

AVON AND SOMERSET LOCAL RESILIENCE FORUM INDIVIDUAL RISK ASSESSMENT (V2.0)

Avon and Somerset Local Resilience Forum Risk Assessment Working Group

Individual Risk Assessment Lead Agency:

Avon Fire & Rescue Service

Hazard / threat category:	Sub-category:
Industrial accidents and environmental pollution	(Localised) fire or explosion at a fuel distribution site or a site storing flammable and/or toxic liquids in atmospheric pressure storage tanks
Hazard and threat description, including scale:	Risk reference no.:
Fire/explosion: a) H4 – up to 3km around site causing up to 150 fatalities and 2,000 casualties; b) HL28 – up to 1km around the site, causing up to 15 fatalities and 200 casualties; c) L7 – affecting both on-site and off-site; or d) L8 – affecting on-site only.	IA/4
Date of revision:	Next review date:
January 2008	January 2009

1. Overview of hazard or threat

Fuel distribution and storage sites

- Petrol filling stations (retail distribution sites):** approximately 200 licensed sites in the former Avon area and approximately 170 in the Somerset area, commonly storing between 50,000-100,000 litres of petroleum spirits and comparable quantities of diesel fuel.
- Sites subject to the Control of Major Accident Hazards (COMAH) Regulations 1999:** five sites in the former Avon area and none in the Somerset area which are subject to the requirements of the COMAH Regulations (Schedule 1 defines the lower-tier threshold as 5,000 tonnes of “automotive petrol and other petroleum spirits” and the top-tier threshold as 50,000 tonnes).

Tank storage of flammable or toxic liquids

Various sites subject to the COMAH Regulations (lower- and top-tier), those storing such materials but not in excess of the lower-tier COMAH threshold.

Hazards from such sites include fire/explosion and environmental pollution. Consequences may range from a minor fuel or chemical spillage dealt with using on-site facilities to a large-scale incident requiring evacuation of large numbers of the general public and the combined resources of all responding agencies to deal with the incident and the threat of significant environmental damage.

2. Key historical evidence

Bontddu, August/September 1996

Approximately 61,000 litres of petrol leaked from an underground storage tank at Bontddu Service Station in north Wales, contaminating ground around the site and entering a nearby river. In April 1997, while contractors were carrying out exploratory drilling to assess the extent and severity of contamination, vapour released from the petrol underground ignited and caused a fireball in a cottage nearby, damaging it and slightly injuring one of the residents. The original leak and subsequent fireball caused considerable concern and disruption. A nearby school was evacuated and remained closed for almost six months, and several householders vacated their homes for a considerable period of time, because of the presence of liquid petrol and vapour on the ground around their premises.

Reference: HELA LACOTS PETEL 65/28 – *Recommendations from the Report into the Bontddu Incident*.

Albright and Wilson, 3 October 1996

Explosion and fire at a factory in Avonmouth caused by the accidental mixture of two chemicals (epichlorohydrin and sodium chlorite) and resulting in a large plume of smoke which had both on- and off-site effects. Further chemicals subsequently became involved. The incident caused some structural damage and several minor casualties (including firefighters). Members of the public were advised to shelter indoors with doors and windows closed. Motorways (M48 and M49) were closed, together with both the Severn Crossings, and significant travel disruption was caused.

Reference: Langdon, S. (1997) *Report on the Albright and Wilson Fire, Avonmouth Works, Bristol BS11 0YT – Thursday, 3 October 1996*. pp 1-4 plus appendix. Bristol: Bristol City Council.

Buncefield Fuel Depot, Hemel Hempstead, Hertfordshire, 11 December 2005

Largest fire and explosion at a fuel storage site in Europe since 1944. Large-scale firefighting operations used 40 million litres of water and 600,000 litres of foam concentrate, along with careful consideration of environmental protection requirements. Evacuation of members of the public was required together with the widespread dissemination of public health advice due to the plume of smoke which covered several hundred square miles in the south of England. Sixty members of the public self-presented to local hospitals with the most serious requiring a two-day stay. Significant transport disruption caused by the closure of the M1/M10 motorways and other major arterial and trunk routes.

