

Title:	Initial Operational Response to a Chemical, Biological, Radiological or Nuclear Explosive
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National Operational Guidance – Initial Operational Response to a Chemical, Biological, Radiological or Nuclear Explosive first edition version one (ARCHIVED on 28-03-2018)

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Foreword

Terrorist incidents involving chemical, biological, radiological or nuclear (explosives) materials (CBRN(E)) occurring in the United Kingdom, although highly unlikely, would have a significant societal impact. Historically, the advice and training for initial responders for incidents of this nature, whether actual or potential, has been to ‘stand off and wait for the specialists’.

This national operational guidance for the initial operational response to CBRN(E) incidents has been created in the light of developments in scientific understanding and lessons learned from exercises and real incidents. It is based on [Initial Operational Response to a CBRN\(E\) Incident](#) published by the Joint Emergency Services Interoperability Programme (JESIP).

The focus of the initial operational response (IOR) to a suspected or confirmed CBRN(E) incident is to save as many lives as possible. To do this, the emergency services must be aware of their roles and responsibilities, what they can do to save lives safely, and in the most effective time.

The initial operational response starts from the very first call to the emergency services or in response to a self-presenter at a healthcare premises. The role of the call handler, supervisor or first responder in identifying a potential CBRN(E) incident – giving correct, but simple, advice to the caller and dispatching the right resources – is critical. The first responders should work together quickly and efficiently to save lives – including conducting a [Joint Dynamic Hazard Assessment](#) (JDHA) to inform multi-agency decision making – to achieve a safe multi-agency response and deliver an effective resolution to the incident for the public and emergency responders alike.

CBRN(E) terrorism is defined as: the actual or threatened dispersal of CBRN(E) materials (either on their own or in combination, or with explosives) with deliberate criminal, malicious or murderous intent (*Initial Operational Response to a CBRN Incident, JESIP, 2013*).

Introduction

This section of the National Operational Guidance (NOG) Programme examines the hazards and control measures relating to fire and rescue service personnel and members of the public during the initial operational response to a CBRN(E) incident. The hazards and control measures that should be considered when writing policies for dealing with an initial response to a suspected or confirmed chemical, biological, radiological or nuclear (CBRN(E)) release. However, it is equally applicable to situations involving other hazardous materials and can be implemented for all levels of incident.

The guidance contains a number of links to external documents containing further or more detailed information. Some of this information is located in the Joint Emergency Services Interoperability Programme (JESIP) website and the Hazard Manager area of the Met Office website and personnel will need to register and/or log in to see the relevant information. In these cases, links are provided to the appropriate log in areas.

Some CBRN(E) terrorist attacks may depend on an explosive device for dispersal. Much of the activity to control access to explosive materials complements the government’s work to control access to CBRN(E) materials.

Fire and rescue services do not engage directly with, or undertake actions involving, explosives in this context. The support mechanisms they provide, and expectations on them, have led to the CBRN title being

changed to CBRN(E): Chemical, Biological, Radiological, Nuclear (Explosives). Fire and rescue service crews are likely to be the first emergency resource deployed to a CBRN(E) incident. First (initial) responders are unlikely to be trained in specialist CBRN(E) response or have access to specific CBRN(E) personal protective equipment (PPE).

This document focuses on the first response to, and the initial lifesaving phase of, a CBRN(E) incident and aims to enable control room personnel and first responders to facilitate or carry out life-saving actions as quickly as possible. The approach also promotes close inter-agency working, which is vital in responding effectively to a CBRN(E) incident.

Previous protocols for response to a CBRN(E) incident have dictated that unprotected emergency responders should withdraw from the scene and await the arrival of specialist trained and equipped assets (called STEP 1-2-3). However, recent evidence has pointed to the need for a more rapid and flexible approach to a CBRN(E) incident.

The new approach outlined in this document, underpinned by a CBRN(E) first responder flowchart, asks control room personnel and first responders to consider informing callers of, or undertaking themselves, a range of rapid lifesaving tasks (called STEP 1-2-3 Plus).

Research has indicated that a rapid response is critical to save lives effectively following a CBRN(E) incident. Specific actions – including removing casualties from an area of gross contamination and removing their outer clothing during the first 15 minutes – can save life and can be achieved without putting emergency service responders at undue risk of exposure. A significant change to current procedures is the use of structural firefighting PPE and self-contained breathing apparatus (SCBA) to undertake immediate lifesaving actions, and the introduction of disrobing and decontamination at the first response.

