

Developing Emergency Management and Response Strategies to Mitigate Major Incidents

Presented By: Elio Stocco
August 2017



R4Risk

L14, 222 Kings Way (PO Box 5023)
South Melbourne VIC 3205

P: (03) 9268 9700
F: (03) 8678 0650

E: solutions@r4risk.com.au
www.r4risk.com.au

- Importance of emergency planning via incident review
- Requirements of an emergency response plan (*the Plan*)
- Identification of major incidents examined by the Plan
- Develop emergency management strategies
- Preparation of the Plan and scenario-specific contingency pre-plans

West Fertilizer Explosion: April 17, 2013



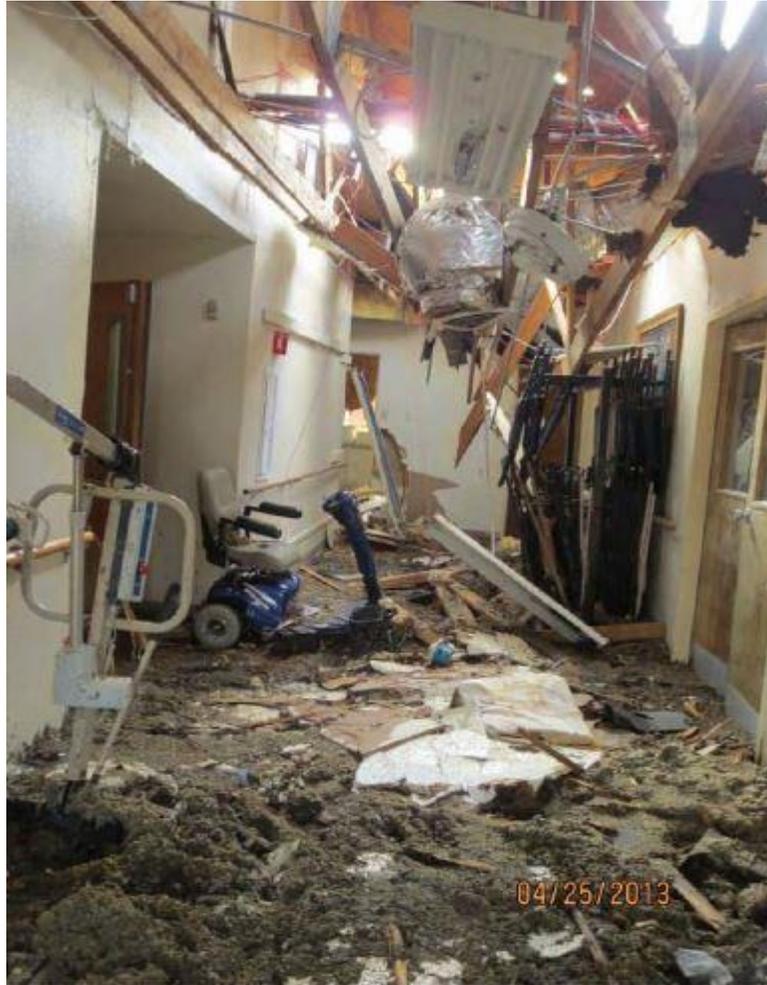
Ref: West Fertilizer Company Fire and Explosion – Investigation Report, Final, Report 2013-02-I-TX, U.S. Chemical Safety and Hazard Investigation Board



Ref: West Fertilizer Company Fire and Explosion – Investigation Report, Final, Report 2013-02-I-TX, U.S. Chemical Safety and Hazard Investigation Board



Ref: West Fertilizer Company Fire and Explosion – Investigation Report, Final, Report 2013-02-I-TX, U.S. Chemical Safety and Hazard Investigation Board



Ref: West Fertilizer Company Fire and Explosion – Investigation Report, Final, Report 2013-02-I-TX, U.S. Chemical Safety and Hazard Investigation Board

- Massive explosion at fertilizer storage and distribution facility
- 15 fatalities, including 12 volunteer firefighters
- Emergency planning and response a key issue identified by the CSB
- Required a well-exercised local emergency plan emphasising the need for immediate notification to responders and community at the first sign of fire

- Chemical reactor overheated at a manufacturing plant releasing a highly toxic and flammable allyl alcohol and toxic allyl chloride vapour
- Resulting toxic vapour cloud hospitalised 154 people and forced the evacuation of nearby residents
- A contributing cause to the high number of exposures and injuries was:
 - inadequate emergency response planning by the local government authorities
 - inadequate method of notifying the public of the hazardous vapour cloud
- Recommended that MFG:
 - Create a comprehensive emergency response plan
 - Provide equipment and training to duties assigned to employees in event of an emergency

