

Chapter Two: Risks

Natural Events

Severe Weather

Risk

2.1 As experience has shown, severe weather can take a variety of forms and at times can cause significant problems and disruption to normal life. Over the coming years, we are likely to see rising temperatures and sea levels, and an increase in the frequency and severity of extreme weather events in the UK. There are many types of severe weather that can have a serious local impact in one area of the UK, such as dense fog. Some of these are outlined in Community Risk Registers but, since they do not have a national impact, they are not covered here. The main types of severe weather that we need to plan for at national level include storms and gales, low temperatures and heavy snow, heat wave and drought.

Background

Storms and Gales

2.2 The most significant storms in recent decades were those of 16 October 1987 and 25 January 1990. The first brought down an estimated 15 million trees in the south-east of England. As the peak wind speeds occurred overnight, there were fewer deaths and injuries than there might have been, given that the storm crossed such a densely populated area.

2.3 By contrast, the 1990 storm occurred during the daytime, was more extensive, and had higher peak wind speeds. The more northerly track meant

that the storm crossed areas that were on the whole less wooded than those affected by the 1987 storm. The net effect was a much higher death toll but less damage to trees and property.

2.4 More recently, a storm battered many parts of the UK on 18 January 2007, with gusts of wind up to 77mph recorded at Heathrow. This caused 9 deaths and widespread damage to trees and buildings across the UK, along with power disruption.

Low Temperatures and Heavy Snow

2.5 There have been a number of occasions recorded where snow has covered large areas of the country for over a week. A notable example was in Northern Ireland in February 2001 where strong north-easterly winds and heavy snow caused travel disruption for up to 5 days and brought down power lines (resulting in power cuts to 70,000 homes), mostly in Counties Antrim and Down. In February 1991 much of the UK, including Heathrow Airport, was covered in snow for a week, with many places recording 10cm or more.

2.6 More recently, in February 2007 snow caused disruption across central areas of England and Wales, resulting in school closures, power outages and people being unable to get to work for 1 or 2 days depending on location.

2.7 There have been other less recent but more severe events, such as the period of snow in 1947 and also in 1962/63, which was the coldest winter in over 250 years. As the climate continues to change, we expect the frequency of these sorts of events to continue to decrease in the future.

Heat Waves

2.8 Temperatures of 32°C or more (the threshold used by the Met Office to define a heat wave) were most widespread during the heat wave of August 1990, having been recorded in virtually all parts of England and some parts of Wales. The only other occasions when at least half of England experienced 32°C were in 1976 and 1911. In terms of persistence, 1976 ranks highest with 32°C being exceeded at one or more places in the UK on 15 consecutive days from 23 June to 7 July.

2.9 The hot summer of 2003 is estimated to have resulted in 2045 excess deaths, mainly among vulnerable populations. Since then, the Heat Health Watch system⁷ has been introduced and during the hot weather of July 2006 significantly fewer (680) excess deaths were recorded.

Other consequences of heat waves can be

- an increased number of admissions to hospital and consultations with GPs due to sunburn, heat exhaustion, respiratory problems and other illnesses such as food poisoning;
- more vehicle breakdowns due to overheating engines; and
- road surfaces deteriorating as tarmac begins to melt.

2.10 As the climate changes, the frequency and intensity of heat waves is likely to increase.

Drought

2.11 Droughts are regular events and vary in intensity and duration across the country. A drought does not arrive without warning. Routine monitoring of drought indicators like river or groundwater sites by the Environment Agency (and equivalent bodies in the Devolved Administrations) picks up indications of any significant deficits developing.

2.12 Periodic restrictions on non-essential water use are an integral part of water resource planning by water companies. The 2004/06 drought in south-east England was similar in severity to the worst droughts of the last 200 years, where nine droughts of similar severity have been recorded, but we got through it with little more than the inconvenience for domestic customers of hosepipe bans.

2.13 Climate change may produce more droughts but not necessarily a more frequent use of restrictions. Water resource and drought planning is dynamic to meet the challenges.

Planning by Government and the Emergency Services

2.14 The Met Office has responsibility for providing weather warnings for the UK. Advisory messages are issued routinely on the Met Office website⁸, using a traffic light system which indicates how confident we can be that severe or extreme weather is due.

⁷ www.metoffice.gov.uk/weather/uk/heathealth/index.html

⁸ www.metoffice.gov.uk

2.15 Early warnings of severe or extreme weather are issued when the Met Office has 60% or greater confidence that severe weather is expected in the next few days. Flash warnings of severe or extreme weather are issued when the Met Office has 80% or greater confidence that severe weather is expected in the next few hours.

2.16 The Heat Health Watch system operates in England and Wales from 1 June to 15 September each year in association with the Department of Health and the Welsh Assembly. The system comprises four levels of response, based on threshold maximum daytime and minimum night-time temperatures. These thresholds vary by region, but an average threshold temperature is 30°C by day and 15°C overnight.

2.17 Water companies' statutory drought plans have trigger points to initiate a range of actions during the various stages of a drought to manage supplies and demand. Only emergency drought orders (EDO) can authorise supply interruptions through standpipes or rota cuts. EDO powers have only been exercised three times in England and Wales since 1945 and not since 1976 when they were used in north Devon and south-east Wales.

Further Information:

Met Office website for up to date weather warnings

www.metoffice.gov.uk

Advice on what to do when severe weather is forecast

www.metoffice.gov.uk/weather/uk/advice/index.html

Heat Health Watch

www.metoffice.gov.uk/weather/uk/heathealth/index

Information on water restrictions and what to do in a drought

www.environment-agency.gov.uk/subjects/waterres

Defra

www.defra.gov.uk/corporate/contingency/index.htm

Scottish Environment Protection Agency

www.sepa.org.uk

Flooding

Risk

2.18 As the events of summer 2007 showed, flooding can take different forms and, at its most serious, can affect many different aspects of our daily lives. Over the coming years, rising temperatures and sea levels, and an increase in the frequency and severity of extreme weather events, are likely to raise the risk of flooding in the UK. The three main types of flooding are coastal or tidal flooding, river flooding and surface water flooding (caused by excess rainfall); the last two of which can be grouped under the general description of

'inland' flooding as they can and do occur simultaneously. A further scenario, major reservoir dam collapse or failure, could bring about almost instantaneous flooding and is included in the industrial accidents section.