The [Initial Operational Response to a CBRN Incident](#) (JESIP 2013) lists the roles and responsibilities of the fire and rescue service. These are:

- Jointly initiate the hazard assessment process at scene
- Carry out search and rescue
- Support the ambulance service by the extraction and immediate life saving interventions of casualties
- Co-ordinate and undertake the movement of casualties to a safer location (warm zone)
- Carry out improvised or interim decontamination of casualties, utilising available resources where appropriate, and in conjunction with the ambulance service
- Render other humanitarian support
- Detect, classify, identify and monitor any CBBRN materials
- Contain and/or mitigate CBRN materials
- Provide advice to police and ambulance services on potential fires and other hazards

Immediate lifesaving rescue

In situations where members of the public are subjected to life-threatening circumstances and immediate lifesaving actions are required, wearing gas tight suits (GTS) and powered respirator protective suits (PRPS)

may be considered excessive owing to time constraints and the availability of resources. Relaxing this requirement may therefore be appropriate to ensure expediency in saving life. However, all hazards and risks must be considered, particularly exposure to hazardous substances and the resultant contamination.

Fire and rescue service structural firekit, combined with SCBA, provides a lesser degree of protection than GTS, but research has demonstrated that the protection factors provided by this level of PPE reduces the risk to fire and rescue service personnel to a level that may be considered acceptable in circumstances where rescues could potentially be undertaken using existing HAZMAT '*immediate human life saving rescue*' protocols.

In deciding whether the risk to the health and safety of responders is being reduced to as low as reasonably practicable, a number of factors have to be taken into account. While it may be appropriate to commit suitably equipped and trained personnel to a hazardous environment for the purpose of saving life, it is not appropriate for body recovery.

In a suspected or confirmed CBRN(E) incident, it is unlikely that it will be possible to identify the contaminant until specialist detection, identification and monitoring (DIM) equipment can be deployed. However, the signs and symptoms of the casualties will give an effective indication of the toxicity of the agent and whether it acts through inhalation or skin exposure.

The physical state of the material (solid, liquid or vapour) will affect the risk to responders. Structural firekit will not provide significant protection against highly volatile or corrosive substances, so direct contact with potential contaminants in solid or liquid form must be avoided. Multiple immediate fatalities attributable to poisoning are indicative of exposure to a contaminant that acts through inhalation. SCBA provides responders with an effective level of protection for up to 30 minutes against contaminants that act through inhalation or eye exposure.

If casualties are showing signs and symptoms of being exposed to a vapour that acts through skin exposure, such as caustic chemicals or vesicants (blister agents), indicated by blisters, itching, etc., responders should limit their time spent in such environments to an absolute minimum.

The environment in which the hazardous material has been released will also vary according to the extent of the hazard and the degree of risk. Volatile vapours will disperse much more readily in open air, reducing the risk to emergency responders. A release within a building or underground may lead to higher concentration levels and the vapour may be slower to disperse.

Firekit and SCBA should only be used during the initial stages of an incident to carry out immediate lifesaving activities. The incident commander must therefore confirm that there are saveable lives before implementing a rescue plan.

Specific assumptions

Specific assumptions only relate to suspected or confirmed CBRN(E)/HAZMAT events and describe the activities to be carried out by non-CBRN(E) specialist personnel in the initial stages of an incident.

- Every fire and rescue service responder will have access to the CBRN(E) initial response aide-memoire and will refer to this to guide their initial actions and decisions
- Initial responders will undertake STEP 1-2-3 Plus

- A Joint Dynamic Hazard Assessment (JDHA) will be undertaken, followed by a service-specific risk assessment
- A [FireMet](#) report will be used to establish a safe approach route, the downwind hazard area and the rendezvous point (RVP)
- A [METHANE assessment](#) will be undertaken as part of the initial scene assessment and this information will be passed to the fire and rescue service control room
- Scene assessment will be undertaken and will consider or use the following information sources:
 - Responder local knowledge
 - Site-specific pre-planning
 - CBRN(E) release indicators
 - Casualty symptomology
 - Witness information
 - Information provided by the fire and rescue service control room
 - Responder agency information and/or intelligence
 - Inter-agency Liaison Officer (ILO)

Fire and rescue service responsibilities

Fire and Rescue Services Act 2004

This act is the principal legislation for the fire and rescue services of England and Wales. It describes the duties and powers of fire and rescue authorities in relation to providing a fire and rescue service.

Sections 7, 8 and 9 describe the duties placed on fire and rescue authorities for providing an operational response. Sections 11 and 12 provide fire and rescue authorities with the power to respond to other types of emergency than those described in sections 7, 8 and 9.