- The Hazelwood mine fire



- The Hazelwood mine fire began on 9 February 2014
- The fire was caused by embers spotting into the Hazelwood mine from bushfires burning in close proximity to the mine
- The mine fire burned for 45 days.
- The fire sent smoke and ash over the town of Morwell and surrounding areas for much of that time.
- It was the largest and longest burning mine fire that has occurred in the Latrobe Valley to date
- The Inquiry made a number of findings
- The Inquiry identified eighteen recommendations to address those findings

- Emergency planning aims to prepare for and mitigate the impacts of an emergency.
- Preparedness requires identifying those circumstances that constitute an emergency for its specific operation and activities
- Responding requires identifying the systems and resources needed to ensure an appropriate response
- Engaging stakeholders potentially affected by the emergency

- Specific to the facility and the major hazards identified in a risk assessment
- Effective in addressing consequences of major incidents
- Developed in consultation with employees, emergency services, industrial neighbours and local council (community)
- Understood by employees, visitors and other people likely to be affected
- Tested, reviewed and updated at appropriate intervals.

- Identify all hazards that might be expected to contribute to an emergency situation
- Consider the full range of activities at the facility
- Conduct hazard and / assessments to develop a list of potential incidents.

- What is effective hazard identification / risk assessment?
- Consequence assessment used to support the understanding of identified major incidents
- Representative set of incidents used in the preparation of a simple and effective plan

- The strategy must outline an operator's philosophy of response to emergencies
- What are the strategic responses that may be considered?
- Level on involvement of on-site personnel
- Strategy depends on the type of incidents identified at site
- Specify the performance required

- Emergency response arrangements necessary to either reduce, or eliminate, the major incident.
- Detail procedures, roles and resources that are required to achieve the response.
- Determine how responses will be coordinated, and allocate responsibilities.
- Identify situations where the routine procedures and resources are not sufficient.

- Emergency responders not adequately consulted when developing plans
- Sites not implementing their plan
- Drills and exercises in particular regarding deployment and use of fire-fighting equipment
- Not liaising with local community on potential hazards at their site
- Emergency plans not specific to the hazards

- Documents containing data and information that assist in establishing control and successfully responding to identified incidents
- Pre-plans are developed to prevent response difficulties
- Reduces the related incident safety risks
- Training tool to test systems against the specific requirements of major incidents

- Understand characteristics of major incidents requiring a CPP
- Develop CPP templates to outline the information required to be captured
- Develop a consolidated list of major incidents requiring contingency pre-plans
- Collate details on major incident

