Best Practices for Temporary Interlock Bypass

Scope

The scope of this best practice is to identify and manage bypassing of instrumented safeguards on process equipment that could result in personal safety, process safety, and equipment damage impacts. Instrumented safeguards can be hard-wired or software interlocks. These instrumented safeguards permissives and logic functions. Bypassing, suppressing, or jumpering the safeguard's function or a device may impair or eliminate its ability to prevent or mitigate the hazardous event. For processes covered under OSHA's Process Safety Management, temporary interlock bypassing is indirectly addressed under Management of Change, 29 CFR 1910.119(l). Although there is no comprehensive regulation addressing temporary interlock bypassing, there is a wide held view that temporary interlock bypassing is a "life critical" activity and should be undertaken seriously.

Examples of interlocks covered by this best practice include interlocks and logic associated with burner management systems, high/low level switches that trigger operation of a shutoff valve, interlocking machine guards, valve limit switches that prevent other valves from being opened or closed, emergency shutdown systems, low level interlock that prevents an agitator from operating, etc.

Key Points

- Interlocks exist for a reason. Understand the purpose of the interlock and the risks that must be mitigated during the bypass period.
- Communication of the bypassed interlock to the operator and other affected personnel is critical. The risk in miscommunication increases when the bypass crosses multiple shifts or days.
- Consider alternatives to temporarily bypassing an interlock, such as performing work during an outage or turnaround.
- Interlocks that are bypassed for longer periods of time should be listed in a log that is reviewed by the Plant Manager at least weekly.
- Bypassing an interlock should trigger a Management of Change (MOC). Consider having a Temporary Interlock Bypass permit that is of sufficient detail to serve this purpose.

Temporary Interlock Bypass Program

Each instrumented safeguard exists for a reason; protecting against some hazard to personnel, the environment, or to assets. The potential consequence of improper bypassing or jumpering of safeguards is the occurrence of an incident that the safeguard was there to prevent or mitigate. Interlocks can protect against hazards such as fires, explosions, unwanted chemical reactions, overpressure events, chemical releases, equipment damage, or personnel exposure.

Best practice is to develop a written program to describe the steps to be taken to temporarily bypass an interlock. This should include, at a minimum, roles and responsibilities, a specific process to be followed to bypass the interlock (such as details of a permit and how it's to be used), program auditing, evaluation, continuous improvement, and training requirements.

Best practice is to review and update the Temporary Interlock Bypass Procedure annually and when significant changes or related incidents occur.

Temporary Interlock Bypass Permit

The temporary interlock bypass permit should include the following information. See Appendix A as guidance.

- Date range that indicates when the bypass is in effect and when the bypass approval will expire.
- Description of the interlock to be bypassed and its purpose.
- Potential hazards created by performing bypass to include diagnosing symptoms leading to those hazards (i.e. Hazard = High pressure in reactor; Symptom – Rapid temperature increase due to runaway reaction)
- Degree of risk of the bypass activity – Can be verified by evaluating process critical safeguards in HAZOP/PHA.
- Identify and implement compensating measures sufficient to address any risk gap created by the bypass.
- Approvals. Approval level should be commensurate with risk. Approvers should be a person or group of people trained and qualified to recognize the hazards associated with disabling the interlock.
- Communication to affected personnel, including posting the open permit at the operator's workstation or other prominent location to communicate that the bypass is in effect.

Before issuing a permit, consider:

- The interlock was installed for a reason, and it is necessary to confirm the purpose for the interlock that you are considering to bypass. Resources to obtain this information includes process safety information (PSI), interlock specification sheet, Process Hazard Assessment (PHA), and piping and instrument diagrams (P&ID's).
- If there is flexibility in timing when the bypass is to occur, is there an optimal time to mitigate risk? For example, schedule during day shift, during processing of less hazardous chemicals, stable operations, at a time when there is a greater margin of safety, etc.
- Bypassing a device is a change to your process safety information PSI. Therefore, ensure you have captured the bypass in your MOC program like you would any other process change. The temporary interlock bypass permit could be configured to satisfy MOC requirements.

- Recognize that many devices may be identified in your PHA as a safeguard to manage/mitigate risk. Therefore, bypassing such a device is essentially elevating risk. Ensure you have adequate protection with your other safeguards.
- Ensure your authorization process defines a specific communication-and-approval protocol that ensures safe review and implementation of interim measures.

Since some interlock bypasses can be in effect for longer periods of time, best practice is to maintain a log of interlock bypasses that are in effect and have this log reviewed weekly by the Plant Manager.

Reduce risk by elimination of bypass events

The safest option is to design interlocks to avoid unnecessary bypassing. For example,

- If bypassing is needed due to conditions at startup, consider permissives or a timer function that temporarily disarms the interlock during startup to eliminate the need for repeated manual bypassing.
- Use redundancy in safeguard architecture so that each malfunctioning safeguard device can be repaired without defeating the entire safeguard function.
- Plan for safeguards to be tested during a turnaround or outage instead of during normal operation.
- Consider the need for in-line spare safeguards to allow for online testing/preventative maintenance or replacement activities.
- Identify "Safety Critical" devices that cannot be bypassed to ensure safe operation of process equipment.
- Periodically evaluate the completed permits to identify specific interlocks that are bypassed more frequently. Can the interlock or associated system be redesigned to eliminate frequent temporary bypasses?

Appendix A
Sample Temporary MOC for Temporary Interlock Bypass

Date:	MOC No.:	W.O. No.:
Requestor:		
MOC Coordinator:		
Loop/Equipment No.:		
Description of the Temporary Interlock Bypass Requested and Reason for the Bypass:		
Purpose of the Interlock:		
Date/Time Bypass to Begin:	Date/Time Bypass to End:	
Technical Basis of the Temporary Interlock Bypass:		
Impact/Hazards/Risks associated with the bypass and the safeguards to be put in place during the bypass to protect against these risks and symptoms leading to these hazards:		
Risk Rating of the Temporary Interlock Bypass: High – PHA Required. (e.g. life critical interlock bypassed, risk of off-site chemical release or significant risk of property damage, bypass of interlock required by insurance carrier) Medium – PHA Required (e.g. significant risk of a recordable injury, chemical release, or some property damage) Low		
Individuals Notified of the Temporary Interlock Bypass:		
Approvals/Date (Approvals Expire on the Date/Time Bypass to End Indicated Above) *Your facility shall specify which job titles to approve which level of risk change, but Plant Manager approval is required for all high risk changes*		
Interlock Returned to Normal? If no, explain. Y N		
Date/Time MOC Completed:		
Signature of MOC Coordinator indicating closure:		