



Module 6: Management of Change Training

Last Revised – June 2024



PS Bootcamp Modules

- ✓ **Module 1: Introduction**
- ✓ **Module 2: Hazard Identification**
- ✓ **Module 3: Risk Matrix**
- ✓ **Module 4: Safeguards Concept**
- ✓ **Module 5: Explosion/Fire Protection**
- ✓ **Module 6: Management of Change**
- ☐ **Module 7: Incident Investigation**
- ☐ **Module 8: Facility Siting**

Agenda

MOC Intro, Changes and Types
MOC Roles and Responsibilities
MOC Workflow including PSSR
Working Exercise

Objectives

Be able to Identify Different Types of Changes and Replacement-in-Kind

Understand the Importance of Recognizing and Evaluating Changes

Understand the MOC and PSSR Workflow Process

Become familiar with MOC Process through Examples

MOC Intro, Changes and Types

MOC Application

- ✓ **Ensure all changes to a process are properly reviewed**
- ✓ **Hazards introduced by the change are identified, analyzed, and controlled prior to starting or resuming a process**
- ✓ **Ensure all required Process Safety Information (PSI) is updated to reflect the change**
- ✓ **Ensure changes are communicated to all affected personnel**

Types of changes requiring MOC



Types of MOCs



Permanent

- Change is expected to follow all the steps of the MOC process and remain in effect, not to revert to its original state or initial condition



Temporary

- Change that is intended to be in place for only a defined and restricted period



Emergency

- Change needed immediately
- Change will eliminate or effectively control the emergency
- Change is safe to implement for people, the environment and equipment



Organizational Change

- Any personnel or organizational structure change that may impact EHS or Process Safety
- Managed through IVL EHS-104

Replacement in Kind

MOC does not apply where Replacement in Kind (RIK) changes are made to any of the processes, procedures, or equipment

RIKs must be evaluated properly

- Review current PSI
- Consult competent persons to verify the change is RIK and does not introduce an unknown variable into the process

For example...

Raising process temp, pressure or flow within specified limits

Replacing a pump with identical manufacturer, materials, capacity, flanges, etc.

Purchasing raw materials of the same quality from existing vendor

Replacement of a sprinkler head with identical make, model and sizing criteria

Temporary MOC

Initial time period not more than 180 days (6 months) in duration

May be extended with approval from the Site Head, up to an additional 180 days, but not to exceed one full year in total



Temporary MOCs Return to Permanent

Return to Permanent can happen 1 of 3 ways....

- 1 {
 - Changed to Permanent State (i.e. new temporary installation is tested and works as intended thus it can be deemed permanent)
- 2 {
 - Change is completely removed (i.e. temporary is completely removed and everything is back to original state)
- 3 {
 - New equipment is installed with a new MOC (i.e. temporary until a new permanent is installed)

What is an Emergency Change?

Permitted under the following circumstances:

1. Needed immediately;
2. Will eliminate or effectively control the emergency situation; AND
3. Safe to implement for people (associates, contractors, and community), the environment and equipment.

An “Emergency MOC” will prevent or mitigate a situation or scenario from happening that poses immediate threat to the health and safety of any individual, to the environmental, or to the neighboring community.

MOC must be initiated within 72 hours of approval of the emergency change



Knowledge Check

DESCRIPTION OF CHANGE

WHAT TYPE OF CHANGE IS IT? RIK, Permanent, Temporary, or Emergency

A centrifugal pump is replaced with a spare of the same design specifications, make and model.

RIK

A worn stainless braided EPDM lined hose is replaced temporarily by another EPDM flexible hose rated for normal use conditions, but not meeting the original specifications.

Temporary

The cooling water control valve actuator on a reactor jacket fails during a reaction process. The operator must operate on manual bypass through the end of the batch.

Emergency

There is a proposed project to upgrade the piping on an existing reactor.

Permanent

Organizational Change Management (IVL EHS-104)

Applies to personnel and organizational structure changes (including changes in outsourcing) that may impact EHS and Process Safety

OCM can be initiated directly or as an MOC action item

Example changes include:

- Change of a person's **EHS role description or responsibilities**
- Change resulting in a position with **EHS responsibilities being eliminated**
- Change in **organization structure**, e.g., de-layering, introduction of new layers, etc.
- Change in **shift pattern, handover, or communications**
- Change requiring physical **relocation of personnel** within the site
- Change of a **person in an existing role** with key EHS responsibilities, e.g., retirement, new employee, transfer, temporary replacement during an extended leave, etc.



