

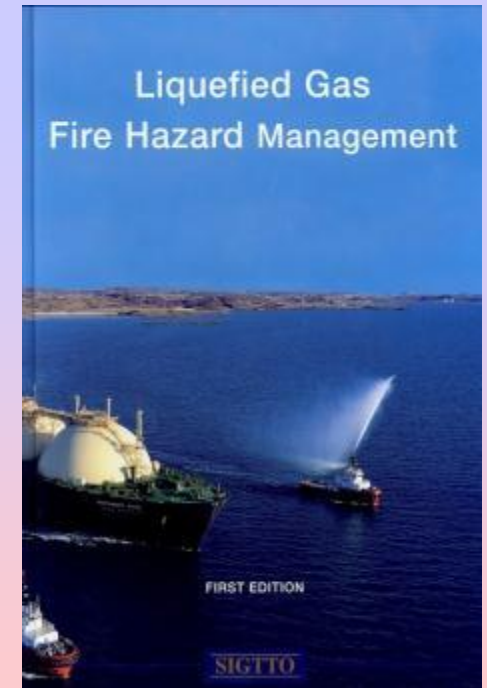


Buncefield Experience

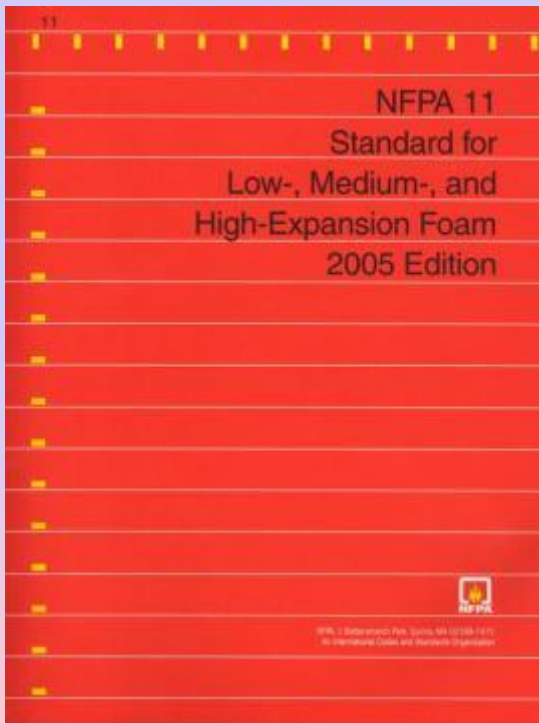
Presented on the departure reception of
Kees Kappetijn,
August 30, 2012
By Niall Ramsden



Industry standards



Industry Standards





Centre For Industrial Safety / Rotterdam Fire Brigade
Tanks Technical Reference and Audit Methodology

Prior to December 2005

Numerous site visits

Numerous large scale fire tests

Lots of knowledge of standards

System design/operation/testing

Major Emergency Exercises

Small incidents

Remote advice on major incidents

But no major incident response!!



Buncefield Terminal fire 11 December 2005

24 tanks destroyed (~ 23 tanks & 7 bunds involved in initial event).

