a regulator		
Replacing a Hansen HA4A regulator with an R/S A4A		
Re-setting suction pressure control set point (within the limits of operation as-defined in the PSI)		
Replacement of a soda lime material constructed sight glass with a borosilicate type glass		

Your MOC programs should

- ▶ **Recommendation:** Include a number of examples of changes that are considered “replacements in-kind” as defined in your program and consistent with the requirements of 1910.119.

Another definition to consider

- ▶ **Change**
 - *Any modification, alteration, or adjustment to a covered process that is not a “replacement in kind.”*

Types of Changes Covered

- ▶ **“Process chemicals”** – would this include?
 - Receipt of *metallurgical grade* ammonia rather than *refrigerant grade* ammonia
 - Change of mineral-based lubricants to semi-synthetic or fully-synthetic oil for compressors
 - Revision of condenser water treatment chemical regimen
 - Addition of a brine mixing station to a machinery room

Types of Changes Covered

- ▶ **“Technology”** – would this include?
 - Conversion from glycol system to a direct-refrigerant system
 - Ceiling hung to penthouse units
 - Conversion of an atmospheric relief system to an internal relief configuration

Types of Changes Covered

- ▶ **“Equipment”** – would this include?
 - Change of carbon steel pipe to stainless steel
 - Replacing an existing vessel with a larger vessel of same material and function
 - Addition of a transfer system to a plant currently without one present

Types of Changes Covered

- ▶ **“Procedures”** – would this include?
 - Changing set points but within limits of operation established in PSI
 - Modifications to SOPs
 - Reduction in operations staffing
 - Revisions to inspection/test intervals for safety systems such as NH₃ detection
 - Approval of overtime for NH₃ operators

Types of Changes Covered

- ▶ “Facilities that affect a covered process” – would this include?
 - Modifications to racking in a warehouse equipped with ceiling-hung evaporators
 - Addition of battery chargers to a machinery room
 - Addition of a new process line within a plant
 - Reconfiguration of office spaces at a plant

Management of Change (MOC)

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Technical basis for the change

- ▶ This is intended to explain
 - The motivation or need for the proposed change
 - The required work for achieving the change
 - Details of the design change (if applicable)
 - Siting information related to the change
- ▶ This documentation should be sufficiently detailed to allow those reviewing or authorizing enough information to approve, deny, or suggest further revisions.

Impact on health and safety

- ▶ This should explain how the change will enhance or potentially degrade personnel safety.
- ▶ It should also trigger whether or not a PHA is required.



Modifications to operating procedures

- ▶ Do the change(s) effect?
 - Standing operating procedures (SOPs)
 - Mechanical integrity inspection intervals
 - Mechanical integrity procedures
 - Pre-startup safety review/checklists
- ▶ If so, those procedures will need updating
- ▶ If procedures are updated, staff need to be trained on the revised procedures!

Necessary time period for change

- ▶ **Temporary changes**
 - Define the span of time allowed for the change
 - Requires a management system to avoid overrunning the allowed time period
- ▶ **Permanent changes**
 - What is a timeline for implementation of project phases (equipment changes, PSM updates, training, etc.)?

Necessary time period for change

► Emergency changes

- Imminent danger situations
 - Personnel in jeopardy
 - Pending refrigerant release
 - Potential for substantial financial loss (e.g. product)
- Streamlined review/approval process
- Require follow-up to address a permanent solution/MOC
- A plant with a functioning PSM program should **NEVER** have to use this process!

Authorization for proposed change

- Appropriate personnel should be included in reviewing the proposed change

Personnel	Nature of change
PSM coordinator	All
Maintenance supervisor	All (especially those involving procedures)
Engineering manager	Changes involving chemicals, technology, equipment or facilities-related
Safety director/representative	All
Purchasing representative	Changes involving procurement of outside resources or equipment
Plant manager	Changes that involve significant risk (those that trigger a PHA)
Corporate engineer	Changes involving chemicals, technology, equipment or facilities-related

Authorization for proposed change

- ▶ Authorizing individuals should be able to
 - 👍 Approve
 - 👎 Reject
 - ✍️ Suggest/require modifications
 - ☠️ Suggest/require that a PHA be performed
- ▶ All those authorizing inherit responsibility for the change!

MOC

Reference: 1910.119(l)



- (3) Employees involved in operating a process and maintenance and contract employees whose job tasks will be affected by a change in the process shall be informed of, and trained in, the change prior to start-up of the process or affected part of the process.

Informing and training

- ▶ All operations staff and contractors, as appropriate
 - System operators, mechanics, line operators, other staff as-required
 - Essential to train on the updated procedures that were modified



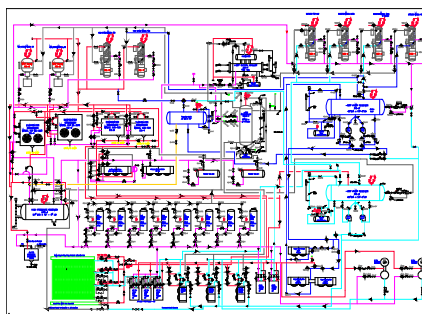
Informing and training

- ▶ Training on MOC processes and procedures is essential for
 - All refrigeration personnel
 - Site safety personnel
 - Engineering personnel
 - Project managers
 - Purchasing
 - Others involved

Informing and training

- ▶ Training should include
 - Emphasis of importance of managing change via. MOC process
 - MOC process overview and terminology
 - How MOC process interfaces with existing procedures (e.g. work orders, PMs, capital projects, etc.)
 - Roles and responsibilities
 - Approval processes
 - Examples of changes requiring MOC
 - Who is MOC gatekeeper? Who can answer MOC questions?

