Preparing for flooding

A guide for sites regulated under EPR and COMAH (June 2015)

Flooding is the most common and widespread natural disaster in the UK. While we do everything we can to reduce the chance of flooding, it is a natural process and can never be completely eliminated. By preparing in advance you can minimise the impact that flooding could have on your activities. Flood planning will help you comply with your Environmental Permit and the COMAH regulations where they apply.

1. Find out if your site is in an area at risk of flooding

It is quick and easy to find out if you're at risk:

- Call **Floodline on 0345 988 1188** 24 hours a day. By taking your postcode, our staff will check if your site is in a flood risk area.
- Look at our website www.gov.uk/prepare-for-a-flood/find-out-if-youre-at-risk and check if your site's postcode is at risk from flooding from rivers, the sea, surface water or reservoirs.
- You should also consider the risk of flooding from other sources such as overloaded drainage systems and from rising groundwater. Your local authority and water company may be able to provide advice on flooding from public sewers.

Floods can happen anywhere at anytime. Even where your site is protected by flood defences you should not be complacent, defences can be overtopped by severe flooding.

2. Be aware - know when flooding is imminent

- **Floodline Warnings Direct:** sign up for our free flood warning service by calling Floodline or visiting our website. Once registered for the service, flood warnings will be sent to you by phone, text, email or fax. Remember to register all vulnerable sites not just your head office.
- **Our website:** view up-to-date flood warning information, monitor the river or sea levels for your local river or coastline and check out the 3 day flood risk forecast for your county.
- **Call Floodline:** listen to recorded information on the latest warnings and predictions or speak to our staff for more general information 24 hours a day.
- **Tune in:** you may see or hear our warnings on television and in radio broadcasts.
- **Using our live data:** contact us if you are interested in using our data to develop a targeted warning service for a network of assets at risk of flooding.

3. Understand flood warnings

Know your flood warning service

We provide three types of warnings, Flood Alert, Flood Warning and Severe Flood Warning. Knowing what these warnings mean will help you prepare for flooding and take action at the right time.

Online flood risk forecast	 FLOOD ALERT	 FLOOD WARNING	 SEVERE FLOOD WARNING	Warning no longer in force
What it means Be aware. Keep an eye on the weather situation.	**What it means** Flooding is possible. Be prepared.	**What it means** Flooding is expected. Immediate action required.	**What it means** Severe flooding. Danger to life.	**What it means** No further flooding is currently expected in your area.
When it's used Forecasts of flooding on our website are updated at least once a day.	**When it's used** Two hours to two days in advance of flooding.	**When it's used** Half an hour to one day in advance of flooding.	**When it's used** When flooding poses a significant threat to life.	**When it's used** When river or sea conditions begin to return to normal.

4. Obtain site topography and more detailed flood modelling

You need to understand how flood levels could affect your site

You should start by obtaining a topographical survey of your site and the neighbouring land. Site levels should be provided as Above Ordnance Datum (AOD) and cross-referenced to Chart Datum (Local) and Tide Tables where appropriate. You then need to relate site levels to predicted flood levels in your area.

Your local Environment Agency office may be able to provide more detailed information on your flood risk

Depending on your location, this might include information on flood history, flood defences, likely flooding scenarios and predictions of flood level and flood water velocity. We might also be able to show how climate change might influence flood risk. With additional knowledge of your site, we can help you to understand the relationship between our flood warning thresholds or our online river levels and the likely impact at your site. Please note that a charge may apply for providing this information.

5. Prepare a flood plan

Your response to flooding should form part of your site accident or emergency plan

A good plan will include steps to protect staff, safeguard hazardous processes and secure polluting material and stock. You should realistically be able to achieve these actions within the time available between receiving a flood warning and your site flooding.

When preparing your flood plan you should be aware that warning of imminent flooding may give little time for response. In addition, remember that all flood mitigation measures can fail.

