

Do your shutoff systems actually work?

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What happened?

A small chemical feed system was designed to refill automatically. It had a high shut off interlock that stopped the feed pump and closed a feed valve to prevent overflowing the tank. The level control system had a malfunction, the tank was filled above the design level, and the high level switch tripped. Before the control system could close the valves and stop the pump, the tank overflowed. Fortunately, no employees were injured and the spill was contained to limit environmental damage.



Why did this happen?

While the system was designed with the correct safeguards, they were not functional as a system. The pump and shutoff valve were too far from the receiving tank to stop flow before the tank overflowed – the liquid in the pipe downstream of the valve was enough to overflow the tank even though the valve had closed. Alternatively, the high level switch could be installed lower in the tank to shut the flow off sooner and account for the materials between the shut off valve and the receiving tank. In general, it is good practice to locate a device to prevent tank overflow as close to the tank being protected as possible.

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See "Free Search: Level Control"

What can you do?

- During a process hazard analysis, or any other safety review, ask if anyone has verified that automatic shutoff systems actually work effectively.
- When starting up a new or modified safety system, test operation of the entire system to verify that it operates as intended.
- Review testing procedures for critical shut off systems, and make sure they actually test the complete system, not just single components of the system.
- Do not accept small spills as the “cost of doing business”. Small spills indicate problems which may be prevalent in the facility and should not be regarded as normal. Where there is one inadequate design, maintenance practice, or operating procedure, others are often present.

Don't assume that safety systems work – check them!