MOC and Siting

The MOC process is also used for:

- Installation of all **new permanent, portable and temporary buildings** intended for occupancy, process control and emergency response
- **Relocation of occupied areas** within existing buildings
- Any **changes of use** to an occupied area



Is this a Change?

Proposed Change: As part of an optimization project, the thickness testing of critical service piping will be outsourced to a contractor instead of being done by our in-house maintenance function.

It is not a
Change

Yes, it is a
change

Need more
information

As long as all personnel are trained and understand the onsite process, frequencies, methodologies, etc., this would not normally cause a problem. However, if the inspectors do not understand the process or no process exists to take care of the recommendations from the inspections; an incident is likely to happen.

Is this a Change?

Proposed Change: Research & Development has determined that the new (and less expensive) gasket material Grafax 1071 should be used instead of the existing gasket material Grafoil 11G for our hot oil service.

It is not a
Change

Yes, it is a
change

Need more
information

This will impact pipe specs to add the new Grafax as accepted gasket. However, there will be the need to document the material compatibility, mechanical review, etc. before changing the pipe specs. Engineers, Maintenance and procurement will need to be informed. There is a lot of PSI that will be involved. This is an MOC.

Is this a Change?

Proposed Change: Operations would like to install a spare pump for the existing tower bottoms pump, but they will have to reroute the existing piping in order to do this.

It is not a
Change

Yes, it is a
change

Need more
information

Routing could change NPSH, potential pump cavitation, depending on routing, pump head, deadhead if additional block valves are need it. Is the spare pump the exact same pump or just similar. This is an MOC.

MOC Roles and Responsibilities

Roles

Responsible Person

- **Manages the change from design to installation to completion and documentation updates.**
- **Ensures MOCs are closed in a timely manner and reminds individuals who have open action items.**

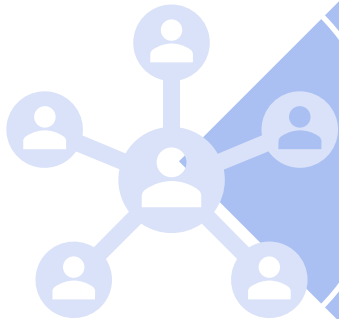
Approvers

- **Level of approval for the type of change taking place is based on what is documented in the site's MOC procedure.**

