



National
Operational
Guidance

Hazard

Smoke plumes



NFCC
National Fire
Chiefs Council

Developed and maintained by the NFCC



Contents

Hazard - Smoke plumes	3
<i>Control measure - Controlled burn</i>	3
<i>Control measure - Extinguish</i>	5
<i>Control measure - Removal or separation</i>	7
<i>Control measure - Air quality cell function</i>	8
<i>Control measure - Operational risk information plan</i>	8



Hazard - Smoke plumes

Hazard Knowledge

Incident commanders should take advice from environment agencies, public health bodies and the police at fires that produce large amounts of toxic smoke. This will help them decide whether or not to extinguish the fire based on the environmental and public health implications. If they decide to extinguish the fire then pollution control measures should be used to protect bodies of water from fire water run-off.



Control measure - Controlled burn

Control measure knowledge

UK law does not require fire and rescue services to extinguish fires. There are times when an incident commander may consider stopping or limiting firefighting, for example, when it is not possible to contain polluted fire water. A controlled burn may reduce environmental damage by avoiding or restricting the use of extinguishing media or allowing better combustion of pollutants. However, it may also worsen them. See Section 3.7, [Environmental Protection Handbook](#).

Examples of when a controlled burn could be considered as a tactical option are shown below.

Controlled burn considered	Controlled burn likely to be inappropriate
Life or health is not at risk or a controlled burn will reduce risk to people	Life or health is at immediate risk or a controlled burn will increase risk to people
There is little chance of extinguishing the fire	There is a high chance of extinguishing the fire with minimal health or environmental impacts
Fighting the fire with other techniques could cause a significant risk to firefighters	The fire is likely to spread widely or to high hazard areas

Property is beyond salvage

Important or valuable buildings are involved

Fire conditions, weather conditions and/or the local landscape are appropriate for minimising air quality impacts

Fire conditions, weather conditions and/or the local landscape are inappropriate

Fire water run-off could damage an area of high environmental sensitivity or value

Drainage from the site leads to an area of low environmental sensitivity or fire water is not polluting

Fire water run-off could affect drinking water sources or affect sewage treatment works

Fire water can be contained on site or off-site

Incident commanders will decide whether to allow a controlled burn. They should take specialist advice, wherever possible, from tactical advisers, environment agency staff, owners/occupiers and public health bodies. The decision should be communicated as appropriate, including to the public via the media, if necessary.

A controlled burn strategy may be considered at any time during an incident. At incidents where it is expected that the fire will burn for some time it may be appropriate to use both controlled burn and extinguishing tactics. For example, using a controlled burn in the initial stages of an intense fire may result in lower concentrations and better dispersion of pollutants because of the high combustion temperatures as well as reduced run-off.

The technique of introducing an accelerated control burn which may include the use of fire service positive pressure ventilation fans (PPV) can help to increase temperature and therefore decrease the combustion time.

However, with both controlled burn and an accelerated controlled burn, as the fire dies back and begins to smoulder, the pollutant levels in the smoke plume may increase, resulting in less dispersion of pollutants and lowering of smoke plume and contents in the atmosphere. At this point an extinguish strategy could be used. Such a strategy would also give more time for fire water containment measures to be put in place.

Certain buildings and their contents have a high value because of their architectural, historical or monetary significance. In these cases, the benefits of a controlled burn must be considered against the building's value. Advice should be taken from the owner or occupier and the appropriate conservation body and decisions made on a case-by-case basis. Other containment measures may be used when a building is of high value and/or poses a high environmental risk.



Note: a controlled burn does not relate to the controlled burn of moorland, heathland etc., or agricultural or other wastes.

For further information see Section 3.7, [Environmental Protection Handbook](#).

Strategic actions

Fire and rescue services should:

- Develop a controlled burn policy and procedures
- Identify pre-determined sites where a controlled burn strategy may be appropriate

Tactical actions

Incident commanders should:

- Carry out an [environmental risk assessment](#)
- Liaise with site owner or occupiers
- Consider other options to reduce environmental impacts
- Request appropriate resources, i.e. DIM/HMA additional environmental protection equipment
- Inform, or request the attendance of the relevant environment agency and any other appropriate agencies such as:
 - Nature conservation bodies
 - Public health organisations
 - Local authority
 - Highway agencies
 - Local media
- Communicate the tactic 'Use of a controlled burn' to all personnel on the fire ground, the fire control room, the site operator (if present) the environment agency and local environmental health departments.
- When an identified nature conservation site is at risk, implement an appropriate protection plan
- Reduce the use of firefighting water, recycling or fire water run-off to foul sewer as alternative tactic to limit fire water run-off



Control measure - Extinguish

Control measure knowledge

Fire service high volume pumps, fixed installation pumps or pumps secured from a third party supplier can be used to provide water for firefighting. When using this type of equipment or when large volumes of water are being pumped, the appropriate environment agency must be informed. As well as containing run-off, care should be taken not to draw too much water because this can threaten water supplies and damage ecosystems.