Similar provisions exist in the Fire Scotland Act 2005 and the Fire and Rescue Services (Northern Ireland) Order 2006.

Health and Safety at Work etc. Act 1974

This Act is the overarching Act for the health, safety and welfare of employees and those affected by an organisation's activities.

Fire and Rescue Services (Emergencies) (England) Order 2007

Amongst other provisions, this Order specifies the duties for fire and rescue authorities relating to decontamination of the public.

Civil Contingencies Act 2004

This Act contains the duties and powers for various emergency response organisations, including fire and rescue services, in relation to civil emergencies.

The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005

These regulations give direction on intraoperability between fire and rescue authorities.

Risk management plan

Each fire and rescue authority should decide their strategic direction through their risk management plan and the adoptive powers under the Fire and Rescue Services Act 2004, or the equivalent in the devolved administrations. Strategic managers should consider their statutory duties and the foreseeable risk in their area to determine the extent of their firefighting capability.

Work to identify risk and prepare operational plans should be carried out in association with the local resilience forum and the relevant section of the fire and rescue service risk management plan.

Intraoperability and interoperability

Interoperability is defined as the extent to which organisations can work together coherently as a matter of routine. To ensure that interoperability exists between the emergency services in England, Wales and Scotland, which might involve cross-border mutual aid at any time, all responder organisations should ensure that their single service response arrangements and local procedures align with the [JESIP Joint Doctrine](#) and accord with the Civil Contingencies Act 2004 guidance set out in [Emergency Response and Recovery](#).

To achieve the best possible outcomes, all responders will need to work together effectively as soon as they arrive at the scene. With appropriate training and exercises in and between the emergency services, as well as with other category one and two responders, the joint response will be significantly more effective in saving lives and reducing harm.

In addition to working with the other emergency services, the process of dealing with a vast range of fire incident types inevitably means that fire and rescue services will need to liaise with many other agencies such as the Highways Agency, English Heritage and the Forestry Commission.

Hazard and control statement

Hazard	Control measures
Failure to approach an incident and to establish and work at the rendezvous point safely	Use FireMet Undertake pre-planning Use the available detection/monitoring equipment Use the immediately available intelligence/information from other agencies or members of the public and/or information passed from the fire control room Identify CBRN(E) release indicators Use the immediately available intelligence/information from Joint Dynamic Hazard Assessment (JDHA) at the

National Operational Guidance – Initial Operational Response to a Chemical%2c Biological%2c Radiological or Nuclear Explosive first edition version one (ARCHIVED on 20-09-2017) (1)

	scene
Failure to carry out scene assessment	<p>Be aware of casualty signs and symptoms</p> <p>Use STEP 1-2-3 Plus</p> <p>Use the available detection and monitoring equipment</p> <p>Use the immediately available intelligence/information from Joint Dynamic Hazard Assessment (JDHA) at the scene</p> <p>Identify CBRN(E) release indicators</p>
Failure to establish cordons	<p>Liaise with other agencies</p> <p>Identify CBRN(E) release indicators</p> <p>Use the available detection and monitoring equipment</p> <p>Use FireMet</p>
Immediate lifesaving rescues	<p>Undertake a Joint Dynamic Hazard Assessment (JDHA)</p> <p>Undertake deliberate reconnaissance</p> <p>Select appropriate personal protective equipment (PPE)</p> <p>Rotate crews</p> <p>Use specialist capabilities</p>
Incorrect assessment of signs and symptomology	<p>Undertake a Joint Dynamic Hazard Assessment (JDHA)</p>
Failure to evacuate ambulant casualties to an area of relative safety	<p>Use the Initial Operational Response aide-memoire</p> <p>Ensure appropriate fire control room advice</p> <p>Use FireMet</p> <p>Undertake Joint Dynamic Hazard Assessment (JDHA)</p>
Inability to undertake early decontamination of casualties	<p>Provide disrobe packs or alternatives</p> <p>Use the Initial Operational Response aide-memoire</p>
Failure to decontaminate responders effectively and safely	<p>Wear personal protective equipment for decontamination</p> <p>Seek specialist advice</p> <p>Disrobe assistants</p> <p>Identify and set up decontamination area</p>
Adverse impact on the environment	<p>Follow Initial Operational Response to a CBRN Incident (JESIP)</p>