Background

Coastal Flooding

2.19 Of these types of event, large scale coastal flooding has the potential to have the greatest impact.

2.20 The last significant event of this type to affect the UK was in January 1953 when the east coast of England suffered one of the biggest environmental disasters ever to have occurred in this country. Flood defences were breached by a combination of high tides, storm surge and large waves. Coastal towns in Lincolnshire, Norfolk, Suffolk, Essex and Kent were devastated as sea water rushed into the streets. Over 600 square kilometres of land were flooded and 307 people killed in that area. 200 industrial facilities were damaged by floodwater. Over 32,000 people were safely evacuated. A month after the flooding the estimated cost was £40 – £50 million, the equivalent of around £1 billion today, not including the cost of relocation and interruption of business activity. Since 1953, a lot of work has been done to improve flood defences. Consequently, the likelihood of defences failing or being overtopped by sea tides is now substantially lower. In particular, the construction of the Thames Barrier in London and associated flood defence systems along the East Coast of England now means there is a good level of protection against sea and tidal surges.

Inland Flooding

2.21 The frequency of inland flooding is increasing; this is evidenced by several examples of river and surface water flooding over the last few years. Of these, the events of summer 2007 were the most widespread. In June/July 2007 severe rainfall, during an extremely wet summer, led to some 48,000 households and 7,300 businesses being flooded across England. Other effects of recent flooding have included the closure of primary transport routes, the loss of some critical services such as electricity, telecommunications and water supplies, and large numbers of people requiring evacuation and alternative accommodation (in some cases for many months). Businesses as well as homes have been made inaccessible for many months while buildings dry out and damage is repaired.

Planning by Government and the Emergency Services

2.22 The Government has a programme of flood risk management, which aims to reduce the likelihood of flooding. Local Resilience Forums (LRFs) are required to have planning in place to assess the risk of flooding and develop appropriate contingency plans. These arrangements are constantly under review.

2.23 Both the Met Office and the Environment Agency maintain sophisticated monitoring and forecasting systems for severe rainfall and river and sea flooding and, if severe rainfall is predicted, clear weather forecasts and warnings will be maintained. In relation to rivers and the sea, the Environment Agency maintains the free Floodline Warnings Direct⁹ system, which you can sign up to in order to receive

⁹ Available on the Environment Agency website

flood warnings and learn more about how to protect your home. Other warnings are also used such as sirens and door-knocking in some areas.

2.24 We need to continue to learn the lessons each time a serious flooding event occurs. The Government is committed to taking forward recommendations from the Pitt Review¹⁰ into the summer 2007 flooding in a programme to reduce the risk and impact of flooding in the future.

2.25 Priorities include:

- developing better institutional arrangements for surface water management;
- improving overall emergency response capability to respond to flood events, including arrangements to protect critical infrastructure and essential services;
- ensuring that, where new development is necessary in areas at risk of flooding, appropriate measures are taken to minimise the risk.

Further Information:

Environment Agency flood pages

www.environment-agency.gov.uk

Defra flood pages

www.defra.gov.uk/envirom/fcd/default.htm

Scottish Environment Protection Agency (SEPA)

www.sepa.org.uk

Rivers Agency of Northern Ireland

www.riversagencyni.gov.uk/index/flood-emergency.htm

Health Protection Agency guidance on risk to health

www.hpa.org.uk

Human Disease

Risk

2.26 Human diseases can take a variety of forms and consequently their impacts can vary considerably both in scale and nature. The main types of human disease that represent new or additional risks to the UK are outlined below. The examples have been chosen to give an impression of the range of possible diseases that would have a significant disruptive effect, but are by no means exhaustive.

Background

Pandemic Influenza

2.27 Influenza pandemics are natural phenomena that have occurred from time to time for centuries – including three times in the last century. The symptoms are similar to those of seasonal influenza

¹⁰ www.cabinetoffice.gov.uk/thepittreview.aspx

but may be significantly more severe. Influenza pandemics arise as a result of a new influenza virus that is markedly different from recently circulating influenza viruses and therefore to which few people, if any, have immunity. As a result of rapid spread from person to person, pandemics have significant global human health consequences. In addition to the severe health effects, a pandemic is also likely to cause significant wider social and economic damage and disruption.

2.28 The most notable influenza pandemic of the last century occurred in 1918/19 and is often referred to as 'Spanish flu'. It caused serious illness, an estimated 20–40 million deaths worldwide (with peak mortality rates in people aged 20–45) and major disruption. In the UK alone there were an estimated 228,000 additional deaths. Whilst the pandemics in 1957 and 1968 (often referred to as 'Asian' and 'Hong Kong' flu respectively) were much less severe, they also caused significant illness levels – mainly in the young and the elderly – and an estimated 1–4 million deaths worldwide between them.

2.29 Experts agree that there is a high probability of another influenza pandemic occurring, but it is impossible to forecast its exact timing or the precise nature of its impact. Based on historical information, scientific evidence and modelling, the following impacts are predicted:

- Many millions of people around the world will become infected causing global disruption and a potential humanitarian crisis. The World Health Organisation¹¹ estimates that between 2 million and 7.4 million deaths may occur globally.
- Up to one half of the UK population may become infected and between 50,000 and 750,000 additional deaths (that is deaths that would not have happened over the same period of time had a pandemic not taken place) may have occurred by the end of a pandemic in the UK.
- Normal life is likely to face wider social and economic disruption, significant threats to the continuity of essential services, lower production levels, shortages and distribution difficulties.
- Individual organisations may suffer from the pandemic's impact on staff absenteeism therefore reducing the services available.

New and Emerging Infectious Diseases

2.30 An emerging infectious disease can be defined as one that has recently been recognised. Alternatively, it could be a disease where cases have increased (or look as though they might be on the increase) over the last 20 years, in a specific place or among a specific population.