Employee Responsibilities



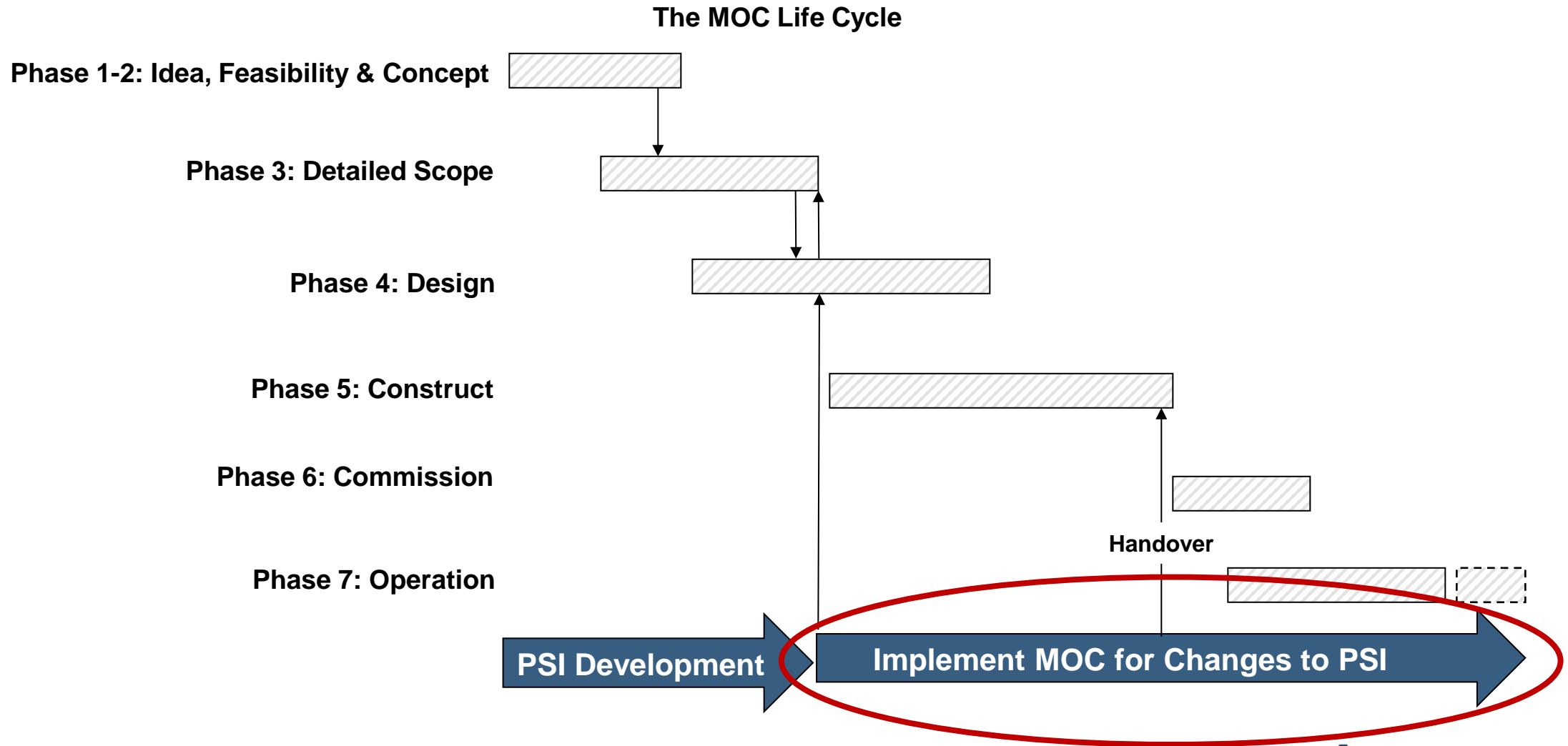
All employees and contractors must recognize changes and inform their supervisor or the Site EHS contact (e.g., Site Head or designee) of any changes that need to be managed in accordance with the site-specific program.