	<p>Follow UK water protocol for contaminated waste</p> <p>Make early contact with the agency responsible for the environment or water companies</p> <p>Use any local container available for containment of dry decontaminated material</p>
Inability to undertake responder rescue in the contaminated area	<p>Use emergency teams</p> <p>Undertake a Joint Dynamic Hazard Assessment (JDHA)</p> <p>Select appropriate personal protective equipment (PPE)</p> <p>Rotate crews</p> <p>Use specialist capabilities</p>
Failure to work effectively with others	<p>Multi-agency training</p> <p>Follow protocols</p> <p>Carry out Joint Dynamic Hazard Assessment</p>

Hazard – Failure to approach an incident and establish and work at a rendezvous point safely

Hazard	Control measures
Failure to approach an incident and to establish and work at a rendezvous point safely	<p>Use FireMet</p> <p>Undertake pre-planning</p> <p>Use the available detection/monitoring equipment</p> <p>Use the immediately available intelligence/information from other agencies or members of the public and/or information passed from the fire control room</p> <p>Identify CBRN(E) release indicators</p> <p>Use the immediately available intelligence/information from Joint Dynamic Hazard Assessment (JDHA) at the scene</p>

Hazard knowledge

Many possible scenarios would lead to an incident being identified as a suspected or confirmed CBRN(E) event. During the approach to a CBRN(E) incident, responders may face three distinct elements of this hazard:

- Airborne contamination
- Secondary devices

- Presence of perpetrators or other terrorists

Airborne contamination may not be easily identified. However, visual indicators of a CBRN(E) event may include all or some of the following:

- Dead or distressed people, birds and animals
- Multiple individuals showing unexplained signs of skin, eye or airway irritation, nausea, vomiting, twitching, sweating, pin-point pupils (miosis), runny nose (rhinorrhea), disorientation, breathing difficulties, convulsions and death
- The presence of hazardous materials or equipment not relevant to the occupancy
- Unexplained smells or tastes that are out of character with the surroundings
- Unexplained vapour or mist clouds
- Unexplained oily droplets or films on surfaces or water
- Withered plant life or vegetation

Depending on weather conditions, it is entirely possible that initial responders could inadvertently drive into or through a contaminated area en route to the scene of the incident.

Casualties of a CBRN(E) attack are likely to be traumatised, either by witnessing the incident and the effect it is having or as a result of being contaminated themselves. A traumatised casualty may act in an unexpected way. For example, they may be completely unresponsive to commands or unaware of danger, even though they are conscious and able to walk, so they may walk into the path of an oncoming vehicle without perceiving the danger they are in.

Perpetrators have previously used the tactic of planting secondary devices, which may have greater impact than the original device. The incident commander must remain alert to the fact that secondary devices have been used by terrorist organisations to target emergency service personnel. They should ensure that an assessment of the RVP is carried out in respect of secondary threats and should focus on the elimination, as far as reasonably practicable, of any identifiable threats, which may not be definitive.

Even when the police have declared an area, including the RVP safe, personnel should be aware of their surroundings, remain vigilant and ensure that their safety is not compromised.

Control measure – Use FireMet

Control measure knowledge

[FireMet](#) information can be accessed through mobilising controls or mobile data terminals, and should be used by personnel to assist their decision on the appropriate direction of an approach to an incident (staying upwind, uphill), and to determine initial cordons, RVPs and marshalling areas.

Control measure actions

Fire and rescue services should:

- Ensure they have policies and procedures in place to allow [Hazard Manager](#) to be accessed by and/or available to those personnel most appropriate to use the information

- Ensure FireMet is monitored regularly throughout an incident.

Control measure – Undertake pre-planning

Control measure knowledge

All fire and rescue service personnel should be familiar with the nine key tasks ([Fire and Rescue Service Operational Guidance, Incidents involving hazardous materials, 2012](#)) associated with CBRN(E) events and undertake continuation training to ensure that they understand the risks and hazards associated with CBRN(E).

Guidance on pre-planning which relates to all incidents will be covered in the national operational guidance for Operations

Control measure actions

Fire and rescue services should:

- Ensure that personnel are familiar with fire and rescue service policies and procedures before the incident and that these include reference to the nine key tasks
- Engage with other organisations. Including becoming familiar with capabilities and responsibilities

Control measure – Use the available detection/monitoring equipment

Control measure knowledge

The definition of detection and monitoring and categorisation is:

- Detection: recognising the presence of CBRN material
- Monitoring: a continuous or periodic process of qualitatively or quantitatively determining the presence or absence of CBRN material
- Categorisation: A partial identification of a CBRN material

Detection and monitoring equipment for CBRN(E) incidents is not limited to those provided specifically for this CBRN(E) but may include those provided for industrial hazmat purposes. Examples include electronic personal dosimeters (EPD).