Picture credit: local Police website

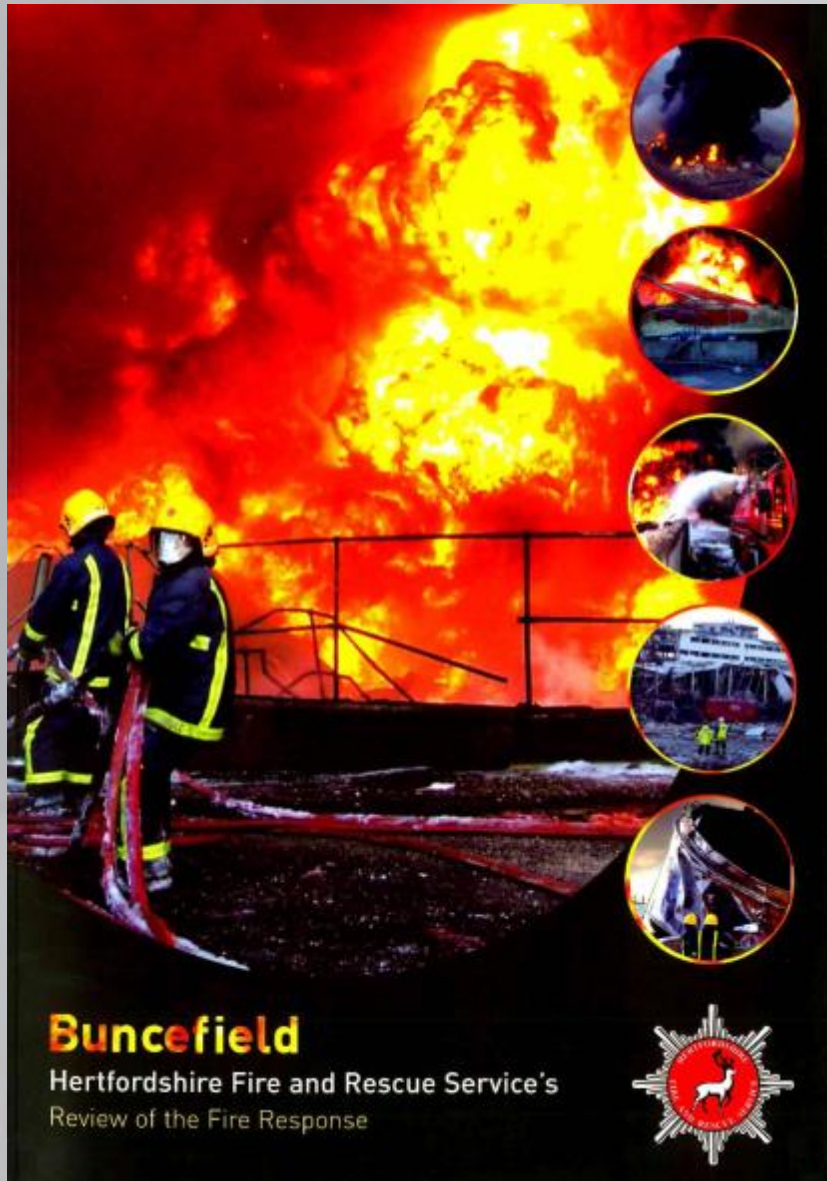


On site

Gold Command 1000, 11 December
Incident Scene

~1200, 11/12 – ~1500 12/12

~1000 – ~1400 14/12



Buncefield

Hertfordshire Fire and Rescue Service's
Review of the Fire Response





Extract from HFRS published report on Buncefield fire attack
“Incident Commander (White surcoat) consulting industry expert and
bronze commanders.”



Initially at Gold Command Escorted to Bronze

Foam – minimum requirements

Foam sources

Foam application

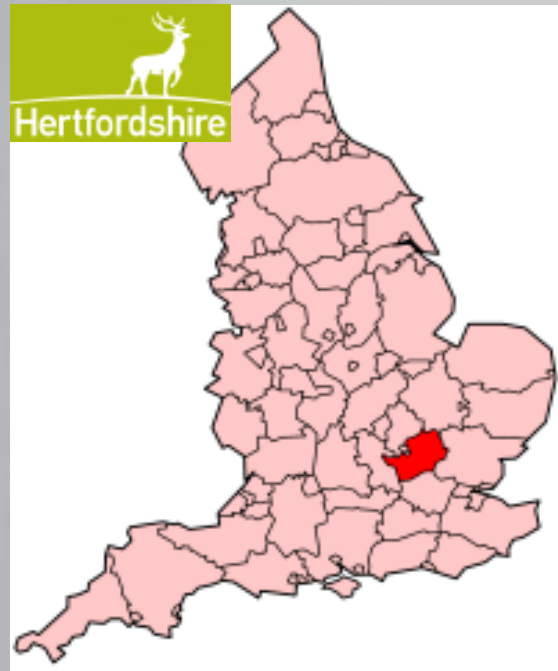
Explosion overpressure study

Incident investigation

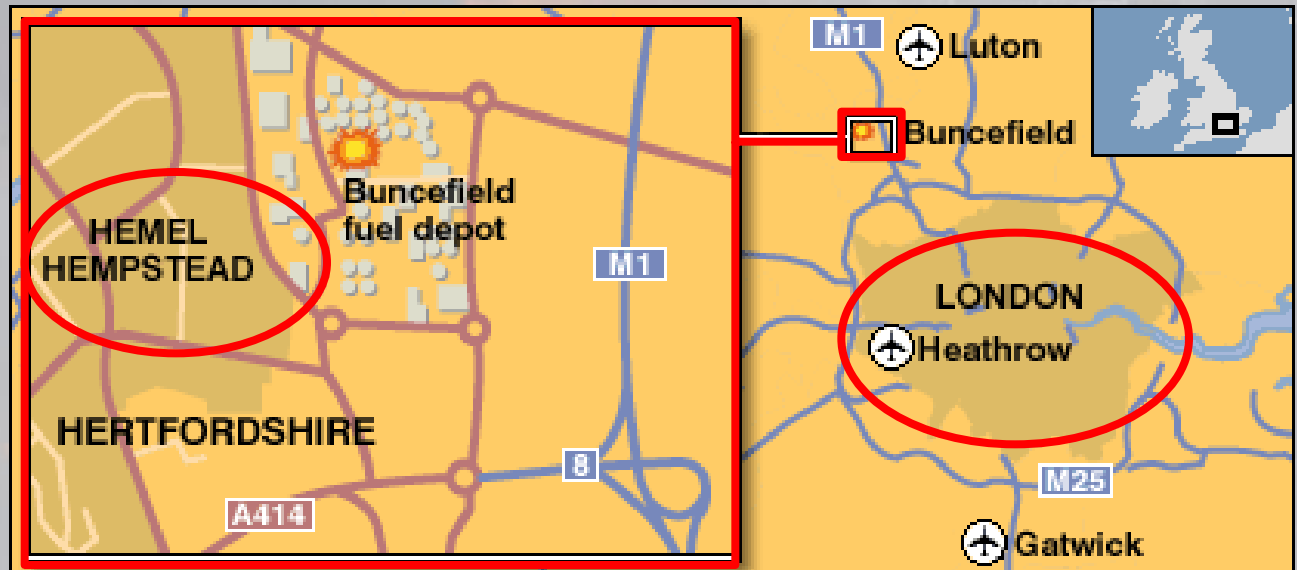
Other RPI personnel:

