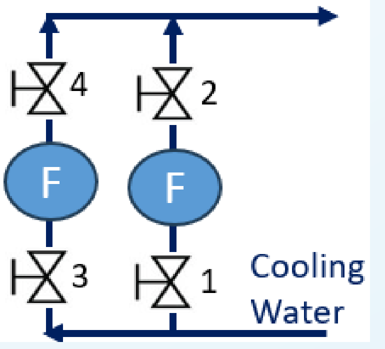
Petrochemical Explosion & Fire

EPSC Learning Sheet July 2025

EPSC

What Happened:



At an Ethylene unit in the Czech Republic (2015) when swapping over cooling water supply lines during a flowmeter calibration, the operator made a simple mistake: while intending to open valve #3 on the spare supply line, he closed the identical valve #2 instead, shutting off all cooling water to the Light Ends columns.

A rapid chain of events ensued. The propylene column over pressured, causing the PSVs to lift, one of which chattered, loosening the inlet flange bolts, releasing high pressure propylene. The resulting jet fire impinged on other PSVs, which then failed, causing a small explosion that was sufficient to snuff out the nearby boilers. Steam supply to the cracker was lost, resulting in a crash shutdown and a split in one of the furnace tubes. The resulting fire caused extensive damage to four furnaces.

Aspects:

- Critical valve operation errors can be eliminated with physical interlocking systems like “trapped key” system.

Consider Human Error and Domino Effects