3. Likelihood

Hazard	Outcome description	Likelihood
Fire/explosion	Up to 3km around site causing up to 150 fatalities and 2,000 casualties.	Rare (2) (National assessment – Health and Safety Executive)
Fire/explosion	Up to 1km around the site, causing up to 15 fatalities and 200 casualties.	Rare (2) (National assessment – Health and Safety Executive)
Fire/explosion	On-site and off-site implications	Rare (2)
Fire/explosion	On-site implications only	Possible (4)

4. Impact

Summary

NOT PROTECTIVELY MARKED

Hazard	Outcome description	Impact	
Fire/explosion	Up to 3km around site causing up to 150 fatalities and 2,000 casualties.	Health:	Catastrophic (5)
		Social:	Significant (4)
		Economic:	Significant (4)
		Environment:	Significant (4)
		Overall:	Significant (4)
Fire/explosion	Up to 1km around the site, causing up to 15 fatalities and 200 casualties.	Health:	Significant (4)
		Social:	Significant (4)
		Economic:	Significant (4)
		Environment:	Significant (4)
		Overall:	Significant (4)
Fire/explosion	On-site and off-site implications	Health:	Moderate (3)
		Social:	Moderate (3)
		Economic:	Moderate (3)
		Environment:	Moderate (3)
		Overall:	Moderate (3)
Fire/explosion	On-site implications only	Health:	Moderate (3)
		Social:	Minor (2)
		Economic:	Minor (2)
		Environment:	Minor (2)
		Overall:	Minor (2)

Details

Impacts associated with fire/explosion:

Primary:

Physical harm and injury: burns, smoke inhalation (varying degrees of severity, including death).
 Damage to property.
 Evacuation and temporary accommodation needs.
 Environmental pollution from products of combustion or escaping unburned product (eg airborne, aquatic, ground water).
 Environmental pollution from firefighting operations (eg foam, firefighting water run-off).

Secondary:

Loss of economic income.
 Safety assessments, possible demolition of damaged buildings and structures.
 Environmental remediation and clean-up.

Temporary impact on transport infrastructure (eg road closures or restrictions on use of railways as safety precautions).
 Need for public information – particularly public health advice and the “go in, stay in, tune in” message.
 Panic buying of fuel causing temporary local self-perpetuating fuel shortages at retail petrol outlets.
 Reduced availability of fire and rescue resources for routine emergency cover.

5. Vulnerability and resilience

Sevenside area in Avon has a high density of top-tier COMAH sites and is consistently ranked in the top five areas of COMAH risk areas in the UK. Preparedness is co-ordinated through the Sevenside Emergency Planning Forum, which has been identified by the HSE as a model of best practice.

Historical evidence of incidents at petrol filling stations suggests that they are dealt with without requiring any mutual aid resources and, with one or two exceptions, the effects are generally limited to on-site implications.

Small-scale domestic and larger-scale clandestine storage of flammable / toxic liquids is usually on a scale such that the effects of an incident may be dealt with as part of the routine operations of the emergency services and other supporting responding agencies.

The Fire and Rescue Service New Dimension programme (run through Communities and Local Government) provides nationwide availability of high volume pumps to support large-scale foam production and additional foam stocks are available through inter-Service mutual aid and assistance from industrial sites which hold independent supplies.

6. Overall assessment

Category:	Sub-category:		
Industrial accidents and environmental pollution	(Localised) fire or explosion at a fuel distribution site or a site storing flammable and/or toxic liquids in atmospheric pressure storage tanks		
Outcome description	Impact	Likelihood	Risk
Up to 3km around site causing up to 150 fatalities and 2,000 casualties.	Significant (4)	Rare (2)	HIGH
Up to 1km around the site, causing up to 15 fatalities and 200 casualties.	Significant (4)	Rare (2)	HIGH
On-site and off-site implications	Moderate (3)	Rare (2)	MEDIUM
On-site implications only	Minor (2)	Possible (4)	MEDIUM

Controls in place:

- Licensing of petrol filling stations by the four Unitary Authorities in the former Avon area and by Devon and Somerset Fire and Rescue Service on behalf of Somerset County Council. Operating Agreement between the Environment Agency and members of the South West Licensing Co-ordinating Group.
- Compliance with Dangerous Substances and Explosive Atmospheres Regulations 2002.
- Compliance with the COMAH Regulations 1999; on-site plans for lower-tier sites and on- and off-site plans for upper-tier sites.
- Sevenside Sirens, Bristol Alert scheme and B&NES emergency radio broadcast scheme for warning and

informing the public.

- Fire and Rescue Service: fire wallet scheme, bulk foam plans, Environment Agency 'grab-packs' and Environmental Protection Unit for pollution control, Environment Agency-Fire and Rescue Service Memoranda of Understanding on environmental protection, mutual aid reinforcement schemes, New Dimension high volume pumping equipment.
- Local authorities: generic emergency plans (eg evacuation and rest centre plans).

Additional risk treatment required:

- None identified.