- Foam attack
- PSLG Follow up

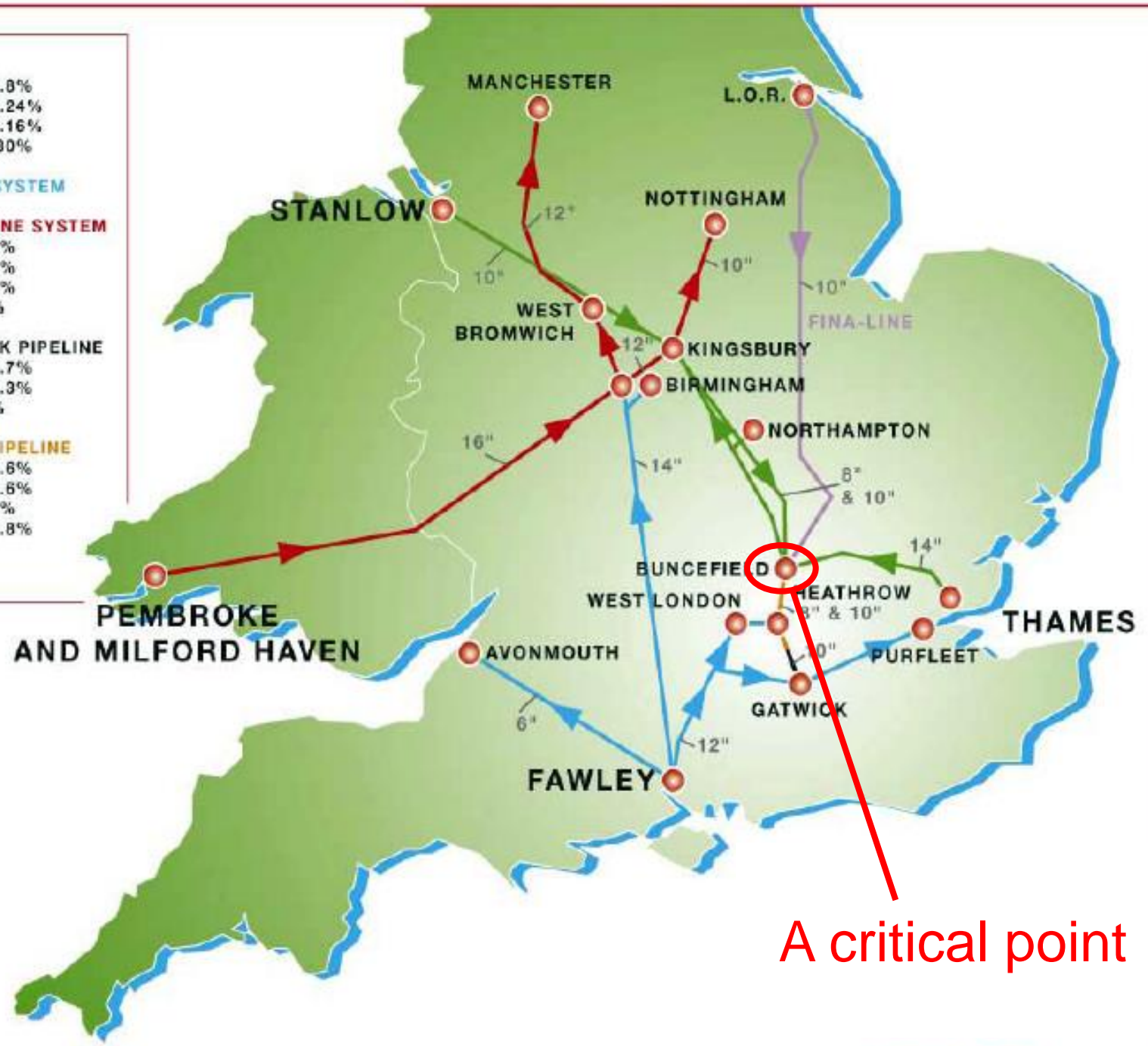




Location



U.K.O.P.	
Shell	47.8%
BP	33.24%
Texaco	15.16%
TotalFinaElf	3.80%
ESSO PIPELINE SYSTEM	
MAINLINE PIPELINE SYSTEM	
Esso	65%
Texaco	20%
TotalFinaElf	10%
Shell	5%
WALTON GATWICK PIPELINE	
BP	60.7%
Shell	33.3%
Texaco	6%
WEST LONDON PIPELINE	
BP	30.6%
Shell	37.6%
Texaco	21%
TotalFinaElf	10.8%
FINA-LINE	



A critical point

5th largest oil-products storage depot in the UK

Capacity ~275 million litres

~5% of UK oil storage capacity

Major hub on the UK's oil pipeline network (UKOP)