2.31 Over the past 25 years, more than 30 new, or newly-recognised, infections have been identified around the world. The pattern of known infections also changes constantly, as the areas where disease is constantly present expand beyond traditional limits. Most of these cases are zoonotic infections, in other words, they are naturally transmissible, directly or indirectly, between vertebrate animals and humans. By their very nature, zoonotic infections can be more challenging to monitor.¹²

2.32 Although it is unlikely that a new infectious disease would originate in the UK, it is possible that

¹¹ www.who.int/csr/disease/influenza/pandemic/en/

¹² For further information on zoonotic diseases, refer to the section on Animal Diseases

one could emerge in another country. Given the ease and speed with which people can travel around the world, it is possible that a new infection could spread rapidly before it is detected, and be transmitted to the UK. New diseases therefore pose a potential threat to the health of the UK population, and may present social and economic challenges.

2.33 A recent example of a newly emerged infectious disease is SARS (Severe Acute Respiratory Syndrome). SARS appears to have originated in Asia in November 2002. Over the following months, the illness spread rapidly to more than two dozen countries across Asia, North America, South America, and Europe. Many of these countries were subject to travel restrictions. SARS posed a global threat, challenging the global public health community. By the time the disease was contained, in July 2003, over 8,000 people had been affected worldwide, of whom over 750 died. The majority of cases occurred among close family members associated with an initial case, and hospital workers who had cared for SARS patients.

2.34 The likelihood of a new disease like SARS spreading to the UK is low, but if an outbreak of an emerging infectious disease occurred in the UK, and preventative measures were not put in place swiftly, the impact seen could be on the scale of the SARS outbreak in Toronto, Canada. Toronto had 251 cases of SARS in two waves over a period of several months. For every patient with confirmed SARS, 10 potential cases were investigated and 100 followed up.

2.35 The emergence overseas of an influenza pandemic or other widespread infectious disease may result in a proportion of the British nationals who are not normally resident in the UK (approximately 12 million) choosing to return to the UK. Some returning British nationals would not have the means to support themselves and their return would have a short term but significant impact upon the areas in which they settle.

Planning by Government and the Emergency Services

Pandemic Influenza

2.36 These inter-pandemic years provide a very important opportunity to develop and strengthen preparations for the potentially serious impact of an influenza pandemic. The Government is collaborating actively with international partners on prevention, detection and research, and is taking every practical step to ensure that the UK is prepared to limit the internal spread of a pandemic and to minimise health, economic and social harm as far as possible. This includes purchasing and stockpiling appropriate medical countermeasures.

2.37 A stockpile of the antiviral oseltamivir (Tamiflu) to treat up to 25% of the population is already in place. This should be sufficient to treat all those who fall ill in a pandemic of similar proportions to those that occurred in the 20th century. The level of stocks is kept under review in light of the scientific evidence.

2.38 Advanced Supply Agreements for the supply of pandemic specific vaccine will allow for the purchase of vaccine for the entire population, if needed, although delivery of the first batch could not start until 4 to 6 months after the pandemic has started. This is because it will take time to identify the strain of influenza responsible and manufacture the appropriate vaccine.

2.39 The UK Government published *The National Framework for Responding to an Influenza Pandemic* in November 2007. The *Scottish National Framework for responding to an Influenza Pandemic* was published in March 2007. These frameworks provide information and guidance to assist and support public and private organisations across all sectors in understanding the nature of the challenges and in making the appropriate preparations.

New and Emerging Infectious Diseases

2.40 The Department of Health has developed a contingency plan for dealing with SARS and this would provide the basis for dealing with any future outbreaks should the disease re-emerge. This builds on our generic responses to outbreaks of infectious diseases and the specific lessons learned during the SARS outbreak. The containment of the SARS outbreaks globally reconfirmed that traditional public health and infection control measures can be successful in containing a new infectious disease.

Early recognition of a new infection is crucial and international collaboration and the deployment of surveillance and monitoring systems is key for tackling new and emerging diseases. The remit of the Health Protection Agency's (HPA) Centre for Infections includes infectious disease surveillance, detection and diagnosis, and the provision of specialist services. The HPA has plans in place for dealing with any new or emerging infections, whether arising abroad or in the UK, and would co-ordinate the investigation and management of national and unusual outbreaks. The HPA also advises government on the public health risks and the necessary preventative and control measures. The HPA collaborates with other international surveillance bodies and undertakes horizon scanning to enable us to respond rapidly to any international health alerts.

2.41 Government departments work closely to strengthen plans to manage an influx of British nationals that may result from a number of scenarios. The Foreign and Commonwealth Office's website provides information on pandemic influenza for British nationals living overseas, as well as travel advice by country which includes up to date health advice sections.

Further Information:**For Pandemic influenza**

www.ukresilience.info/pandemicflu

also**Department of Health**

www.dh.gov.uk/en/PublicHealth/Flu/PandemicFlu/index.htm

Health Protection Agency

www.hpa.org.uk

Scottish Executive

www.scotland.gov.uk/pandemicflu

Health Protection Scotland

www.hps.scot.nhs.uk/resp/index/asp

European Centre for Disease Prevention and Control

www.ecdc.europa.eu/

European Union

http://europa.eu/index_en.htm

World Health Organisation

www.who.int/csr/disease/influenza/pandemic/en/

Foreign and Commonwealth Office

Information for British nationals living overseas, as well as travel advice by country which includes up to date health advice sections.

www.fco.gov.uk/en/travelling-and-living-overseas/staying-safe/health/avian-and-pandemic-influenza

www.fco.gov.uk/en/travelling-and-living-overseas/travel-advice-by-country/

NHS

General information and advice on human health, including information about human diseases, can be found on the NHS Choices website.

www.nhs.uk

Animal Disease**Risk**

2.42 There have been a number of cases of significant animal disease in the United Kingdom; Foot and Mouth Disease and Avian Influenza (Bird Flu) being the most notable recent examples. When considering the likelihood of such outbreaks, scale should be taken into account. There have been a number of more frequent but smaller-scale examples in recent years but the outbreaks depicted in the diagram in Chapter One are of a much larger scale than those we have seen recently.