An effective plan will be based on a thorough understanding of the risks of flooding on specific areas of plant and operations. Completing a flood Hazard and Operability (Hazop) study could be appropriate for high hazard sites such as those falling under the COMAH regulations.

When drawing up your plan you should consider the following:

- the impact of flood water inundating and/or floating plant and equipment
- the impact of loss of utilities on a short and long term basis
- the impact of the loss of safety critical equipment and other key components e.g. PLC's, SCADA
- the ability to revert to manual operations taking into account hardware, operating procedures, competence and training
- the time needed to safely shut down operations and move personnel, polluting materials and stock

Your flood plan should identify appropriate action and the associated information needed when flooding is predicted. A good plan would include the following:

- the allocation of flood response tasks to individuals who are trained for the role
- sources of flood warning, weather predictions and real-time river and sea levels
- appropriate trigger points - such as rainfall, river levels, flood warning - for specific action such as shutting down operations, isolating equipment, evacuating personnel
- links to asset registers and equipment status
- details of design, ownership and operation of relevant flood defences
- contact details and contractual arrangements for the supply of emergency resources e.g. pumps, power generators, clean-up equipment
- options for off-site recovery/remediation should loss of containment or pollution occur
- post flooding activities including:

    - removal of flood water
    - integrity checks of plant and equipment
    - inventory checks to identify losses of polluting, hazardous or radioactive material

Flood plan exercises

Your flood plan should be exercised to build the competence of staff and ensure that actions are realistic given the likely time and on-site resources that will have available.

6. Improve your site's flood resilience

Taking simple steps can go a long way to protecting your operation from flooding
The following is a list of things you should consider to minimise the impact of flooding. This list is not exhaustive and you should assess the specific flooding hazards including the potential impact from objects floating in fast-flowing floodwater.

Design to Stop, Slow, Deflect flood waters
The following measures can stop flood water reaching your site or reduce its impact on vulnerable operations. You may need permission from your local council or the Environment Agency to implement some of these measures:

- drainage systems with excess capacity and penstocks
- sustainable drainage techniques such as retention ponds and soakaways
- ground and platform raising or diversion channels
- permanent or temporary flood defences
- effective maintenance of drainage and flood management systems

Storing polluting / hazardous substances and waste
Where stores have to be in areas at risk of flooding, the following measures should be taken. Particular consideration should be given to hazardous substances which react in the presence of water.

- **Bulk storage and process tanks:** floodwater can cause tanks to float, resulting in the disconnection of pipelines and loss of the contents stored. Tanks can be raised above predicted flood water levels as long as this doesn't compromise the tank integrity and safe operation. Alternatively you should make sure that tank anchor points are able to withstand tank buoyancy. Underground tanks may be particularly vulnerable to flooding. When flooding is predicted, pipework should be emptied, valves closed and delivery pumps turned off.

- **Drums and IBCs:** drums and similar vessels can float in floodwaters resulting in loss of containment or downstream blockages and potentially complicated off-site recovery. Portable containers should either be permanently elevated above predicted flood waters or moved and secured if a flood is predicted. Secure fencing and gates at site boundaries should be used to prevent small containers floating off-site.

- **Product warehouses:** vulnerable products should be moved above predicted flood waters. To protect all stock, flood resistance measures such as flood boards or demountable flood defences at doorways could be provided. For more details of flood prevention products see: http://www.bluepages.org.uk/

- **Waste:** waste material and associated containers should be securely stored, in a manner that will prevent them floating away. Soluble material should not be stored where it may come into contact with flood water. A dedicated flood resistant store may be appropriate.

- **Radioactive substances:** radioactive substances should not be stored in the flood plain. If there is no alternative, then radioactive sources and waste should be positioned and managed to ensure that they cannot come into contact with flood waters. Users of mobile sources should also consider flood risk when sources are stored and used away from their home base.