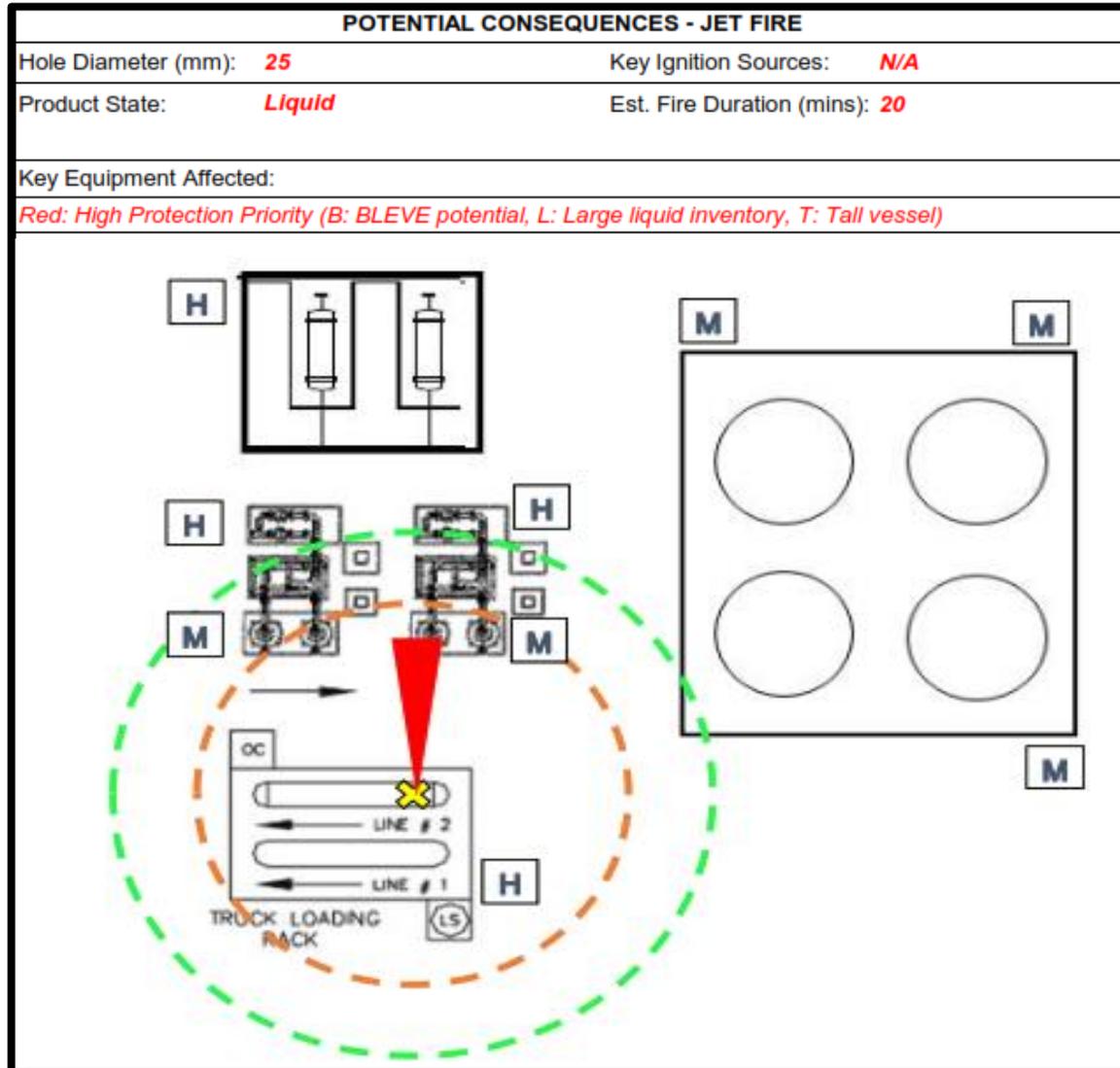
SITE A CONTINGENCY PRE-PLAN		REF NUMBER	<i>PP-01</i>
Plant Area:	<i>A3 - LPG Storage Area</i>		
Equipment No.:	<i>V101 - LPG Storage Bullet</i>		
Incident Title:	<i>Jet fire resulting from a pressurised release of LPG from Storage Tank</i>		
PRODUCT & INCIDENT DETAILS			
Typical Product:	<i>LPG</i>	Flash Point (°C):	<i>-104</i>
Product Components:	<i>100 % Propane</i>	Est. Isolatable Inventory (kg):	<i>20,000</i>
Description:	<i>Scenario represents a release from the LPG Storage Bullets. Applicable to each bullet in the storage area.</i>		
ISOLATION			
Process Isolation:	<i>The area can be isolated via the following ESD hand switches : V-101 LPG Storage Bullet ESD in the control room (HS-200) and local push buttons adjacent to the control room (HS-2001). The key isolation valves on inlet (MLV-30) and outlet (MLV-300).</i>		
BLOWDOWN			
Blowdown:	<i>No liquid blowdown</i>		

Description of the major incident and location

Product and incident details

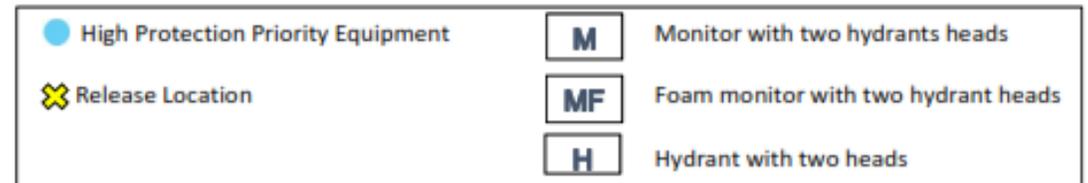
Isolation and blowdown steps

CPP for a Jet Fire in LPG Storage Area



Consequences of the major incident

Graphical representation of the consequences of the major incident and equipment layout