Background***Non-zoonotic Notifiable¹³ Animal Diseases (e.g. Foot and Mouth Disease)***

2.43 Non-zoonotic diseases are those that cannot be transmitted to humans. Swift action is still needed, however, in order to contain the spread of certain listed or notifiable diseases. As well as Foot and Mouth Disease, other examples are Classical Swine Fever, Bluetongue and Newcastle Disease (of birds).

2.44 Foot and Mouth Disease (FMD) is spread by direct and indirect contact – it can even be windborne. In countries like the UK, where the disease arises only as the result of imported infection, the accepted policy is to stamp it out by culling all affected stock and any others which have been exposed to such risk of infection that it is reasonably certain that they would develop the disease if left alive. Vaccination may be used in addition to control the outbreak. Measures for reducing the risk of introduction include effective control on imports of meat, other animal products and susceptible animals. Movement restriction regimes and on-farm controls will also limit the spread of disease.

¹³ Definition – www.defra.gov.uk/animalh/diseases/notifiable/index.htm

2.45 There are two forms of swine fever: Classical Swine Fever, which has been recorded in the UK; and African Swine Fever, which has not. Classical Swine Fever is a very contagious disease of pigs and the measures for control and restriction are similar to those for Foot and Mouth Disease.

2.46 Bluetongue was recorded in the UK for the first time in 2007. The disease is spread between susceptible animals by infected midges. Sheep are most severely affected by the disease. Measures to reduce the risk of introduction include controls on imports of cattle and sheep but these are less effective than for Foot and Mouth Disease since movements of midges obviously cannot be controlled. Vaccination is the most effective form of control and is currently being rolled out across England and Wales. The principles of a future Scottish Vaccination Campaign have been agreed and will be rolled out later this year.

***Zoonotic Notifiable Animal Diseases
(e.g. Highly Pathogenic Avian Influenza)***

2.47 Zoonotic notifiable animal diseases are those diseases that can be transmitted naturally between vertebrate animals and humans. They are named in section 88 of the Animal Health Act 1981 or in an Order made under that Act. The ease with which zoonotic disease transmission occurs varies by disease but, for Highly Pathogenic Avian Influenza, it is relatively uncommon and requires specific circumstances. For example, only intense exposure of a person to birds that are infected with Highly Pathogenic Avian Influenza is likely to allow transmission of this disease to humans.

2.48 Highly Pathogenic Avian Influenza (e.g. H5N1) has been recorded in poultry in the UK several times over the last few years. Migratory wild birds can spread and introduce it by direct and indirect contact. It can also be introduced by mechanical transmission, that is, physically carried by infected material. For disease in poultry the control measures include culling of birds on infected premises. There is no policy to cull wild birds. Vaccination has not been used as a control option given the success of other means of eliminating the disease.

2.49 West Nile Virus is a viral infection of birds, horses and humans, spread by the bite of infected mosquitoes that can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). Infection by West Nile Virus has never been identified in horses or humans in the UK. The virus historically occurs in Africa, mainland Europe, the Middle East, West and Central Asia and for the first time in the USA in 1999 where it is now considered endemic.

2.50 Rabies is a fatal viral disease of the nervous system which can affect all mammals including humans. The disease is usually spread by saliva from the bite of an infected animal. Classical Rabies has long been eradicated from the UK. Controls on the import of susceptible animals, including the pet travel scheme and quarantine, help protect against infected animals entering the UK.

Planning by Government and Emergency Services

2.51 The UK Government works to provide effective guidance so as to prevent an outbreak of animal disease occurring in the first place but it also tries to predict local and global trends so that it can prepare effectively. This includes:

- monitoring disease outbreaks around the world, and reporting on the latest developments and risks;
- working with partners to provide warnings and rapid detection of UK disease threats; and
- talking face to face with businesses at livestock markets across the country.

Further Information:

For animal health and welfare

www.defra.gov.uk/animalh/index.htm

www.dardni.gov.uk/index/animal-health.htm

For health issues relating to zoonoses

www.hpa.org.uk

For food safety advice

www.food.gov.uk

Major Accidents

Major Industrial Accidents

Risk

2.52 Much has been done in the UK both to help prevent industrial accidents and to minimise their effects, but they can still occur. Industrial accidents can take a wide variety of forms and consequently their impacts can vary considerably both in scale and nature. In most cases they will have no or very limited impact outside the plant and can be dealt with locally. But, as the examples from around the world detailed below show, in rare cases it is possible for there to be more significant consequences.

Background

Fires

2.53 Fire can either be a risk in its own right, or because of the damage that it can cause.

- On 14 November 1990, a fire in a telephone exchange led to the failure of all lines in the Scarborough area, including those of the coastguard, other emergency services, and the public utilities. Some cash dispensers and computer systems linked to the telephone network also failed.
- In December 2005, the largest peacetime fire in Europe occurred at the Buncefield Oil Storage Terminal in Hemel Hempstead. There were no deaths but a number of injuries. In the short term, the surrounding area was evacuated.

Some businesses in the immediate vicinity as well as the site itself experienced much longer-term disruption to operations.

Contamination

2.54 Contamination can take many forms. While there are extensive arrangements in place to prevent and detect any contamination before it reaches the general public, accidents can still occur. Some of the more extreme examples drawn from around the world are detailed below:

- In 1997 in Scotland and 2006 in England there was accidental contamination of water supply areas with diesel. The event in February 2006 affected 2,500 properties in the Exeter area. The water company enacted emergency procedures and distributed alternative supplies of drinking water whilst the incident was investigated and resolved. The Drinking Water Inspectorate¹⁴ conducted an assessment and made recommendations and suggestions for measures to mitigate against a repeat of such incidents.
- In 1976 an accident occurred at a chemical plant manufacturing pesticides and herbicides in Seveso, Italy. This led to the release into the air of dioxins which were poisonous and carcinogenic. The contamination affected some ten square miles of land and vegetation. More than 600 people had to be evacuated from their homes and as many as 2,000 were treated for dioxin poisoning.