Important to British aviation industry

Gatwick

Heathrow

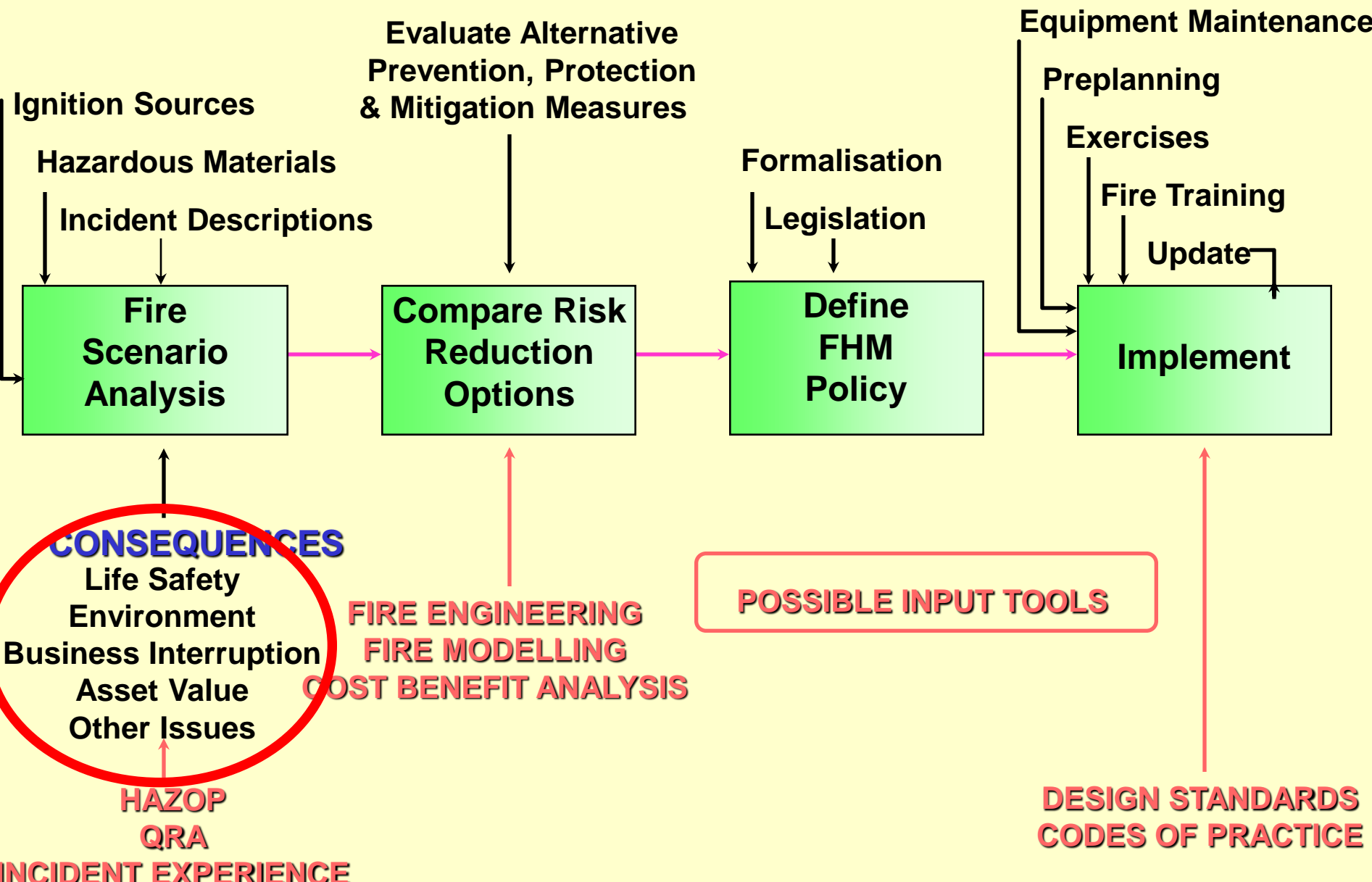
Luton





We live under a
Risk Based legislative
regime

FIRE AND EXPLOSION HAZARD MANAGEMENT



A major hub

Main risk actually business continuity!

Too often we only look at safety and environment issues

Equally

Sometimes regulators get involved when only minimal risk to safety or the environment!!

Risk Based assessments

Always difficult to assess
the low probability high
consequence incidents



**Buncefield Terminal fire
11 December 2005**

24 tanks destroyed (~ 23 tanks & 7 bunds involved in initial event).