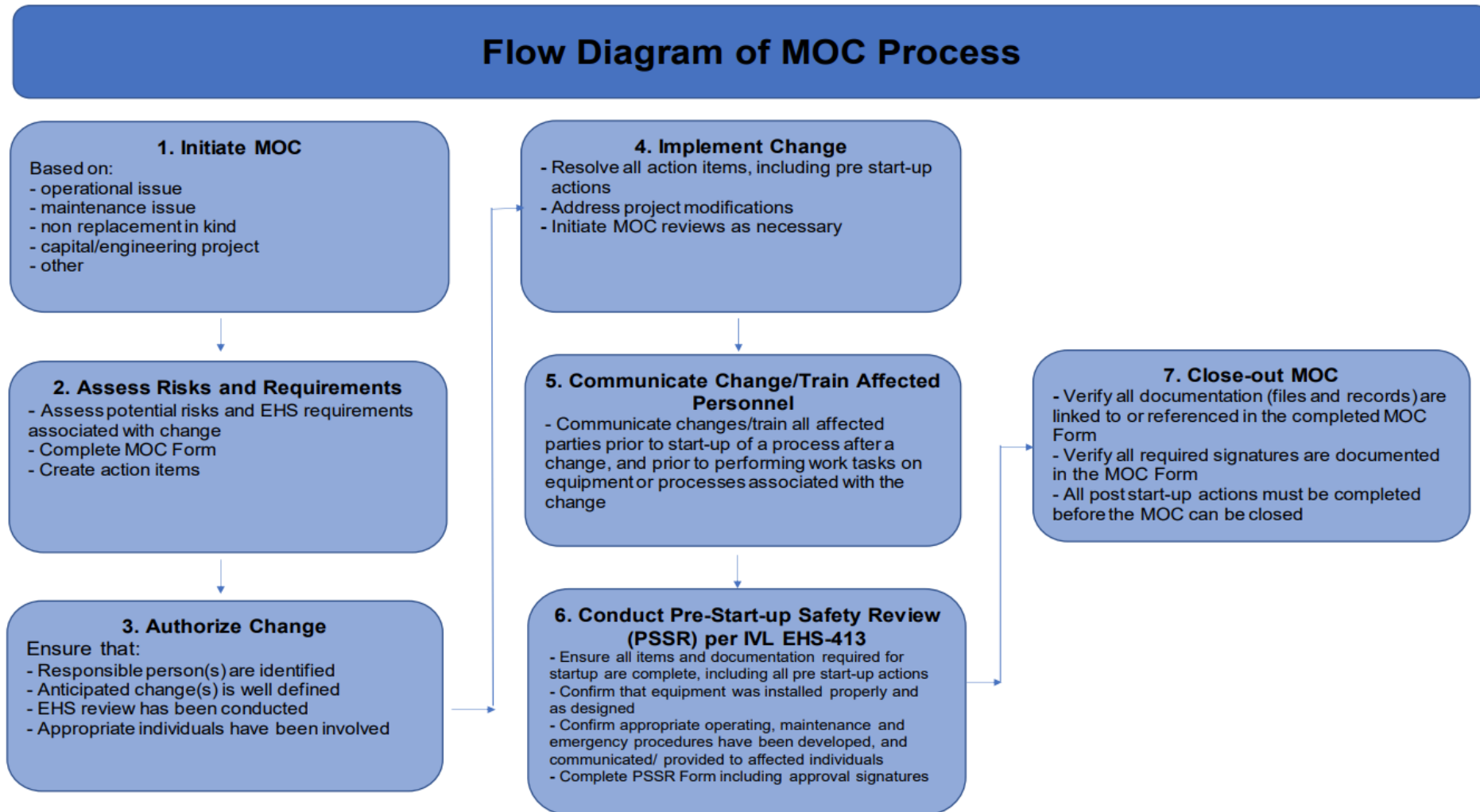
Participate in MOC reviews, closure of action items and pre-startup safety reviews, as necessary.

MOC Workflow

When does MOC start?



Flow Diagram of MOC Process (IVL EHS-204)



1. Initiate MOC

Determine if change is “Replacement-in-Kind”, Permanent, Temporary or Emergency

Based on:

- operational issue
- maintenance issue
- non replacement in kind
- capital/engineering project
- other

2. Assess Risks and Requirements

Assess potential risks and EHS requirements associated with change

Complete MOC Form including Documented Risk Assessment

Create action items and track to closure in accordance with Management of Actions (IVL EHS-107)



Note: MOC actions are not required to be risk ranked.

3. Authorize Change

Define steps to authorize the proposed changes, which ensure that:

- Responsible person(s) is identified
- Anticipated change(s) is well defined
- EHS review has been conducted
- Appropriate individuals have been involved

4. Implement Change

Resolve all action items, including PSSR actions

Address project modifications

Initiate MOC reviews as necessary

5. Communicate Change/Train Affected Personnel



All personnel affected by the change must be informed of the change and given training ***prior to*** start-up of a process after a change, and prior to performing work tasks on equipment or processes associated with the change.

Training records must be stored with the MOC record.