- In September 1987 a lead canister containing caesium-137 ruptured in Goiania, central Brazil. The contamination was spread by human contacts, wind and rainwater runoff resulting in 4 deaths from exposure and 244 people, 7 major properties and 42 residences being contaminated.

2.55 In some cases an accident may simply impact on local wildlife and the surrounding environment.

- In 1996 the crude oil tanker Sea Empress grounded off south west Wales, spilling around 72,000 tonnes of oil into the sea. This had a short term effect on some marine life. In 2007 the MSC Napoli was beached in Lyme Bay after suffering serious structural failure. A small amount of oil leaked into the sea, and some cargo washed ashore on nearby beaches. In March 2008 the Ice Prince sank off the Devon coast, shedding around 2,000 tonnes of timber, much of which subsequently washed up on beaches along the south coast.

Technical failure

2.56 Probably the most extreme scenario (but one of the least likely) in this section, is the nationwide loss of electricity. The high voltage electricity transmission network in Great Britain has never experienced a complete shutdown in its history. Nevertheless, because of our reliance on electricity for so many aspects of our lives, even localised losses of electricity can have a significant impact on those affected. A loss of gas supply could also be significant for those who rely on gas for heating and cooking.

¹⁴ www.dwi.gov.uk

- On 27 October 2002 a storm swept across England and Wales resulting in interrupted electricity supplies to 2 million customers. Most were reconnected within 2 days but a very small percentage were disconnected for up to 10 days.
- A major accident at a gas processing facility on 25 September 1998 severely disrupted gas supplies to the State of Victoria in Australia. Householders lost their gas supplies for heating, cooking and hot water, as did hotels and restaurants. Industry which used gas had to close and their suppliers were also affected as there was less demand for their products. Gas supplies were restored to major users on 5 October and to householders in the following days.
- In April 2007 a major pumping component at a waste water treatment plant serving 800,000 customers in Edinburgh failed, causing 1,000 litres a second of partially diluted untreated sewage to be pumped into the Firth of Forth.
- The Malpasset dam on the Reyran River in Southern France was breached on 2 December 1959. The breach created a wall of flood water 40m high, moving at 70 km/h. It destroyed two small villages and in 20 minutes, reached Fréjus, 7km to the south, where it was still 3m high. The resulting flood killed over 400 people and caused widespread damage.

Planning by Government and the Emergency Services

2.57 The Government, industry, regulators and emergency responders work closely to reduce the chance of any incident occurring.

2.58 Following the Seveso incident, detailed above, there were major changes to European law, which is now regularly reviewed. The current legislation is the Control of Major Accident Hazard Regulations 1999 (COMAH) and Control of Major Accident Hazard Regulations (Northern Ireland) 2000 under which major hazard sites are regulated and inspected in accordance with the regulations. Their main aim is to prevent and mitigate the effects of major accidents involving dangerous substances.¹⁵

2.59 Following the accident at the nuclear power plant at Chernobyl in 1986, the Government prepared a National Response Plan for dealing with the effects of overseas nuclear accidents on the UK population and infrastructure¹⁶ and set up the Radioactive Incident Monitoring Network (RIMNET).¹⁷ The RIMNET system is designed to deliver the co-ordination of consequence management and the authoritative central science response to any overseas incident.

2.60 The UK Government has also worked to reduce the opportunity for any accident involving radioactive sources to occur, such as the Goiania incident. The High-activity Sealed Radioactive Sources & Orphan Sources (HASS) Regulations 2005 mean sources are constantly tracked, and 6,000 surplus sources have been removed from circulation by a UK wide initiative.

¹⁵ www.hse.gov.uk/comah

¹⁶ www.defra.gov.uk/corporate/contingency/topics/nuclear.htm

¹⁷ www.defra.gov.uk/environment/radioactivity/emergencies/rimnet/index.htm

2.61 In the event an incident does take place, there is a well developed capability amongst the emergency services to deal with industrial accidents involving hazardous materials. The emergency services receive specialist training and are provided with protective equipment and the relevant supplies in order to enable them to operate in hazardous environments and to rescue and treat any casualties. Both the Ambulance and Fire and Rescue Services have means to decontaminate people affected by such an incident and local authorities have plans in place to open reception centres for those caught up in the incident or displaced from their homes. Where necessary, decontamination of the area of any incident can be undertaken by contractors drawn from a framework established by the Government Decontamination Service¹⁸ so that it can be returned to normal use.

2.62 The response to any incident involving hazardous materials, whether accidental or deliberate, requires a well co-ordinated multi-agency response. Accordingly, there is planning for such events at national, regional, and local level and regular testing of the plans through exercises.

Sector specific planning includes:

Electricity

2.63 There are comprehensive plans in place for handling both a complete national outage and regional outages. In the event of a national outage (which has never occurred), and provided there had been no damage to the system, the objective would be to restore supplies throughout Great Britain within three days.

Water & Sewerage

2.64 The Security and Emergency Measures Direction of 1998 places a series of statutory requirements on water companies in England and Wales (the Security and Emergencies Measures Direction 2002 applies in Scotland) in relation to their emergency planning functions. All water companies have plans in place to provide trained and experienced personnel, and suitably equipped permanent or mobile accommodation to act as command and control centres.

2.65 Where the piped mains water cannot be used, supplies of drinking water which meet the prescribed standard are required. These may be provided from other parts of the company's network not affected by the emergency or from neighbouring companies. They may be supplied to customers in bowsers or bottles.

Gas

2.66 Most high pressure gas pipes form part of an overall network. This means gas supplies can often be rerouted, reducing the potential for national disruption to the domestic network.

Communications

2.67 Telephone companies have their own plans for dealing with disruption, and there are arrangements for them to work together where necessary and appropriate. Action to restore services following a major incident will begin immediately but the time to get services back on line will depend on the cause and severity of the loss of the telecommunications network and service.

¹⁸ www.gds.gov.uk

Fuel

2.68 The Government's National Emergency Plan for Fuel is designed to prioritise fuel resources in the event of major disruption to supply. It includes the possibility of rationing supply to retail customers, and prioritising emergency services and essential service providers. If there is sufficient diesel to supply emergency services and essential service providers then the surplus will be prioritised to truck stops and HGV motorway filling stations to help keep supply chains operational.