Control measure actions

Fire and rescue services should have procedures in place to:

- Ensure available detection and monitoring equipment is used to determine RVP, cordon sizes and hazard areas until specialist detection identification and monitoring (DIM) assets and advisers arrive, as this will inform key decision-making processes
- Ensure personnel understand the operation and readings of detection and monitoring equipment

Control measure – Use the immediately available intelligence/information from other agencies or members of the public and/or information passed from the fire control room

Control measure knowledge

To provide a safe system of work and to reduce the risk to responders to as low as reasonably practicable, incident commanders are required to undertake the actions below before committing responders.

To facilitate an effective plan, fire and rescue services must be aware of the impact a common hazard may have on the public and on their own personnel and any subsequent operations. The hazard assessment is designed to determine the presence (or otherwise) of a hazard and to agree on a common perception of the attendant generic risks. This assessment may be conducted by a single competent agency and jointly agreed or conducted, by a number of agencies, and the collective findings jointly agreed.

Incident commanders must remain vigilant and consider the presence of secondary devices, especially when considering RVPs and parking appliances.

Control measure actions

Fire and rescue services should ensure they have policies and procedures in place for gathering, use, and sharing information. This should include having arrangements in place with other agencies prior to an incident occurring.

Incident commanders should:

- Follow procedures to receive incident information while en route
- Follow procedures for accessing and using information from [FireMet](#)
- Identify and implement specific control measures and incorporate them into an integrated multi-agency operational plan before exposing personnel to the hazard area
- Ensure that fire and rescue service personnel remain vigilant in the approach to an incident and make contact with other emergency service personnel as soon as possible after arrival in order to share information/intelligence

Control room operators should:

- Provide information received on any potential secondary device, including its location, to emergency service responders as a matter of urgency

Control measure – Identify CBRN(E) release indicators

Control measure knowledge

The visual indicators, listed in Hazard Knowledge above, will assist responders in ascertaining whether CBRN(E) materials may be present.

Some CBRN materials will not lead to any immediate signs or symptoms, but this does not preclude the dangers associated with ongoing dispersal of such materials. It should also be borne in mind that some agents may travel considerable distances.

The primary objective for all CBRN(E) incidents is to save 'saveable life'. Within the joint response the fire and rescue service have responsibility for search and rescue.

Control measure actions

Fire and rescue services should ensure they have policies and procedures in place that reflect the contents of the [CBRN\(E\) first responder aide-memoire](#) and other relevant publications.

Fire and rescue services should ensure that documents published for the purpose of initial operational response are distributed to relevant responding personnel.

Fire and rescue service first responders should:

- Follow the CBRN(E) first responder flowchart and multi-agency [CBRN\(E\) aide-memoire](#) if immediate lifesaving actions are required – a [Joint Dynamic Hazard Assessment](#) (JDHA) process should not prejudice any requirement for immediate lifesaving actions.

Control measure – Use the immediately available intelligence/information from Joint Dynamic Hazard Assessment (JDHA) at the scene

Control measure knowledge

To provide a safe system of work and to reduce the risk to responders to as low as reasonably practicable, incident commanders are required to undertake the actions below before committing responders.

To assist in this process and to facilitate an effective plan, fire and rescue services must be aware of the impact a common hazard may have on the public and on their own personnel and any subsequent operations. The hazard assessment is designed to determine the presence (or otherwise) of a hazard and to agree on a common perception of the attendant hazards on which the service specific risk assessment is based. This assessment may be conducted by a single competent agency, and jointly agreed or conducted by a number of agencies, and the collective findings jointly agreed.

However, the JDHA process and the requirement for agencies to jointly agree the hazards must not prejudice any requirement for immediate lifesaving actions.

As part of the JDHA process, eyewitness accounts of the terrorists' appearance can be gathered. However, it should be remembered that clothing can easily be changed to avoid detection, which may give the impression that there are more terrorists than there actually are. If there are concerns that terrorists may be present dressed as responders, or in changed clothing, care should be taken by all personnel in the hazard zone.

Control measure actions

Fire and rescue services should:

- Have procedures in place that ensure incident commanders are able to apply the JDHA to an incident. This includes the need to work collaboratively with other emergency responders
- Include in their training materials the need to be aware of who is present at a potential CBRN(E) incident and the possibility of perpetrators or terrorists still being present

Hazard – Failure to carry out a scene assessment

Hazard	Control measures
Failure to carry out a scene assessment	Be aware of casualty signs and symptoms Use STEP 1-2-3 Plus Use the available detection and monitoring equipment Use the immediately available intelligence/information from Joint Dynamic Hazard Assessment (JDHA) at the scene Identify CBRN(E) release indicators

Hazard knowledge

When carrying out a scene assessment at a potential or actual CBRN(E) incident there are three elements.

