

Be Smart: Safe Restart

Re-starting Chemical Production Facilities Post COVID-19 Restrictions



As a result of the COVID-19 pandemic, many chemical production facilities around the world have been shut down for extended periods, experienced limited production capabilities, or low staffing conditions.

As companies begin reopening, it is critical that facility operators conduct pre-startup safety reviews, and take into account the unique circumstances at many sites due to this pandemic. In the chemical industry, it is common for individual processes to be shut down. Shutdowns occur for a variety of reasons, including maintenance, inspection, retrofit, upgrading and others.

It is uncommon for an entire plant to be shut down, and even more uncommon for a plant to be shut down for weeks, potentially without staff onsite conducting preventative maintenance and inspections.

It is important to remember that a significant number, likely the majority of chemical incidents occur during startup.¹ Process safety incidents are 5 times more likely to occur during startup as compared to normal operation.²

Prior to restarting any process, consider conducting a pre-startup safety review, to reassess hazards that may exist due to changes that may have occurred during the shutdown period.

A pre-startup safety review can help companies evaluate any additional impacts due to complications associated with complete shutdown that might impact startup procedures of any or all processes. For instance, auxiliary systems, normally not concurrently in shutdown may only come online for a short time prior to individual processes being restarted.

Some examples of impacts to auxiliary and production processes that might need to be considered include:

- Outstanding preventative maintenance due
- Outstanding inspections due
- Issues with lubrication systems
- Loose fittings, and equipment that may have become purged or de-inventoried
- Corrosion
- Compressed air systems, especially moisture accumulation
- Utility reliance (electricity, water, steam)
- Safety system functionality (including fire protection systems)
- Gas detection functionality
- By-passed or disabled alarms and notifications
- Instrumentation stuck open/closed due to non-use

¹US Chemical Safety Board, Safety Digest: CSB Investigations during startups and shutdowns.

²Based on U.S. data.

Exercise caution when performing startup operations, consider conducting assessments to determine when equipment is ready for operation, and give priority to restarting those operations with life safety functions, such as fire protection devices. Safe restart procedures will vary by company, and often involve great detail, but some general elements a company might include within its safe restart approach are outlined in the four steps below.

- **Document ‘as found’ state of operations.** Record the current state of processes, and include enough detail for each process to understand where chemicals are being stored, the environmental conditions they have experienced, potential corrosion, valve positions, etc. Address deviations between the assumed state of operation in historical startup plans and the current state and consider amending the plans accordingly. Many process safety events occur due to process lines left open. To decrease the risk of an incident, consider walking process lines and examining open ended lines, drains and vents during a pre-startup safety review. Identify outstanding maintenance and inspection items, and assess the impact to restarting plans.
- **Create or revise a startup plan.** Pre-startup safety reviews may need to be adapted or revised based on current conditions. The plan may need to detail the order in which restart activities will need to occur. In particular, identify and address any outstanding maintenance and inspections, as appropriate.
- **Review training/drilling needs.** In some instances, refresher training on startup procedures may be beneficial. Discuss restart plans in pre-startup meetings that may include operations, maintenance, and engineering teams. Consider the need to drill restart procedures in order to address last minute questions and/or amend the plan as needed.
- **Proceed with caution.** Identify predefined hold points and determine if all supporting systems (auxiliary, utility, safety) are in order before proceeding to the next step in the startup plan. Considering adding an officer who has the duty of monitoring the startup process, with the authority to stop the process should any unanticipated deviation occur.



More information on conducting a pre-startup safety review, and navigating unique process safety challenges during COVID-19 is available from the Center for Chemical Process Safety.^{3,4}



³<https://www.aiche.org/ccps/publications/books/guidelines-performing-effective-pre-startup-safety-reviews>

⁴<https://www.aiche.org/sites/default/files/html/544906/RBPS-during-COVID-19-and-Similar-Disruptive-times.html>