6. Conduct PSSR per IVL EHS-413

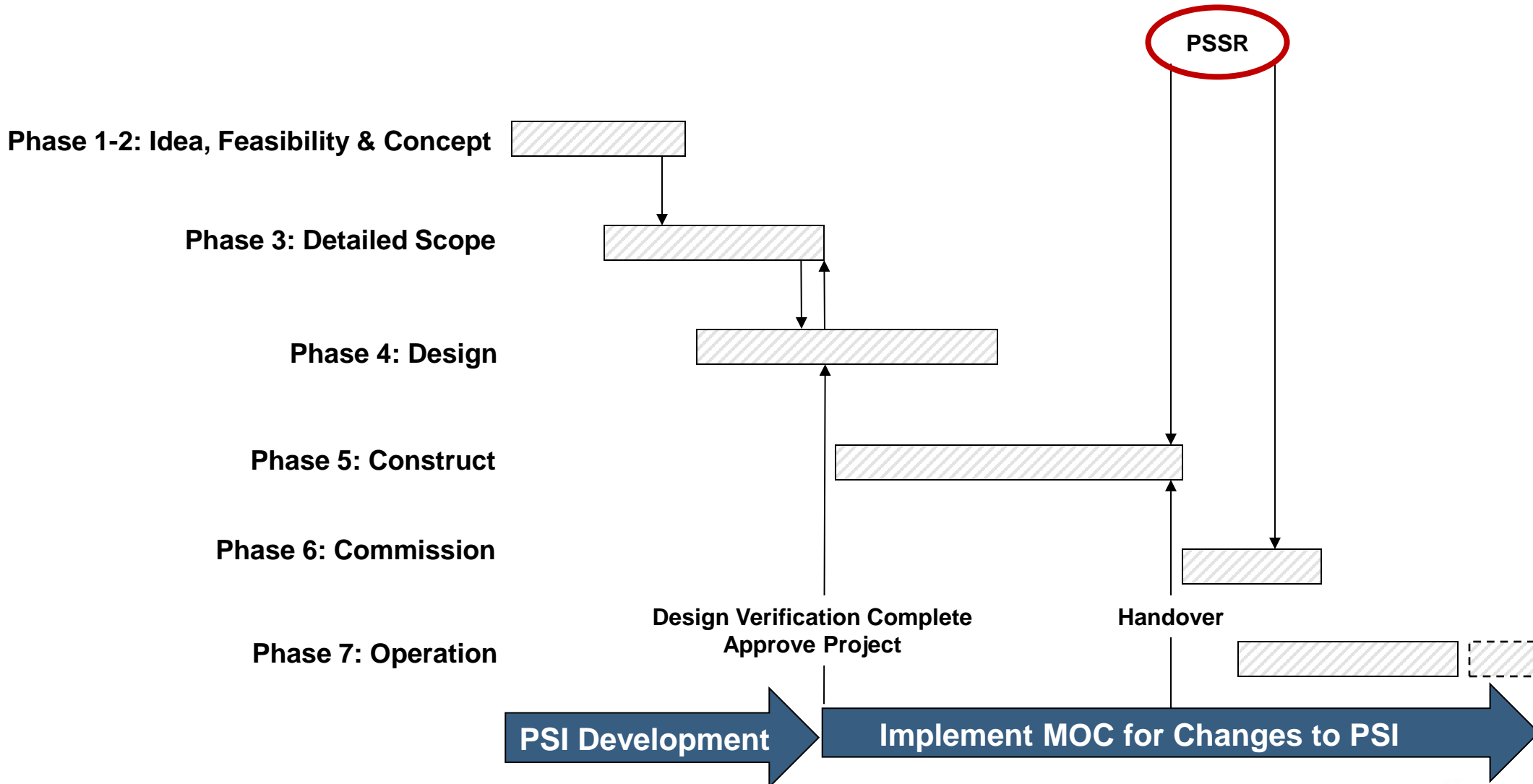
Triggers:

- For all changes that require an MOC per IVL EHS-204
- For a plant/unit that has been shut down for a period exceeding 1 month
- When required by national or local regulatory requirements

Example Forms - Simple Level and Higher Level:

- Higher Level shall be used for any High Hazard Process Systems (HHPS) per PSM Applicability, IVL EHS-417

PSSR Timing



PSSR Requirements

Completed by a multi-disciplinary team to ensure:

- The plant/unit has been constructed in accordance with the design intent
- Actions from PHAs have been completed and implemented in the design and installation
- Actions from MOCs have been completed and documented
- All operating, maintenance and emergency procedures are in place
- All personnel affected by any change have received training

Actions managed to completion in accordance with Management of Actions (IVL EHS-107)

Facility Manager, or designee, authorization required for start-up:

- Cannot be completed until all Pre-Startup items have been confirmed complete, all physical changes confirmed installed and tested through the completed PSSR

7. Close-out MOC

Verify all documentation (files and records) are linked to or referenced in the completed MOC Form

Verify all required signatures are documented in the MOC Form

All post start-up actions must be completed before the MOC can be closed

Records maintained per regulatory or site business segment record retention requirements

Temporary Changes are complete when the change has been returned to the original state and all resulting action items have been closed.