- Failure to recognise a CBRN(E) incident
- Non-identification of the hazard area
- Failure to share information and intelligence

It is important that fire and rescue service control room operators and operational responders are aware of the differences between a hazardous material (HAZMAT) incident and a CBRN(E) event.

Hazardous materials incidents are predominantly accidental, in that they usually involve human error or natural or technological causes, and the fire and rescue service will lead on this type of incident.

The key difference between a hazardous materials incident and a CBRN(E) event is deliberate and criminal intent, which results in the police service co-ordinating a multi-agency response. There are many possible scenarios which would lead to an incident being identified as a suspected or confirmed CBRN(E) event.

As part of the assessment of an incident as a CBRN(E) event, incident commanders should be aware of the indicators given in the airborne contamination section above.

The scene assessment process may begin before the arrival of any emergency responder at the incident. The fire control room receiving the initial call will have gathered and passed on relevant information to emergency services responders and should have shared this information with the other emergency service mobilising controls.

All information available should be taken into account. Any intelligence available from the police and other sources, any signs and symptoms displayed by contaminated people, and any visual or audible indicators should be considered when carrying out the scene assessment task.

When they arrive at the incident and commence the scene assessment task, fire and rescue service responders may be confronted by witnesses or contaminated people. Information should be sought from these individuals and this information used as part of the scene assessment process.

Hazard areas will need to be determined, and hot, warm and cold zones identified:

- **Hot zone:** the contaminated area (or areas) where the initial release occurs or disperses to. It will be the area likely to pose an immediate threat to the health and safety of all those located within it and is the area of greatest risk
- **Warm zone:** the area uncontaminated by the initial release of a substance, which becomes contaminated by the movement of people or vehicles
- **Cold zone:** the uncontaminated area between the inner and outer cordon

The establishment and maintenance of a multi-agency command group at the scene of the incident should be undertaken at the earliest opportunity.

All information available should be taken into account. Any intelligence available from the police and other sources, any signs and symptoms displayed by contaminated people, and any visual or audible indicators should also be considered when carrying out the scene assessment task.

Control measure – Be aware of casualty signs and symptoms

Control measure knowledge

Some CBRN materials will not lead to any immediate signs or symptoms but this does not preclude the dangers associated with ongoing dispersion of such materials. It should also be borne in mind that some agents may travel considerable distances.

Multiple individuals may be showing unexplained signs of skin, eye or airway irritation, nausea, vomiting, twitching, sweating, pin-point pupils (miosis), runny nose (rhinorrhoea), disorientation, breathing difficulties, convulsions and death.

Control measure actions

Fire and rescue services should:

- Ensure their policies and procedures include the need to save life, even in situations where the JDHA indicates the presence of CBRN(E) materials
- Provide personnel with training in the application of the [JDHA flowchart and aide-memoire](#)

Control measure – Use STEP 1-2-3 Plus

Control measure knowledge

Previous protocols for response to a CBRN(E) incident dictated that unprotected emergency responders should withdraw from the scene and await the arrival of specialist trained and equipped assets (STEP 1-2-3). However, recent evidence has pointed to a need for a more rapid and flexible approach to a CBRN(E) incident.

The new approach outlined in IOR, underpinned by the CBRN(E) first responder flowchart, asks control room operators and first responders to consider informing callers of, or undertaking themselves, a range of rapid lifesaving tasks (STEP 1-2-3 Plus) (*Initial Operational response to a CBRN Incident, JESIP, 2013*).

Research has indicated that a rapid response is critical for effective lifesaving following a CBRN(E) occurrence. Specific actions, which include the removal of casualties from the area of gross contamination and removing their outer clothing during the first 15 minutes, can save life and can be achieved without putting emergency service responders at undue risk of exposure. A significant change to current procedures is the use of structural firefighting personal protective equipment (PPE) and self-contained breathing apparatus (SCBA) to undertake immediate lifesaving actions, and the introduction of disrobing and decontamination at the first response.