Strategic actions

Fire and rescue services should:

- Develop procedures that incorporate the use of high volume pumps for incidents that will require large volumes of water to extinguish
- Liaise with local environment agencies, local authorities' statutory resilience forums to identify and formulate plans for sites that are likely to produce significant smoke plumes/require large amounts of water to extinguish if involved in fire. See National Operational Guidance: Operations. [Identify foreseeable risk](#)
- Have procedures in place for the safe decontamination of high volume pumping equipment after use. See the following sections of the [Environmental Protection Handbook](#):
 - 1.6.6 Protocol for disposing of contaminated water and associated wastes at incidents
 - 2.12.1 High volume pump decontamination

Tactical actions

Incident commanders should:

- Seek technical advice - for instance, from a Hazardous Materials Advisor (HMA) or product specialist before deploying a high volume pump
- Complete an [environmental risk assessment](#) before deploying a high volume pump
- Notify the local environment agency each time a high volume pump is used or where large volumes of water are being pumped
- Consider the use of local environment agency pumps for incidents that are likely to be

significantly protracted

- Consider the decontamination of high volume pumping equipment after use



Control measure - Removal or separation

Control measure knowledge

Fires at open-air storage sites, particularly those storing combustible waste can create large volumes of smoke and fire water containing a wide range of pollutants. The direct application of water with or without firefighting additives to stacks of burning material is often ineffective and may generate large volumes of smoke and contaminated fire water.

For specific guidance on fires involving waste sites see National Operational Guidance: [Fires in waste sites](#) (including renewable energy facilities).

Strategic actions

Fire and rescue services should:

- Develop operational procedure for incidents involving fires at waste sites

Tactical actions

Incident commanders should:

- Consider the use of firefighting additives such as foam for small waste fires and prevent fire spread. (Note: For larger waste fires, foam may provide rapid 'knock down' but often has minimal long term effects on larger waste fires)
- Consider separating burning material from the fire using heavy plant and extinguishing it with:
 - Water jets
 - In bunded pools
 - Tanks of water
 - Controlled burn
 - Burial with approval of the appropriate environment agency
- Make use of specialist fire and rescue service or on-site equipment

- Where possible, recycle the fire water run-off. See Recycling fire water run-off.



Control measure - Air quality cell function

Control measure knowledge

If major chemical air pollution occurs at an incident, the environment agencies and public health bodies will set up an air quality cell. This will include other organisations including the [Meteorological Office](#), [the Health and Safety Laboratory](#) and local authorities.

The air quality cell will co-ordinate air monitoring and will provide air quality information. Public health bodies use this information to provide health advice to responders and the public. See Section 3.8, [Environmental Protection Handbook](#).

Similar arrangements exist in Wales, Northern Ireland and in Scotland, where [Scottish Environment Protection Agency](#) (SEPA) provides air quality monitoring through the [Airborne Hazards Emergency Response](#) (AHER) service.

Strategic actions

Fire and rescue services should:

- Ensure that lines of communication are in place to disseminate information provided by the air quality cell to incident commanders and other specialist advisers during major incidents or other significant events

Tactical actions

Incident commanders should:

- Implement appropriate control measures on the receipt of air quality information





Control measure - Operational risk information plan

Control measure knowledge

Operational risk information plans are prepared in accordance with the [Fire and Rescue Services Act 2004](#) and focus on firefighter safety. The plans should also include information on pollution, prevention and control where a risk to the environment is identified at an incident.

For further information see:

- [DCLG operational risk information guidance](#)
- Section 2.2 and 2.3, [Environmental Protection Handbook](#)
- National Operational Guidance: Operations [Identify foreseeable risk](#)
- National Operational Guidance: [Incident Command](#)

Strategic actions

Fire and rescue services should:

- Include environmental risk information within operational risk plans

Tactical actions

Incident commanders should:

- Consider pollution prevention information contained within site specific risk plans when a risk to the environment has been identified in risk information,
- Carry out an [environmental risk assessment](#)
- Implement the identified environmental protection control measures identified within the relevant operational risk information plan
- Monitor the impact of fire and rescue service tactics on the identified environmental risk