Picture credit: local Police website







Search and rescue concerns





Some issues

Public concerns

Media interests

Firefighter safety concerns

Foam application

Regulatory issues

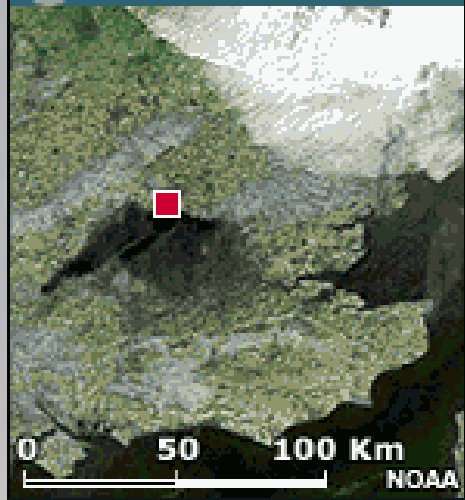
Consequences

Smoke issues





1 11 DEC, 0940 GMT

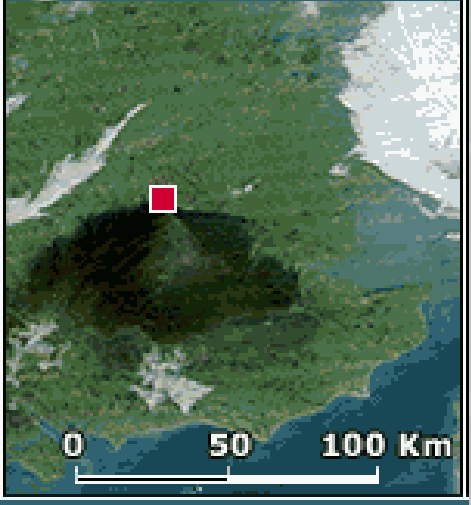


■ Buncefield fuel depot

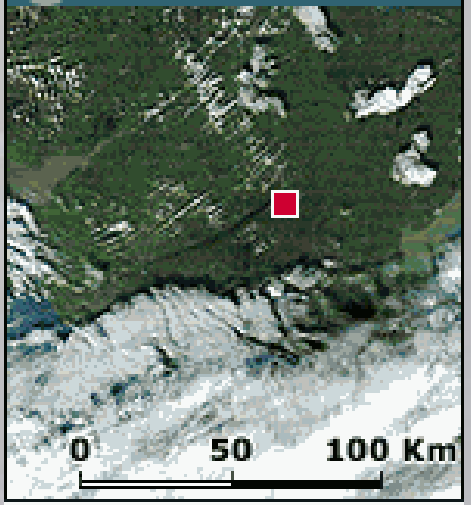
2 11 DEC, 1150 GMT



3 11 DEC, 1336 GMT



4 12 DEC, 1241 GMT



Transport disruption

Motorways closed

Queues at petrol stations

Panic buying

Department of Trade and Industry – “No shortages”

30% of Heathrow fuel

Rationing

Long-haul flights affected

Effect on local road network



Effect on local air travel



An aerial photograph of Heathrow Airport. In the foreground, the iconic white control tower stands prominently. To its right, a runway is visible with a British Airways aircraft on the ground. In the background, another British Airways aircraft is in flight, banking upwards. The surrounding area includes airport buildings and green fields.

Fuel shortages
30% of Heathrow's fuel!

Flight paths?

BAA 

Heathrow



Toxicity?

Pollution tracked after oil blast

Schools within a 10-mile radius of the blast remain closed

Environmental experts are monitoring pollution across southern England as a plume of smoke from the Hertfordshire fuel depot blasts drifts south.



Blaze pollution 'may end up in the water'

As a precaution drinking water abstraction boreholes have also been closed in conjunction with Three Valleys Water Company

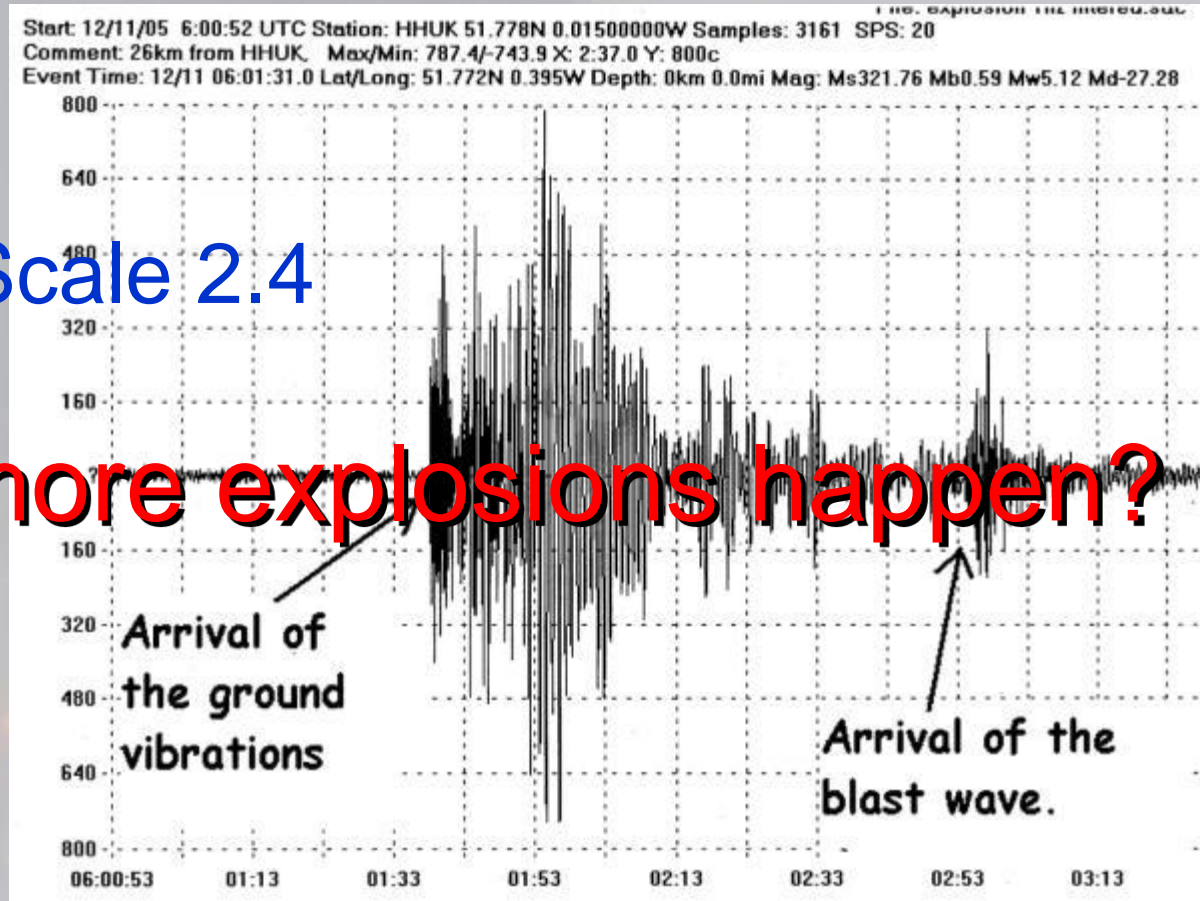
Further Explosions

Initial explosion

06:02

Richter Scale 2.4

Will more explosions happen?