Control measure actions

Fire and rescue services should:

- Have policies in place for ensuring that members of the public and personnel from other agencies involved in a potential release are informed of the emergency actions they can take to minimise the impact on themselves
- Be aware of the need to carry out a JDHA, whilst being clear that the process does not prejudice any requirement for immediate lifesaving actions

Control measure – Use the available detection and monitoring equipment

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Use the immediately available intelligence/information through Joint Dynamic Hazard Assessment (JDHA) at the scene

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure: Identify CBRN(E) release indicators

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Failure to establish cordons

Hazard	Control measures
Failure to establish cordons	Liaise with other agencies Identify CBRN(E) release indicators Use the available detection and monitoring equipment Use FireMet

Hazard knowledge

In establishing cordons at CBRN(E) incidents, the following aspects should be considered:

- Failure to recognise CBRN(E) incident
- Insufficient resources to secure cordons
- Change of wind direction

It is important that fire and rescue service mobilising controls and operational responders are aware of the differences between a hazardous material (HAZMAT) incident and a CBRN(E) event.

Hazardous materials incidents are predominantly accidental, in that they usually involve human error or natural or technological causes, and that the fire and rescue service will lead on this type of incident.

The key difference between a hazardous materials incident and a CBRN(E) event is deliberate and criminal intent, which results in the police service co-ordinating the multi-agency response. Many possible scenarios would lead to an incident being identified as a suspected or confirmed CBRN(E) event.

Establishing and maintaining a multi-agency command group at the scene of the incident must be undertaken at the earliest opportunity. A critical element of scene management is establishing and maintaining cordons.

It is the responsibility of the police service to decide on a suitable location to establish the outer and traffic cordons and to manage all access and egress to and from the outer cordon. The police may liaise with fire and rescue service incident commanders, especially in relation to the downwind location of the outer cordon.

Incident commanders should be familiar with the national operational guidance for Incident Command in relation to organising cordon management.

Consideration must be given to the fact that some CBRN(E) materials will not lead to any immediate signs or symptoms but this does not preclude the dangers associated with ongoing dispersion of such materials. It should also be borne in mind that some agents may travel considerable distances.

Fire and rescue service personnel should be mindful that wind direction may fluctuate, and may behave unexpectedly, particularly if the incident is located in an urban environment. Further information on the behaviour of plumes is available in *Fire and Rescue Service Operational Guidance, Incidents involving hazardous materials (TSO, 2012)*.

Control measure – Liaise with other agencies

Control measure knowledge

CBRN(E) terrorism is defined as the assumption or knowledge, based on intelligence or evidence of actual or threatened dispersal of chemical, biological, radiological or nuclear material (either on their own or in combination, or with explosives), with deliberate criminal, malicious or murderous intent, targeted at a given population or economic or symbolic points.

Control measure actions

Fire and rescue services should:

- Ensure the JDHA process is used to assist in determining the location and size of cordons to be put in place in the initial stages, and before and after the nature of the substance used is confirmed by specialist responders. This process should not prejudice any requirement for immediate lifesaving actions
- If immediate lifesaving actions are required, fire and rescue service first responders should follow the [CBRN\(E\) first responder flowchart and multi-agency CBRN\(E\) aide-memoire](#)

Control measure – Identify CBRN(E) release indicators

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Use the immediately available detection and monitoring equipment

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Use FireMet

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Immediate lifesaving rescues

Hazard	Control measures
Immediate lifesaving rescues	Undertake a Joint Dynamic Hazard Assessment (JDHA) Undertake deliberate reconnaissance select appropriate personal protective equipment (PPE) Rotate crews Use specialist capabilities

Hazard knowledge

The act of committing to rescues without full chemical protective clothing, while sometimes necessary, presents three elements:

- Location of casualties and establishing those being saveable
- Restricted access and physical hazards damaging PPE
- Manual handling when rescuing from difficult locations

In situations where members of the public are subjected to life-threatening circumstances and immediate lifesaving actions are required, wearing gas-tight suits (GTS) and powered respirator protective suits (PRPS) may be considered excessive owing to time constraints and the availability of resources. Relaxing this requirement may therefore be appropriate to ensure expediency in saving life. However, all hazards and risks must be considered, particularly exposure to hazardous substances and the resultant contamination.

In deciding whether the risk to the health and safety of responders is being reduced to as low as reasonably practicable, a number of factors have to be taken into account. Fire and rescue service structural firekit, combined with self-contained breathing apparatus (SCBA), provides a lesser degree of protection than GTS, but research has demonstrated that the protection factors provided by this level of PPE reduces the risk to fire and rescue service personnel to a level that may be considered acceptable in circumstances where saveable life rescues could potentially be undertaken using 'immediate human life saving rescue' protocols. While it may be appropriate to commit suitably equipped and trained personnel to a hazardous environment for the purpose of saving life, it is not appropriate for body recovery.