Marine Pollution

2.69 The Maritime and Coastguard Agency has well practised plans including all the relevant emergency services for both major and minor pollution incidents and procedures for handling vessels that are involved in accidents.

Planning for Dam Inundation

2.70 The Environment Agency enforces the Reservoirs Act 1975 which applies to more than 2,000 reservoirs in England and Wales. It is responsible for maintaining a register of these reservoirs and achieving compliance with the Act. In Scotland, Local Authorities enforce the Reservoirs Act.

Further Information:

Government Decontamination Service

www.gds.gov.uk

The Government's National Emergency Plan for Fuel

www.og.berr.gov.uk/downstream/emergencies/down_emerge.htm

Maritime & Coastguard Agency's National Contingency Plan for maritime pollution

www.mcga.gov.uk

Radioactive Incident Monitoring Network (RIMNET)

www.defra.gov.uk/environment/radioactivity/emergencies/rimnet/index.htm

Control of Major Accident Hazards (COMAH)

www.hse.gov.uk/comah/

Major Transport Accidents

Risk

2.71 Transport accidents occur across the UK on a daily basis (mainly on roads involving private vehicles) and well practised plans are in place to deal with these at local and regional level. This section is focused on those rare major transport accidents which have such a significant impact that they require some form of national response. Thanks to modern safety regimes large-scale transport accidents are very rare, nevertheless they cannot be entirely ruled out as the following examples demonstrate.

Background

Air

2.72 There have not been any major air accidents in the UK since the Kegworth incident in 1989, when a Boeing 737 crashed close to the M1 Motorway, resulting in the death of 47 passengers, with no loss of life on the ground. A more recent incident was the loss of power to a Boeing 777 on approach to Heathrow in January of 2008; this emergency landing caused one serious injury and no deaths.

Maritime

2.73 The last major accident involving a UK flagged ship was the sinking of The Herald of Free Enterprise in March 1987. The ferry capsized shortly after leaving Zeebrugge en route to Dover resulting in 187 deaths. The sinking of the Estonia in the Baltic Sea in 1994, which led to 850 deaths, also demonstrates the potential for loss of life on a massive scale when flooding of a vessel occurs.

2.74 In December 2002 the Tricolor was hit by a container ship in French waters in the English Channel and sank. The hazard that this created in part of the Channel resulted in some disruption to shipping as other vessels were required to steer clear of the site.

Road and Rail

2.75 Whilst accidents do occur much more frequently on the UK's road networks than on other modes of transport, the scale of even the largest such incident would not be sufficient to warrant a co-ordinated central government response. Similarly, continuing improvements to rail safety regimes and infrastructure over recent years have seen a

substantial reduction in both the frequency and impact of rail accidents. As with road accidents, it is highly unlikely that an incident of this kind would require a co-ordinated central government response.

Planning by Government and the Emergency Services

2.76 Individual transport sectors are, mostly, subject to regulation of their provision of services. All transport sector operators have plans that cover a range of possible outcomes including those most likely to create a wider impact. These plans include the diversion of resources where possible (based on safety and operational requirements).

2.77 The response by the emergency services to such events is covered by their existing arrangements for responding to other types of major incidents.

Further Information:

Department for Transport

www.dft.gov.uk

Civil Aviation Authority

www.caa.co.uk

Transport Scotland

www.transportscotland.gov.uk

Traffic Scotland

www.trafficscotland.org

Northern Ireland Public Transport

www.translink.co.uk

www.drdni.gov.uk/index/public_transport.htm

Malicious Attacks

2.78 As the National Security Strategy outlined, the UK faces a serious and sustained threat from terrorism. At the time of publication the national threat assessment stands at ‘severe’, meaning that some form of attack is highly likely. Many of those networks and individuals who are judged to pose a terrorist threat share an ambition to cause large numbers of casualties without warning. Some have aspirations to use non-conventional weapons such as chemical, biological, radiological and nuclear substances. Others aspire to attack our national infrastructure using both traditional methods and more novel methods such as electronic attack.

2.79 The Government’s counter terrorism strategy, CONTEST¹⁹ is an integrated approach based on four main work streams, each with a clear objective to try and stop terrorist attacks occurring or, when they do, to mitigate their impact. The National Risk Register is focused on preparing for emergencies but the work in this area links closely with the CONTEST workstreams outlined below:

- Pursue: stopping terrorist attacks
- Protect: strengthening our protection against attack
- Prepare: mitigating the impact of attacks
- Prevent: stopping people becoming terrorists or supporting violent extremism

2.80 As the National Security Strategy made clear, terrorism is not the only malicious threat we face. Organised crime is increasing across the world and

exploiting new opportunities including directly or indirectly supporting terrorism. While the Serious and Organised Crime Agency assesses the threat to the UK to be high, it is not the pervasive threat that it is in some parts of the world.

2.81 The National Security Strategy confirms the assessment in the 1998 Strategic Defence Review that, for the foreseeable future, no state or alliance will have both the intent and capability to threaten the UK militarily. The UK does, however, remain subject to high levels of covert non-military activity by foreign intelligence organisations. They are increasingly combining traditional intelligence methods with new and sophisticated technical attacks, for example attempting to penetrate computer networks through the internet. In addition, malicious acts by individuals against essential services, whether for criminal or personal motives, can have the same effect as significant accidents.

Further Information:

Security Service – MI5

www.mi5.gov.uk

Serious and Organised Crime Agency (SOCA)

www.soca.gov.uk

SOCA – UK Threat Assessment

www.soca.gov.uk/assessPublications/UKTA0809.html

National Security Strategy

http://interactive.cabinetoffice.gov.uk/documents/security/national_security_strategy.pdf

¹⁹ Further information on CONTEST can be found in the National Security Strategy
http://interactive.cabinetoffice.gov.uk/documents/security/national_security_strategy.pdf

Attacks on Crowded Places

Risk

2.82 Whilst there have been attacks against well protected targets around the world, terrorists also attack crowded public places because they have less protective security and therefore offer a higher likelihood of success.

