



Learning Event



MAINTAINING PROCESS EQUIPMENT

HAZARD
Chemical
(flammable)

Explosion

CONSEQUENCES
Actual: No harm to persons
Potential: This could have caused multiple fatalities

WHAT ARE YOU DOING TO IDENTIFY HAZARDS IN TRANSIENT OPERATIONS?

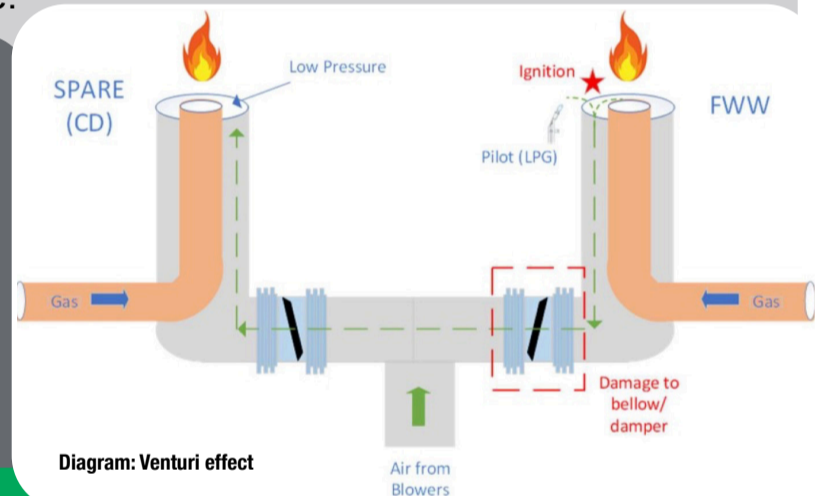
What Happened?

A major shutdown for planned maintenance was initiated which involved depressurizing the plant and flaring hydrocarbons. As part of shutdown work scopes, the main flare air blowers were taken offline leading to no positive pressure within the air annulus of the flare warm wet (FWW) and spare 1st stage flares. These two air assist flares were communicating through common air ducting and open dampers. A venturi effect (created by a low-pressure point at the spare 1st stage tip) drew hydrocarbon from the flare warm wet gas riser/pilots into the air annulus towards the spare flare. A flammable atmosphere was then created and ignited at the flare warm wet tip, leading to a deflagration (causing flare warm wet tip damage) followed by a detonation which caused the flare warm wet bellows to rupture.

Why did it Happen?

The air assist system design was modified and operating mode changed at different times before facility startup. The risk of hydrocarbon ingress into the air assist system was not identified during design reviews. As such, appropriate controls for this scenario were not identified. The flare air assist design was novel to the industry at the time of design.

Lessons from an incident in 2012 that identified the risk of hydrocarbon ingress into a flare air assist annulus were not clearly articulated.

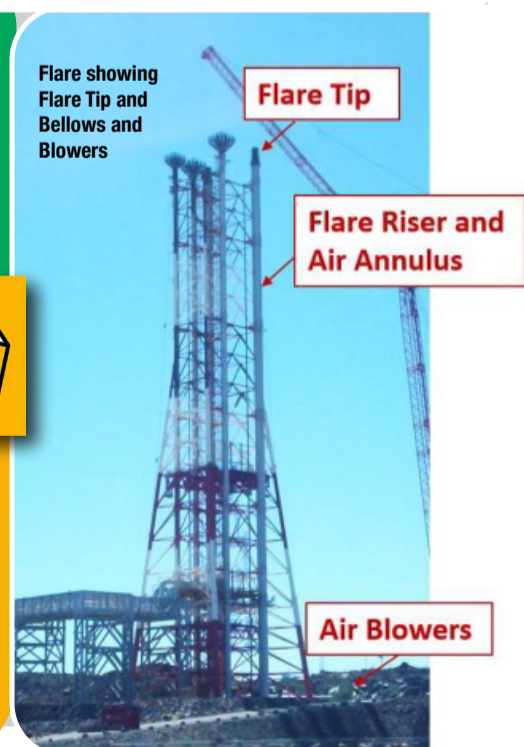


What did they Learn?

Emergency Preparedness: Before the commencement of a task, familiarise yourself with primary and secondary muster points.

Risk identification: Vendor engagement during front-end design and safety reviews / HAZOP, specifically for novel or complex systems, is important.

Communication: Operating procedures to provide key vendor parameters and a clear line of sight to operational risks.



Process Safety Fundamentals

- ✓ We improve our understanding of process safety hazards at our location and our roles in controlling them.
- ✓ We use operating and maintenance procedures, even if we are familiar with the task.
- ✓ We look for and speak up about change.
- ✓ We discuss changes and involve others to identify the need for management of change (MOC).
- ✓ We review the MOC process for guidance on what triggers an MOC.
- ✓ We discuss and seek advice on change that occurs gradually over time.

Ask yourself or your Crew:

- Are any areas of your facility novel to your company and the industry? Has an appropriate risk assessment been carried out, with the right subject matter expertise (technical/operations) to adequately identify and address the risks?
- Do you know where the primary and secondary muster points are at your facility?

Further Information:

Safer Together
Process Safety
Awareness Video:
We all Have a Part to Play



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