MOC Touchpoints

OCM IVL EHS-104

If personnel changes with EHS/PS impacts are identified OCM must be followed

EHS Criticality IVL EHS-405

If PSI is updated the EHS Criticality Assessment may need to be updated

PSSR IVL EHS-413

After mechanical checkout is completed, a PSSR must be performed

Management of Actions IVL EHS-107

MOC and PSSR actions tracked to closure

Case Study

Wastewater Treatment CO2 System

- Incident occurred February 8, 2021
- CO2 leaked **undetected** from broken glass on a rotameter through an **unsealed** conduit into an occupied control room
- Depleted the O2 in the Control Room
- Three employees sent to ER
- Two OSHA recordables



Unsealed conduit in CO2 cabinet



Rotameter broken glass



Case Study

Wastewater Treatment CO2 System



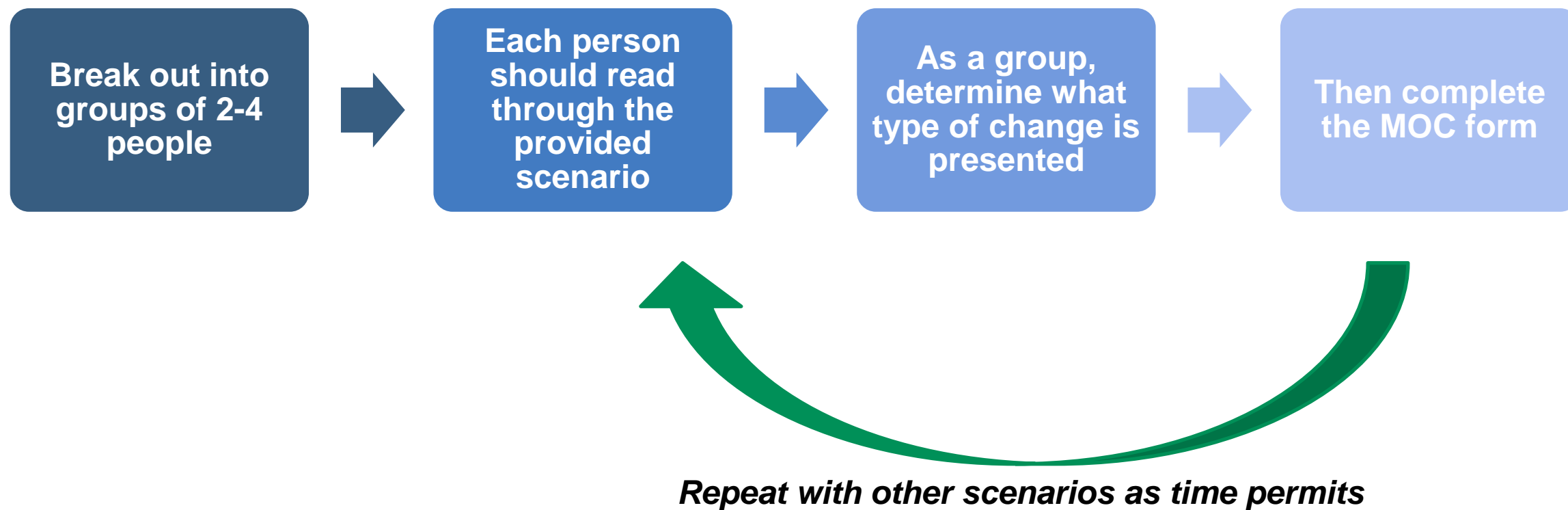
Key Learnings

Importance of completed and thorough MOC/PSSR:

- ✓ Change in system operation – stand alone to manually operated
- ✓ Change in designation of 'Open Control Room' not intended for Occupancy
- ✓ Operating Procedures and Training on CO2 System
- ✓ Alarms for CO2 Cabinet and Control Room
- ✓ Seal conduit in cabinet and electrical panel
- ✓ Locks/Car Seals to ensure valves in correct position

Working Exercise

Working Exercise



Questions/Comments

