

Operational Readiness

How do you know that a piece of equipment that you intend to put into service is actually ready for use? For example:

- a routine startup of a process pump, such as switching from the online pump to the spare
- transferring material into a different tank or other process vessel
- introducing material into a piping system that has been out of service for maintenance
- starting up new equipment following a plant modification

(which should be covered by your plant's management of change and pre-startup safety review procedures).

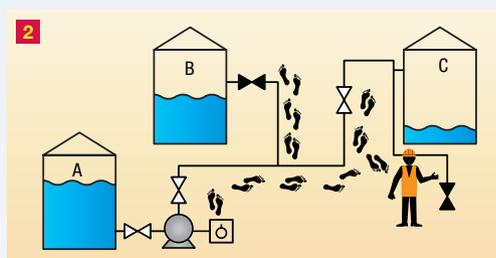
Any time that you introduce material or energy into equipment that is not currently being used, it is essential that you confirm that the equipment is ready. Are all of the parts of the equipment actually there and properly installed, or is something missing? Are all the valves that are supposed to be open actually open, and are all the valves that are supposed to be closed actually closed? Is everything else ready to use?

Did You Know?

It is believed that one of the many contributing causes of the Piper Alpha North Sea oil platform disaster (165 fatalities) in July 1988 (Figure 1, see July 2005 and July 2013 Beacons) was a release of light hydrocarbon condensate when a pump was restarted. Unknown to workers starting the pump, a relief valve in the pump discharge had been removed for service and a blank had been loosely installed in its place. This section of piping was not readily visible from near the pump.

One company recently reported [Forest, J. J., "Walk the Line," *Process Safety Progress* **34** (2), pp. 126-129 (June 2015)] that nearly half of the loss of primary containment (LOPC) incidents in the plants studied were related to conduct of operation causes (see June 2015 Beacon). Most of those were due to problems with properly setting up process equipment before introducing material or energy. Some common factors:

- expectation not set by management
- setup not formally included in operator training
- lack of discipline and consistent format for operating procedures and shift communications
- failure to follow standard operating procedures for complex equipment setup.



What Can You Do?

- When you change the status (start, stop, open, close, increase, decrease, etc.) of a piece of equipment in your plant, know where material and energy come from, where they can go, and how that will change when you change the equipment status.
- Complete a field assessment of a system before changing its status (Figure 2). Make sure that all components of the system are properly installed, and that everything is in the correct position (open, closed, on, off, etc.). (See CCPS Videos: <http://www.aiche.org/ccps/resources/overview/ccps-videos/videos-english/walk-line>).

- Be particularly careful when putting equipment back into service following maintenance or any other activity where the equipment was taken apart. Make sure that it has been properly reinstalled, that all temporary isolation devices such as blinds have been removed, and that all valves are in the right position.
- Set a personal goal of zero equipment setup errors and walk-the-line incidents in your job, and encourage your colleagues to do so as well.

"Walk the Line!" - Johnny Cash

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