

To The Point

Coming out of Shutdown - Start Up Fundamentals & Safety Tips

CHUBB®



As many manufacturing operations, processes and even entire buildings may be temporarily removed from service from time to time, it is important to consider safe start up and turnaround measures now. In any process, the shutdown and restart operations present the greatest risk, even when well-planned and well-managed.

A “turnaround” is an event during which one or more processing or production units are removed from service temporarily. A poorly planned or executed shut down or turnaround can be a dangerous proposition.

Start up and turnaround can also be overwhelming if managed as a single, standalone event. Facilities should have effective communication, provide workers with appropriate training, and have in place strong and current policies and procedures for hazardous operations.

Define Responsibilities for Safety and Success

Responsibilities should be established for the pre-startup safety review plan at the facility. Senior management representatives should be designated to ensure that pre-startup safety reviews are conducted and documented within each specific area and department. To help manage the process:

- **Define the Scope** - Planning, scoping and organization is essential for safe turnaround. Turnarounds are high cost, high impact events, and you must have a strategy in place to execute safely. Involve all levels of the organization, especially the environmental, health and safety (EHS) team.
- **Prepare** - Make sure your EHS plans are ready to address safe plant start up. Consider logistics for storage, protection, equipment, services, and utilities. Work plans should detail job scope, manpower, contractors, and labor hours. Safety steps, permitting, drawings and photos are all an essential part of the process.

Risk Engineering Services

Careful safety planning of any turnaround is critical.

- **Execution** - Execute the known items in the plan, and prepare for the unknowns too, such as scope changes. Inspect the main assets while equipment is down. Recommission testing must validate safety and readiness to return equipment to normal operation. Testing activities will likely need electricians, technicians, process control staff, vendors, and operations staff.
- **Start Up and Turnover** - After testing is completed, final inspection by operations, maintenance, and vendors must evaluate readiness for service. After equipment is operational, ramp up can begin. Upon completion, review the turnaround to update EHS plans, key performance indicators, punch lists, contractor management, shut down/start-up/ramp-up, critical path and lessons learned.

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Safety Tips When Managing the Turnaround

Often, there are additional employees and contractors used to assist, and they might be new to the plant and safety procedures. Existing employees might be asked to perform new tasks in isolated, confined or hazardous areas of the facility, elevating risk. Certain risks are part of the shutdown process, such as exposure to toxic chemicals, the unexpected release of energy from machines, the reality of damaged or defective equipment and electrical hazards.

Careful safety planning of any turnaround is critical. Planning should include developing, documenting and communicating safety procedures between different facility operations. Ensure your safety plan details all shutdown and turnaround activities to identify potential risks and hazards.

Consider the following:

- Conduct, complete, and apply written safety reviews (such as Pre-Start Up Safety Reviews - PSSRs) prior to turnarounds/turnovers.
- Review process hazards analyses (PHAs) where required and make sure they are current to reflect any process modifications, new equipment, installations or potential hazards.
- Conduct a management of change (MOC) analysis for equipment, processes, and procedures that are not replacements in kind.
- Provide start up safety orientation to new workers and train them on how to avoid identified risks. Instruct them in emergency safety procedures.
- Screen new contractors for competence, relevant skills and familiarity with the type of turnaround you're conducting and identify who will supervise them.
- Lockout and tagout equipment (per OSHA or regional equivalent) to help prevent machines from restarting unexpectedly.
- Make sure the confined space program (per OSHA or regional equivalent) is fully enforced, preventing energizing of any tank or vessel to protect operators.
- Ensure the hazard communication program (per OSHA or regional equivalent) is current to reflect new equipment or processes and any new chemicals being introduced.
- Review any additions or modifications to equipment that may require arc flash analysis (per OSHA or regional equivalent)
- Review and protect hazardous locations that present or may present ignitable atmospheres.
- Ensure Chubb Hot Work Permits and Programs are strictly followed.
- Do not bypass critical safety devices during troubleshooting operations during unit startups.
- Verify auxiliary plant equipment such as sump pumps, emergency batteries, UPS systems and water treatment systems are all in proper working order.
- Ensure all boilers and pressure vessels are inspected and maintained to jurisdictional standards prior to start up.
- Heavy machinery brought in to move equipment poses great risk. Make sure it's operated only by trained, certified, qualified workers and appoint spotters.
- Protect wet locations. Keep moisture out of enclosures to prevent electrical shock hazards.
- Make sure machinery is properly grounded. To protect against electrical hazards, use power source and line quality monitoring devices to alert operators to problems.
- Pay special attention to air and gas cylinders. Close their main valves when not in use, remove regulators and install safety caps.
- Review ventilation requirements for new equipment that may generate hazardous vapors / gasses / fumes.
- Conduct a full inspection of major machinery prior to start up.
- Ensure fire protection systems are operational, and inspected, tested and maintained per applicable regulation.

Shutdowns and plant turnarounds are challenging and can be dangerous. The right planning, training and communication can help keep everyone safe.

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