Further explosion

06:27

Further explosion

06:28

Loss of property



Longer term – property value loss

Accommodation



January 26

'I DID LOOT BUNCEFIELD BLAST HOME'

A man has pleaded guilty to looting a house which had been evacuated following the massive Buncefield Oil Depot explosion last month

Warren Patten, 22, took property worth £5,500 from the detached house

Legal claims for people affected by Buncefield fuel explosions

Many hundreds, if not thousands, of people are likely to have legal claims for compensation resulting from the injuries sustained, the damage to their properties and the disruption to their lives.

Who is responsible?

Crucial issue - start gaining evidence surrounding the claims

Health problems

Potential for many more hundreds of people to go down with sickness and respiratory complaints such as asthma is high.

Immediate illnesses such as vomiting, but there is always the worry of more lasting injuries. Only time will tell here whether the fumes spewing out of the oil depot will lead to more chronic illnesses. The police are suggesting that the fumes are not toxic, but that maybe a knee jerk 'don't worry' sort of statement rather than a considered review. It may well simply be too early to say how toxic is the plume.



“400 businesses and 25,000
staff affected

Overall financial impact may be
in the region of £ 5 billion”

Media Interest



An aerial photograph of a large-scale industrial fire. The scene is filled with thick black smoke and bright orange flames. In the foreground, a large cylindrical tank is engulfed in fire. In the middle ground, a fire truck is positioned, with firefighters visible. A large plume of white steam or smoke rises from the center of the fire. The background shows more industrial structures and trees, some of which are charred.

Fire Fighting

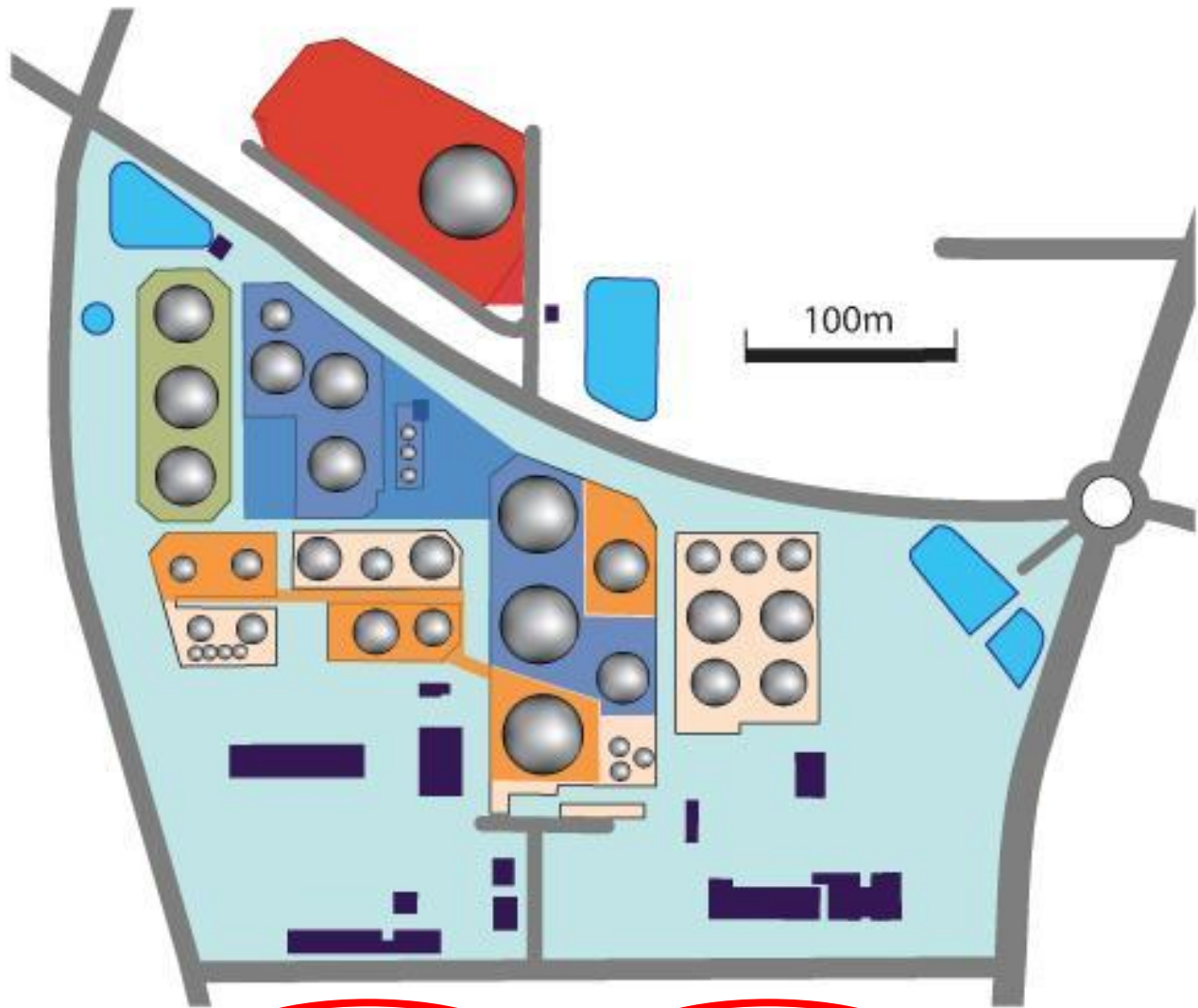
First decision

Do you want to put it out?