Safety critical control systems
You should consider the location of safety critical plant such as control rooms, process control and instrumentation systems and emission abatement plant. Where this equipment could be inundated by water you should assess its flood resilience and its vulnerability to damage by floating objects. Where equipment can't be moved above predicted flood waters and its resilience can't be assured, hazardous activities should be safely halted when flooding is predicted.

Utilities
You should make sure that electricity (including on-site transformers and substations), gas, steam, heating, cooling and water supply systems are above predicted flood levels, are flood resilient or can be safely isolated or switched off before flooding. As the loss of utilities may be for an extended period, you should consider the installation of backup systems for critical equipment.

Effluent treatment and oil separation systems
Effluent treatment and oil separation systems are likely to contain quantities of untreated effluent, retained sludge or oil at risk of being lost if the system is flooded. These systems are likely to be at greatest risk as they are often positioned at the lowest point of a site.

You should assess the need to empty oil separators, treatment plants, storage tanks and effluent pipe work before they're flooded. You should also make sure that systems that have been subjected to flooding are working correctly before using them again.

Emergency response
Flood events affecting an industrial site or its surrounding region are also likely to disrupt emergency response. Potential impacts could include:

- delayed or diminished attendance by off-site emergency services
- disruption to normal response measures such as fire-fighting or pollution control
- delayed evacuation of employees and local residents.

For vulnerable high hazard sites you should use our flood maps to assess whether access and evacuation routes for your site are likely to be affected by flooding. You can also talk to your local authority emergency planners about how they have prepared for flooding of your site.

Because of the impact of flooding on emergency plans it may be appropriate to suspend hazardous activities when flooding is predicted.

Information Security
Relevant Information on the inventory of polluting material and waste, or the inventory of radioactive sources and waste, should be kept and managed so that it is not at risk of damage or loss during flood events.

Business Continuity

When planning for flooding, consideration should also be given to the wider impact of flooding on your business. For example you should consider the resilience to flooding of business critical information and IT systems.

Further Information

Flood Risk Guidance: our online flood guide for businesses and a template flood plan are available at www.gov.uk/prepare-for-a-flood/make-a-flood-plan

Flood Resilience and Resistance Guidance: CIRIA Report C688. 2010. W McBain, D Wilkes, M Retter. Flood resilience and resistance for critical infrastructure.

Pollution Prevention and Emergency Planning Guidance:
-Pollution Prevention Guidance notes (PPGs) www.gov.uk/government/collections/pollution-prevention-guidance-ppg
- CIRIA publication C736 "Containment Systems for the Prevention of Pollution: Secondary, Tertiary and other measures for industrial and commercial premises."
- Safety alert from the Chemical Industries Association Managing extreme weather events at chemical businesses
- Emergency planning for major accidents: Control of Major Accident Hazards Regulations 1999 - HSG191. Available via http://www.hse.gov.uk

Contact Us

- **Call Floodline 0345 988 1188** 24 hours a day to find out if you are at risk of flooding, register for flood warnings or to get more information about flooding.
- **Call our Customer Service line 03708 506 506** during office hours to speak to your local Environment Agency office for more detailed information and for guidance on flood planning.
- **Visit our website** www.gov.uk/browse/environment-countryside/flooding-extreme-weather to find out if you are at risk of flooding, register for flood warnings or to get flood warning information 24 hours a day.
- **Email us** enquiries@environment-agency.gov.uk

This guidance has been developed as part of a programme of work undertaken by **CDOIF**.

CDOIF (Chemicals and Downstream Oil Industries Forum) is a collaborative venture formed to agree strategic areas for joint industry / trade union / regulator action aimed at delivering health, safety and environmental improvements with cross-sector benefits.

The following **CDOIF** members contributed to the development and the 2014 review of this guidance:

TSA Tank Storage Association www.tankstorage.org.uk · Chemical Business Association · UKpia · CIA Chemical Industries Association Working for chemical and pharmaceutical businesses

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