

SM cloud from a storage tank



EPSC Learning Sheet September 2020

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What Happened:

Styrene Monomer (SM) polymerised exothermally in two storage tanks, evaporating SM that was released from the tank. The toxic gas cloud killed 12 and injured ca 1000 in the area.

Aspects:

- SM evaporation created a lethal concentration of 5000 ppm at 200 m distance, killing and injuring nearby civilians.
- SM polymerisation must be avoided by keeping the temperature below 20°C and adding an inhibitor (TBC).
- Control tank temperature with a SIL rated cooling system.
- Understand inhibitor (TBC) depletion characteristics, measure it and add it in time to stop a runaway reaction.
- Keep O₂ concentration 15-20 ppm in the liquid (that equals about 5% in the gas phase) to help inhibiting polymerisation.
- Keep circulation over the tank to avoid stratification.
- Storage siting: take off-site exposure into account.

Styrene Monomer storage needs attention