The main incident attack

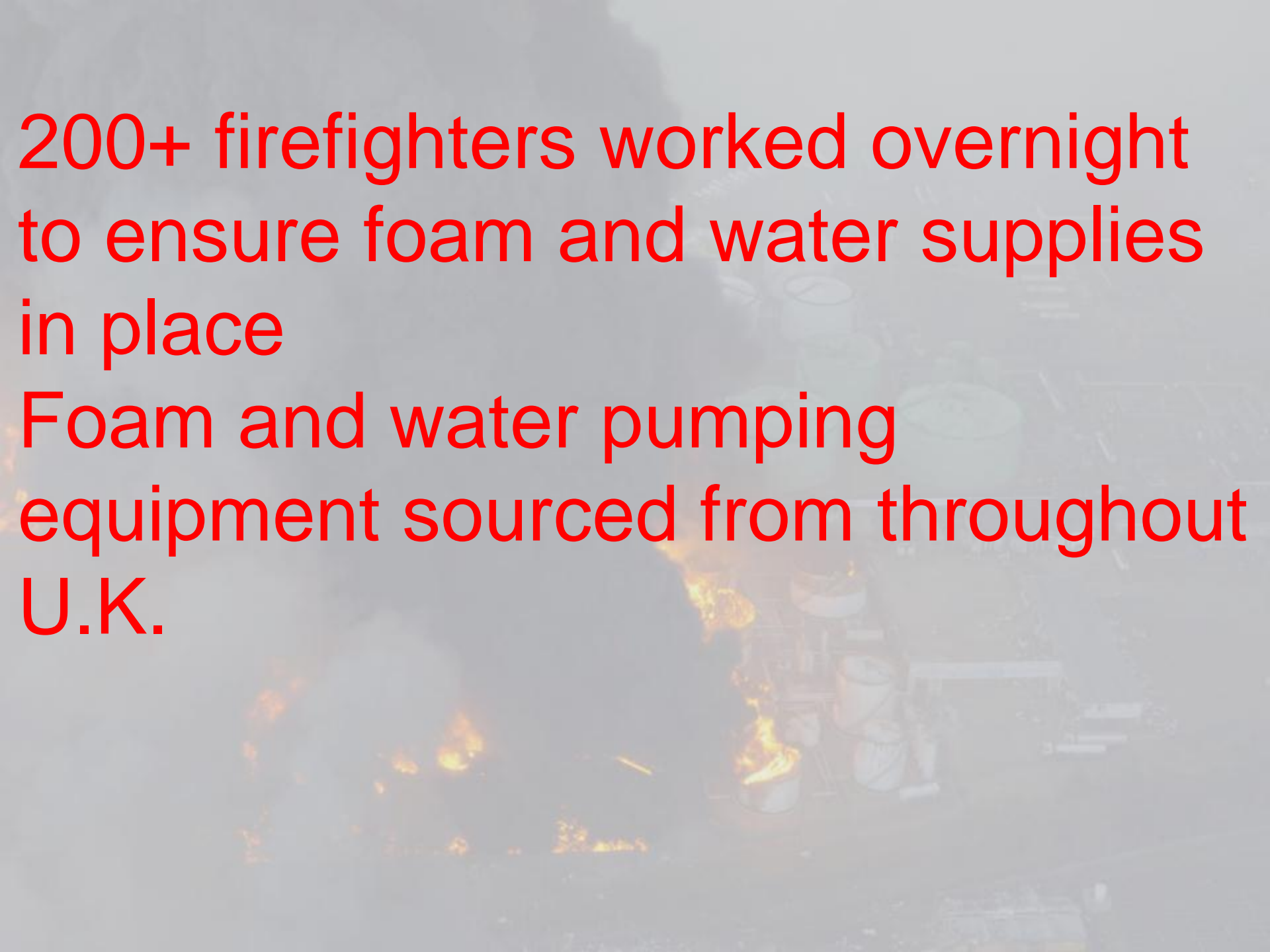
The plan!

Phased approach





The reality!

An aerial photograph of a large fire at night. The fire is intense, with bright orange and yellow flames rising from a dark area. Several firefighters in reflective gear are visible around the fire, and various pieces of firefighting equipment, including pumps and hoses, are scattered on the ground. The scene is illuminated by the fire and possibly by emergency lights, creating a dramatic and urgent atmosphere.

200+ firefighters worked overnight
to ensure foam and water supplies
in place

Foam and water pumping
equipment sourced from throughout
U.K.





> 1600m

Physical effort Fatigue





Plans “Dynamic” due to:

- Environmental Issues (Initial and intermittent re run off)
- Change of Wind Direction (East to South Direction)
- Pressure fires
- Reignition of tanks/bunds
- Problems with Water Supplies (continuity and pressure)
- Problems with Foam Concentrate supply continuity
- Additional Equipment arrival (Monitors, Dry Chem units etc.)
- Foam layer break up
- Concern re fire spread/tank collapse





The firefighting?

