

Hydrocarbon and chemicals that we store, transport or process can result in undesirable harm to lives and livelihood in the event of a loss of containment. Flammable storage tank overfill incident at Buncefield (2005) resulted in large vapour cloud and a fire that involved over 20 other storage tanks. While there were fortunately no fatalities in the Buncefield incident, the same could not be said for the Piper Alpha disaster in 1988 that claimed the lives of 167 persons. Inadequate fire protection and poor emergency preparedness contributed to what happened that day.

Three key aspects of emergency response are discussed here.

Emergency Facilities and Equipment

Equipment needed to immediately contain the hazards should be provided at the site. These equipment include those that provide a **means to detect, to alert and to control the release**. Some examples are; gas detectors placed at pump seals, piping manifolds or other areas of high leak potential, audible beacons and flashing lights to warn people in the area, and fire/leak suppression systems. Such equipment **need to be designed to be effective** for the hazard it is meant to control. Local standards such as SS532, SS667, and even the product MSDS provide guidance on the means to and the equipment needed for containment.

Emergency Response Planning

An ER plan should **identify the scenarios of concern, how they may escalate, and the steps needed to contain and mitigate** the incident. Such plans should be reviewed by emergency response practitioners and validated in the field. **Roles and responsibilities of the Site Incident Commander, and the Site Main Controller** in the Emergency Command Centre should be clearly defined, to ensure effective command and control during high stress emergency situations. An Emergency Response Plan template is available in SCDF's online resources⁵.



Vapour releases can have far-reaching effects beyond company fence line. [Ref. 2]

Testing and maintenance of equipment, training of personnel

Facilities to test emergency equipment such as alarms, fire monitors/pumps or emergency isolation systems should be provided, and **test intervals and performance standards** established in accordance to standards such as NFPA's. A **control of defeat process** should also be put in place to ensure that alternate protection measures are available when emergency equipment is out of service.



Large fire monitors designed to deliver adequate fire water, deployed in the right location are essential to prevent spread of a fire [Ref. 3]

Emergency response drills are essential to familiarize everyone at site on what actions are needed to minimize confusion. Drills also provide an opportunity to verify response time and effectiveness, and identify constraints otherwise not apparent during table top planning. Staffing changes, in particular amongst members of the company emergency response team, could lead to a loss of knowledge and competency of how to handle emergencies. As such, **frequent training** is also necessary to ensure key personnel are competent to effect a strong emergency response.

Emergency response equipment and actions are crucial to prevent an escalation of an on-going incident. Early detection of an abnormal event such as a loss of containment, provide persons with adequate time to go to safe areas away from potential impact zones. Emergency responders can also then provide timely and appropriate actions to intervene. When our facilities and our people are ready, we have a greater chance to mitigate that worst-case scenario.

References:

1. COMAH 1999 *Emergency planning for major accidents*
2. US Chemical Safety and Hazard Investigation Board, *Safety Digest: Emergency Planning and Response*
3. US Chemical Safety and Hazard Investigation Board, *Safety Video: Husky Energy Refinery Explosion and Fire*
4. OSHA, *Emergency Preparedness and Response* (<https://www.osha.gov/emergency-preparedness>)
5. SCDF *Emergency Response Plan* (<https://www.scdf.gov.sg/home/fire-safety/erp>)

Process Safety is Everybody's Responsibility!

An initiative of the Process & Engineering Committee

SINGAPORE CHEMICAL INDUSTRY COUNCIL LIMITED (SCIC)

8 Jurong Town Hall Road, #25-04, The JTC Summit, Singapore 609434

Tel: 6267 8891 Fax: 6267 8893