Background

2.83 The most likely target for a crowded places attack is one which is easily accessible, regularly available and offers the prospect for an impact beyond the loss of life alone. Additionally, a crowded place with iconic status, or which has interests that are terrorist targets in their own right is likely to be preferred over similar venues with no such associations. Such attacks can be conducted by groups with a relatively limited level of expertise. Terrorists worldwide have for example targeted nightclubs (e.g. Bali, 2002) and hotels (e.g. Egypt, 2005 and Jordan, 2006).

Planning by Government and the Emergency Services

2.84 Longstanding and regularly activated major incident plans and structures are in place across government. The adaptability and expertise of the emergency services provides an extremely solid basis for handling a mass casualty incident. For example, Ambulance Trusts and other NHS organisations have an excellent track record in dealing with major incidents and regularly exercise their major incident plans. The Urban Search and Rescue²⁰ (USAR)

capability for the Fire and Rescue Service, provided through the New Dimensions programme, has now been fully rolled out across the service.

2.85 Considerable work is underway, led by the Home Office, in conjunction with the National Counter Terrorism and Security Office (NaCTSO) and local police Counter Terrorism Security Advisers (CTSAs), and with the close engagement of local partners, to put in place a consistent framework for reducing the vulnerability of crowded places across the UK. This has included putting in place a standard way for CTSAs to assess vulnerability to terrorist attack of crowded places which will enable local partnerships to prioritise their work and evaluate its protective impact.

2.86 In addition, a supplement to '*Safer Places – the Planning System and Crime Prevention*' will be published to provide a practical guide on how to design in counter terrorism measures in new developments.

Further Information:

Fire and Resilience – Urban Search and Rescue
www.communities.gov.uk

National Counter Terrorism Security Office
www.nactso.gov.uk/crowdedplaces.php

Home Office
www.security.homeoffice.gov.uk

²⁰ www.communities.gov.uk/fire/resilienceresponse

Attacks on Critical Infrastructure

Risk

2.87 The national infrastructure comprises those facilities, systems, sites and networks necessary for the functioning of the country and the delivery of the essential services upon which daily life in the UK depends²¹. These fundamental services, such as electricity and water supply, underpin daily life and ensure the country continues to function socially and economically.

2.88 Many of the impacts which could result from industrial accidents, technical failure or severe weather could also result from a terrorist attack on critical infrastructure. The risk and impact varies according to the importance of the specific infrastructure asset attacked.

2.89 Electronic attacks on critical infrastructure and on transport systems are dealt with in subsequent sections.

Background

2.90 Terrorists in the UK have previously attacked, or planned to attack, national infrastructure. Attempts were made to attack electricity substations in the 1990s. Bishopsgate, in the City of London, was attacked in 1993 and South Quay in London's Docklands in 1996. These attacks resulted in widespread damage and disruption but relatively few casualties. Elsewhere in the world terrorists have carried out attacks against energy infrastructure (in Saudi Arabia and Yemen in 2006) and against financial institutions and government buildings (such as the attacks on the World Trade Centre in 1993 and 2001).

Planning by Government and the Emergency Services

2.91 As with attacks on crowded places, longstanding and regularly activated major incident plans and structures are in place across government. Planning for the impacts of attacks on critical infrastructure is in many cases the same as for accidents or technical failure. The previous section on major industrial accidents outlines a range of these plans which, in addition to businesses' continuity plans for losses of essential services, should help obviate the effects of any disruptions.

2.92 A comprehensive and well established programme of work to protect the critical national infrastructure from terrorism and other national security threats is also in place, along with robust mechanisms to ensure an effective response by the range of government departments involved. This programme of work covers protective security measures for the nine national infrastructure sectors. Government arrangements for delivering advice were reorganised at the beginning of last year with the creation of the Centre for the Protection of National Infrastructure (CPNI) to provide integrated advice across the three security disciplines – physical, electronic and personnel security.

Further Information:

Centre for the Protection of National Infrastructure

www.cpni.gov.uk

²¹ There are nine *national infrastructure sectors* which deliver essential services (Energy, Food, Water, Transport, Communications, Government, Emergency Services, Health, and Finance). Within the sectors there are certain 'critical' elements of infrastructure, the loss or compromise of which would have a major detrimental impact on the availability or integrity of essential services.

Attacks on Transport Systems

Risk

2.93 Of the different malicious attacks outlined in this document, conventional attacks on transport systems are judged to be some of the more likely to occur; although the likelihood of them affecting any one individual is still very low. This assessment is supported by the many examples of this type of attack perpetrated by different groups across the globe. As the recent incidents outlined below indicate, attacks on transport systems can take different forms with different levels of impact.

Background

Rail and Underground

2.94 Stringent security measures are applied at airports. Rail and underground networks, however, are open systems, which is likely to make them attractive potential targets for terrorist attacks. As a result, there have been several successful attacks on rail networks worldwide.

2.95 On 7 July 2005 the London transport system was attacked with 4 explosions (3 on underground trains, 1 on a bus). This was followed by unsuccessful attacks against the London transport system two weeks later. There have also been a number of recent examples in other countries of successful attacks against underground systems (e.g. Moscow, 2004) and mainline rail services (e.g. Madrid, 2004).

Air

2.96 Over the past 20 years there have been a number of attacks by terrorists against the aviation industry. These include the 1988 Lockerbie attack involving a Pan Am flight, the deliberate use of hijacked planes to attack the World Trade Centre and the Pentagon in September 2001, and the attempted attack using explosives concealed in shoes on a transatlantic flight in 2001. Despite this ongoing threat, the number of attacks has remained relatively small due in part to the work of the police, security and transport safety authorities and the development of appropriate security measures at airports.

Maritime

2.97 To date, no such attack has taken place against a British ship or in UK waters. If such an attack were to be successful, its impact could vary significantly depending, for example, on the spread of fire on board or whether enough damage was caused to lead to the vessel sinking.