Issues

A magnificent joint effort

Logistical strength of the Government

Fire Brigade

Specialist equipment and expertise

from Industry

Control of building activity nearby
Acceptability of Controlled Burndown
Tank contents monitoring

Comparison with fill rates

Quiescent state

Independent HiHi and ESD

Operation and Maintenance controls

Remote tank valve operation

Vapour detection in bunds

Bund integrity under fire conditions

Bund capacity for firewater

Firewater run off control, containment and treatment

FSIA – including system vulnerability

Preplanning and Exercising Preplan

Performance standards for foam procurement

Training on foam application and foam system testing

Consequence modelling

Major Incident Response Unit development

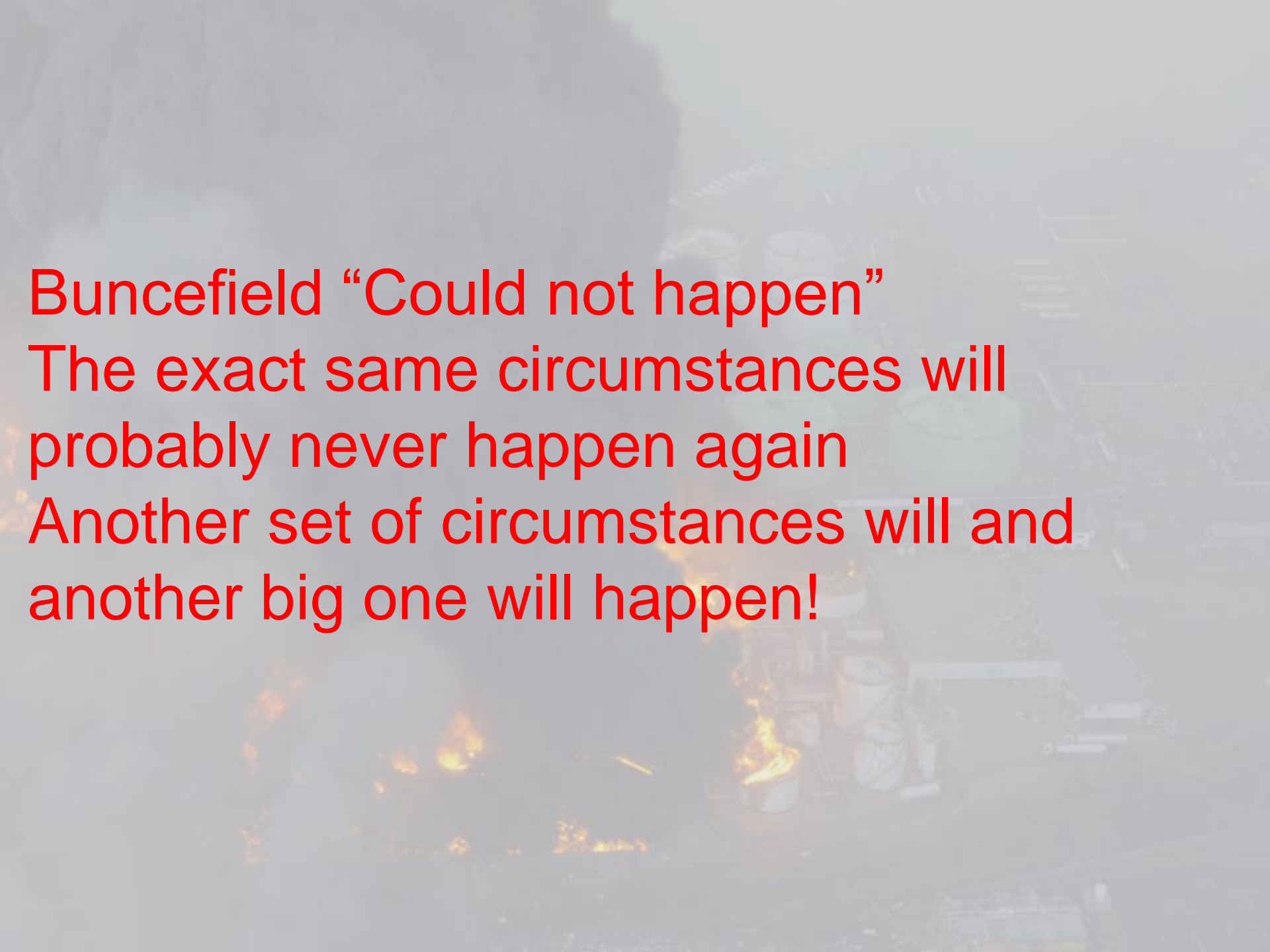
Issues

A true

Fire Hazard

Management

approach!!



Buncefield “Could not happen”
The exact same circumstances will probably never happen again
Another set of circumstances will and another big one will happen!







Buncefield “Could not happen”

The exact same circumstances will probably never happen again

Another set of circumstances will and another big one will happen!

Maintain versatility, expertise and skill set

Every one can have a part to play

Different circumstances Different solutions





Storage Tank Firefighting

A background image showing a large fire at an industrial site, likely a storage tank. Several firefighters in full gear, including helmets and jackets, are visible in the foreground, some holding hoses. The fire is intense, with bright orange and yellow flames and thick black smoke rising into the air. The scene is hazy, suggesting a lot of smoke or steam.

Not an exact science
Provide the tools and
the knowledge to
keep options open!

A team effort

Complementary skills