CPP for a Jet Fire in LPG Storage Area: Response Requirements

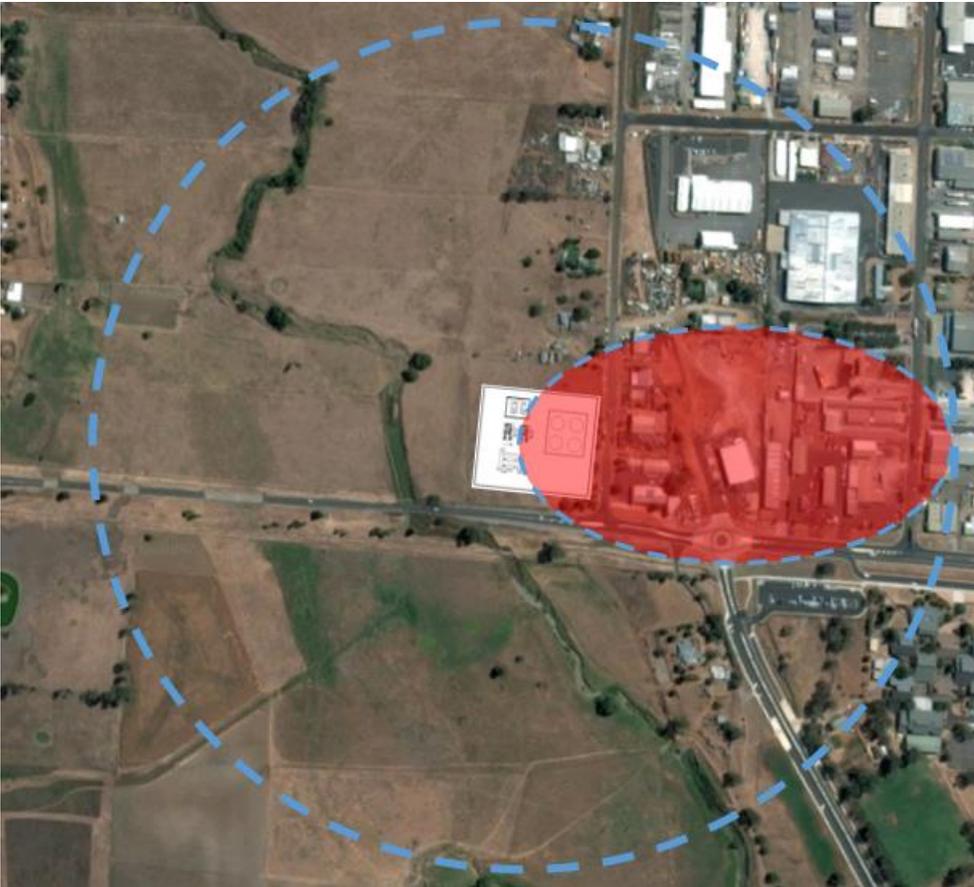
FIXED FIRE FIGHTING EQUIPMENT IN VICINITY			
Fire Hydrants:	4	Deluge Systems (Total):	1
Fixed Fire Monitors:	5	Deluge Systems (Detail):	V102 LPG Bullet
Foam / Water Monitors:	-		
Detail:	Deluge system on V-102 LPG Bullet requires 500 L/min		
ADDITIONAL FIRE EQUIPMENT / RESOURCES REQUIRED			
Portable Monitors:	1	Emergency Response Vehicles:	1
Foam Cannons:	-	Emergency Service Officers:	1
64 mm x 30 m Hoses:	4	Advanced Fire Fighters:	-
Supplementary Hoses:	2	SCBA:	-
38 mm x 30 m Hoses:	-		
38 mm Branches:	-		
Other:			
FOAM AND WATER REQUIREMENTS			
Impingement Water Req. (L/min)	2,000	Water Req. (L/min):	5,000
Cooling Water Req. (L/min):	1,000	Water Volume Req. (L):	600,000
Deluge Water Req. (L/min):	800	Water Volume Available (L):	800,000
Supplementary Water Req. (L/min):	1,200		
CONTAINMENT DETAILS			
Drainage Details:	Drains to on-site sump, which is isolated from the town stormwater system		
Containment Capacity (m3):	1,000		

Fixed fire-fighting equipment

Additional fire equipment and resources

Foam and water requirements

Containment details



- Lists consequence impact to toxic criteria of varying severity (i.e. ERPGs, AEGLs)
- Response strategy to mitigate the release
- Identification of key locations on-site
- Identification of key off-site populations

- Consult emergency services within the jurisdiction
- Emergency services must be involved in the preparation and acceptance of the plan
- Responders must know and understand the hazards
- Constant liaising with key emergency services personnel is essential to ensuring individuals are aware of their roles and responsibilities
- Joint training and emergency drills exercises

- Identify the neighbours requiring consultation
- Industrial neighbours that may be impacted and or can assist
- Residential neighbours
 - Houses
 - Vulnerable populations

- Test the plan
- Emergency services, adjacent facilities, the local council and nearby residents should be involved in major testing exercises.
- Emergency response personnel must be trained correctly in the use of developed CPP

- Develop a plan that demonstrates a preparedness to respond to site specific emergencies
- Contents of the plan need to address the key requirements outline in legislation
- CPP are developed to detail the specific requirements of the identified major incidents
- Stakeholder consultation is vital to ensure correct response to the incident
- Training exercises are important in building experience in response personnel to minimise potential for delay or mistakes

R4 RISK Summary