Planning by Government and the Emergency Services

2.98 Individual transport sectors are, mostly, subject to regulation of their provision of services. All transport sector operators have plans that cover a range of possible scenarios including those most likely to create a wider impact. Those plans include the diversion of resources where possible (based on safety and operational requirements).

Rail and Underground

2.99 These remain popular targets for malicious groups due to the high number of people that travel on these systems each day and the ease of access to the general public. Security for the national rail network, as well as London Underground, the Docklands Light Railway and the Glasgow Subway, is regulated by the Department for Transport, which inspects and monitors compliances. As open networks, these systems will always be more vulnerable to attack than closed systems such as aviation. Both Network Rail and London Underground have robust plans in place to respond to emergencies and these are regularly tested and updated. The British Transport Police are responsible for policing British rail networks and are closely involved in contingency planning, as well as working with industry and the Department for Transport on security issues.

2.100 Eurostar services through the Channel Tunnel are subject to a more stringent security regime similar to that which exists at airports, under which all passengers and their baggage are currently subject to screening.

Air

2.101 Stringent protective security measures exist at UK and EU Member State airports. Airlines and airports are required to carry out a range of specified measures. These include the following measures to mitigate the risk of attack:

- screening of passengers and their bags, as well as of all staff working in restricted areas;
- physical security measures including the separation of incoming international passengers from all outbound travellers; and
- background checks on staff in sensitive posts.

2.102 Security measures are also in place to protect aircraft in flight, such as the compulsory locking of cockpit doors. These security regimes are regularly inspected by the Department for Transport's Transport Security & Contingencies Directorate (TRANSEC) to ensure compliance. In addition, TRANSEC provides advice to UK airlines operating overseas on measures needed at their foreign stations.

Maritime

2.103 Stringent protective security measures exist (including tightly controlled access) for cruise ships and ferries serving the UK and Northern Ireland. New rules for domestic ferries came into effect on 1 July 2007 as domestic sea-going ferries now fall within the scope of the EU regulation for enhancing ship and port facility security.

Further Information:

Department for Transport
www.dft.gov.uk

TRANSEC
www.dft.gov.uk/pgr/security

Non-conventional Attacks

Risk

2.104 To date there have been relatively few examples of attacks perpetrated using non-conventional, or in other words chemical, biological, radiological and nuclear (CBRN) materials. However, we still need to plan for them. The potential scale and nature of any impact will be dependent on the type of substance used, as the following examples demonstrate.

Background

2.105 A cult in Japan made a number of attempted attacks using non-conventional substances. The most well known incident was the Sarin release in March 1995 on the Tokyo underground that killed 12, and affected many more. There was little direct impact upon the underground system, which was operational and with normal traffic levels as soon as police released the crime scene.

2.106 In late 2001 anthrax attacks in the US, where letters containing anthrax spores were sent in the post, resulted in five deaths and increased an already heightened sense of public anxiety following the 11 September attacks. Senate offices and mail sorting areas were contaminated for long periods causing considerable disruption.

2.107 The use of some CBRN materials has the potential to have very serious and widespread consequences. An example would be the use of a nuclear device. There is no historical precedent for this type of terrorist attack.

Planning by Government and the Emergency Services

2.108 There is a well developed capability amongst the emergency services and other responder agencies to deal with industrial accidents involving hazardous materials. Similarly the emergency services are well versed in dealing with terrorist incidents involving conventional explosives. In dealing with a potential terrorist incident involving unconventional materials therefore, many of the same procedures and equipment can be applied. One of the most significant differences between a conventional terrorist attack and one using chemical, biological,

radiological or nuclear material is the potential for contamination of people, and of buildings, infrastructure and the surrounding environment. The occurrence and nature of such attacks can also be difficult to detect and identify.

2.109 The emergency services receive specialist training and are provided with protective equipment and the relevant supplies in order to enable them to operate in hazardous environments and to rescue and treat any casualties. Both the Ambulance and Fire and Rescue Services have means to decontaminate people affected by such an incident and local authorities have plans in place to open reception centres for those caught up in the incident or displaced from their homes. Where necessary, decontamination of the area of any incident, so that it can be returned to normal use, can be undertaken by contractors drawn from a framework established by the Government Decontamination Service.

2.110 The response to any incident involving hazardous materials – whether accidental or deliberate – requires a well co-ordinated multi agency response. Accordingly, there is planning for such events at national, regional, and local level and regular testing of the plans through exercises.

Further Information:

Government Decontamination Service
www.gds.gov.uk

Home Office
www.security.homeoffice.gov.uk

Cabinet Office
www.ukresilience.gov.uk

Electronic attack

Risk

2.111 The risk and impact of electronic attacks on IT and communication systems varies greatly according to the particular sectors affected and the source of the threat. Electronic attacks have the potential to export, modify or delete information or cause systems to fail.

2.112 There is a known risk to commercially valuable and confidential information in some government and private sector systems from a range of well resourced and sophisticated attacks. Electronic attack may be used more widely by different groups or individuals with various motives.

Background

2.113 IT systems in government departments and various organisations, including elements of the national infrastructure have been and continue to be attacked to obtain the sensitive information they hold. Some of these attacks are well planned and well executed.

Planning by Government and the Emergency Services

2.114 IT systems are increasingly interconnected with each other and with the citizen using internet technologies. This provides huge benefit in terms of convenience, efficiency and cost saving but also requires that departments effectively manage the associated risks. CESG, the Information Assurance arm of GCHQ (Government Communications Headquarters), uses its expertise in this fast moving

arena of internet security to provide help and support to government in dealing with these risks. The Centre for the Protection of National Infrastructure (CPNI) provides advice on protective security measures and direct technical support to organisations within the national infrastructure.

2.115 Business continuity plans in all critical national infrastructure sectors obviate the effects of any disruptions as far as possible (see sections on government planning for industrial accidents and attacks on critical infrastructure).

Further Information:

Centre for the Protection of National Infrastructure

www.cpni.gov.uk

CESG (National Technical Authority for Information Assurance)

www.cesg.gov.uk

Get Safe Online

www.getsafeonline.org

Central Sponsor for Information Assurance

www.cabinetoffice.gov.uk/csia.aspx