

Release from Flare system

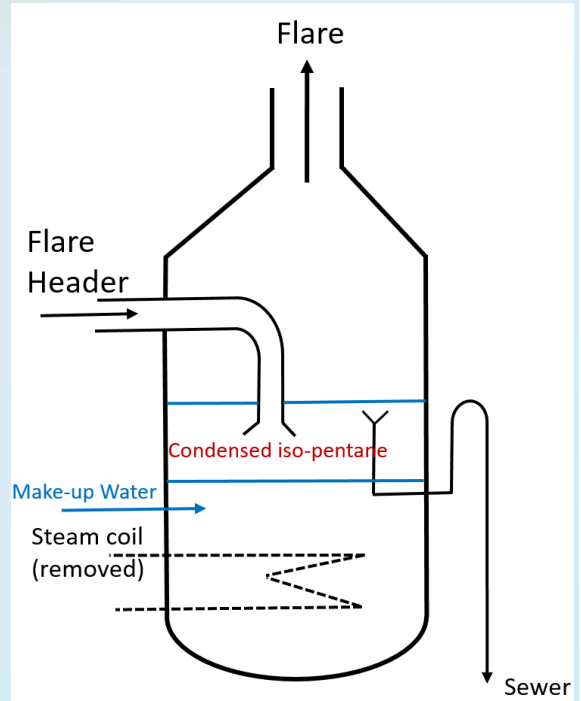
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What Happened:

During the start-up of a refinery, high amounts of iso-pentane did leak through an off-gas vent of a distillation column, to the flare. This condensed in the cold water seal of the flare and was able to overflow into the oily water sewer, where it evaporated and triggered gas alarms. The large gas cloud was not ignited.



Aspects:

- Operators were unaware of the mechanical failed open vent control valve, indicated as closed on DCS
- Iso-pentane has a boiling point of 26 °C, when released as a gas it passed the KO drum, condensed in the cold water seal vessel and flow-over into the sewer as a liquid, as it swims on top of the water. In the closed sewer it was mixed with condensate, evaporated and lifted several pit covers
- In the past the steam coil in the water seal drum was taken out of service after it corroded, as its function was unclear. Warm water in the seal could have limited the release
- If water is removed at a lower point in the seal drums, condensed hydrocarbons get more time to re-vaporate
- This rare scenario was not described in the hazard analysis

Start-up requires additional attention