MOC



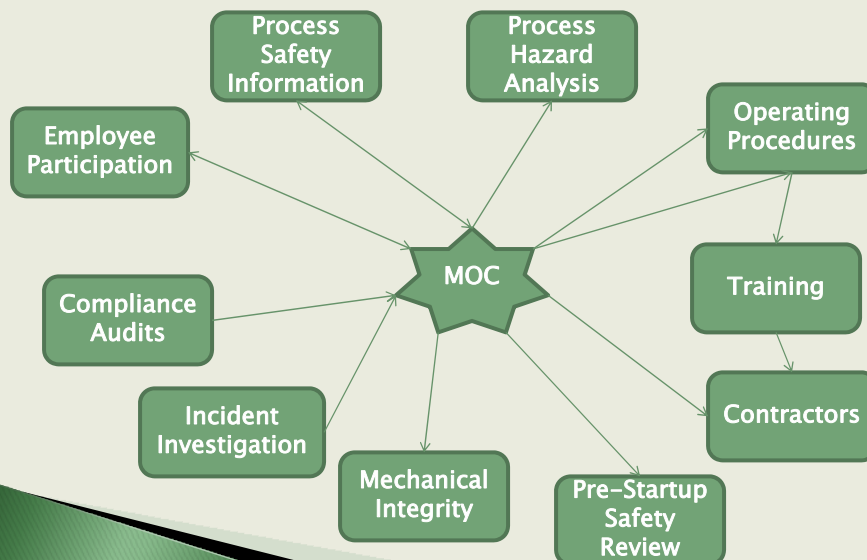
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PSI Updates

- ▶ **Chemical information**
- ▶ **Technology information**
 - Block flow & PI&Ds
 - Inventory
 - Safe limits (pressures, temperatures, flows, ...)
 - Consequences of deviation
- ▶ **Equipment information**
 - Materials of construction
 - Electrical classification
 - Safety system designs (relief, ventilation, interlocks, detection systems, emergency shutdowns, etc.)
 - Material and energy balances

Linkage with other elements



MOC Triggers

- ▶ Addressing/implementing changes from
 - PHA recommendations
 - Incident investigations
 - Compliance audits
 - Operational upset response (e.g. false alarms)
- ▶ Addition of new lines, capacity, ...
- ▶ Revisions to staffing
- ▶ Changes to facility
- ▶ Programming changes
- ▶ Contractor service agreements

Strongly Consider

- ▶ Using your MOC system for all changes
 - When it is determined that the change is truly a RIK, mark it as such and closeout
- ▶ Using your MOC to insure proper closeout of
 - PHA recommendations
 - Audit findings/exceptions
 - Incident report recommendations

MOC KPIs

- ▶ **Number of MOCs issued by plant**
 - Most plants will likely generate 50–100 MOCs per year
 - Low MOC rate is suggestive of malfunctioning MOC program
- ▶ **Number or % of open MOCs**
 - Should be less than 50% at any instant in time

MOC KPIs

- ▶ **Number of temporary MOCs continuing past end-date**
 - Desirable to minimize the frequency of temporary MOCs
 - Under no circumstances should temporary MOC be operating past end date

OSHA Interpretations

▶ Hazzan – 1996

- *Do MOC provisions of PSM apply when maintenance procedures are changed?*
- The MOC provisions (I)(1) through (I)(5) apply to changes in maintenance procedures and for changes made to equipment test and inspection frequencies...

OSHA Interpretations

▶ Tolley – 1996

- *What changes are significant enough to trigger a PHA?*
- A PHA revalidation is required “at least every five years” and a periodic PHA may be required more frequently, for example, when an existing facility is modified more than slightly, to assure that the PHA (corresponding to the existing facility before modification) is consistent with the current process.

OSHA Interpretations

▶ Palmer- 2006

- *How long should Management of Change (MOC) documentation be kept under the PSM standard?*
 - The PSM standard does not explicitly specify the manner and the duration for which an employer must maintain MOC documentation.
 - If the change alters the original design basis or design intent, be sure the MOC updates this information in the PSI and keep the MOC for the life of the process.
 - If the MOC is related to changing procedures and practices [1910.119(l)(5)], OSHA only requires retaining the MOC until it is incorporated into the next process hazard analysis (PHA) revalidation or update required by 1910.119(e)(6).
 - For the purpose of evaluation during compliance audits, keep a statistically-significant number of representative MOCs for at least 3 years.

OSHA Interpretations

▶ Palmer- 2006

- *Can the facility start a new MOC log after the completion of the 5-year revalidation Process Hazard Analysis (PHA)?*
 - OSHA does not require an "MOC log." OSHA only requires that MOC procedures be implemented whenever a specified change other than a *replacement-in-kind*, is contemplated.

OSHA Interpretations

▶ Palmer– 2006

- A contemplated change was determined to be a RIK. Is there any requirement for documenting and maintaining a file to prove to an inspector that the change was in fact a RIK?
 - No — not with respect to 1910.119(l). Employers are not required to conduct an MOC when changes are replacement-in-kind.
 - However, you will likely need to document the equipment replacement to support future inspections, tests, and preventive maintenance requirements.

Management of Change

▶ OSHA–Identified Common MOC Problems

- Written MOC program not developed
- MOC process not used to manage changes
- Authorization (signatures) missing
- Use of “emergency” MOC’s
- No follow through – P&IDs, procedures, training

Appendix C (1910.119)