Firekit and SCBA are less susceptible to cuts and tears than chemical protective clothing, but incident commanders should balance this against the risk of exposure to the contaminant when deciding on the most appropriate level of PPE.

In a suspected or confirmed CBRN(E) incident, it is unlikely that it will be possible to identify the contaminant until specialist detection, identification and monitoring (DIM) equipment can be deployed. However, the signs and symptoms of the casualties will give an effective indication of the toxicity of the agent and whether it acts through inhalation or skin exposure.

The physical state of the material (solid, liquid or vapour) will affect the risk to responders. Structural firekit will not provide significant protection against highly volatile or corrosive substances, so direct contact with potential contaminants in solid or liquid form must be avoided. Multiple immediate fatalities attributable to poisoning are indicative of exposure to a contaminant that acts through inhalation. SCBA provides responders with an effective level of protection for up to 30 minutes against contaminants that act through inhalation or eye exposure.

If casualties are showing signs and symptoms of being exposed to a vapour that acts through skin exposure, such as caustic chemicals or vesicants (blister agents), indicated by blisters, itching, etc., responders should limit their time spent in such environments to an absolute minimum.

The environment in which the hazardous material has been released will also vary according to the extent of the hazard and the degree of risk. Volatile vapours will disperse much more readily in open air, reducing the risk to emergency responders. A release within a building or underground may lead to higher concentration levels and the vapour may be slower to disperse.

Where a CBRN(E) release has occurred in conjunction with explosives, access and egress may be restricted, and the use of specialist equipment and personnel may need to be considered, to assist in accessing and extricating casualties from these types of environments.

Rescuing persons who are physically trapped may be protracted and result in the casualties being exposed to a contaminant for an extended period. A protracted extrication may also increase the risk to responders owing to extended exposure, and incident commanders should consider this as part of the Joint Dynamic Hazard Assessment (JDHA).

Where a CBRN(E) release has occurred in conjunction with explosives, access and egress may be restricted, and there may be manual handling issues when attempting to extricate casualties. Incident commanders should therefore consider using specialist equipment and personnel to assist in accessing and extricating casualties from these types of environments, to mitigate manual handling issues.

Control measure – Undertake a Joint Dynamic Hazard Assessment (JDHA)

Control measure knowledge

The JDHA is a key component in achieving an effective multi-agency response to deliver a safe resolution to the incident. It is part of the Joint Decision Model (JDM), stage 1: gather information and intelligence. Ideally, this process should be multi-agency. The non-attendance of a particular emergency service or their on-scene commander should not in itself stop this process from taking place but may impact on any decision to deploy personnel.

Joint Decision Model



This information is then used to undertake the following tasks in support of the JDM:

- Identifying the tasks – each individual agency should identify and consider the specific tasks to be achieved through its own role and responsibilities
- Dynamic Risk Assessment – undertaken by individual agencies, reflecting the tasks/objectives to be achieved and the hazards identified
- Apply control measures – each agency should consider and apply appropriate control measures to ensure that any risk is as low as reasonably practicable
- Integrated multi-agency operational response plan – the development of this plan should consider the outcomes of the hazard assessment and the service risk assessments in the context of the agreed priorities for the incident
- Decision log – the outcomes of the JDHA and risk assessments should be recorded, together with the identified priorities and the agreed multi-agency response plan

Control measure actions

In forming its policies and procedures for effective integrated multi-agency operational response, the fire and rescue service should consider the following key steps:

- Identify the hazards (gather information and intelligence) – this will begin from the initial call received by the control room and will continue as first responders arrive at the scene
- Information and intelligence gathered by individual agencies should be disseminated to all first responders and control rooms effectively. The following should be taken into account when identifying hazards:

- CBRN(E) release indicators
- Casualty numbers (walking and non-walking)
- Severity and type of signs and symptoms
- Weather conditions, in particular wind direction
- Hazards present or suspected
- The location of the incident: is it likely to be terrorism or a hazardous material incident?
- Environment – building, open space, underground
- Presence of perpetrators

When the JDHA is complete, it is essential that an effective agency-specific risk assessment is carried out as soon as possible, and in consultation with emergency service partners. In a high-risk, time-pressured environment, responders should implement greater levels of control measures to reduce risk to an acceptable level. This requires balancing the need to save life with the need to reduce risk to personnel. Only then can personnel be committed to the hot/warm zone.

Periodically review and reassess the process to ensure that all new information and intelligence is captured and considered, and to ensure the tactics employed are safe and effective.

In deciding whether the risk to the health and safety of responders is being reduced to as low as reasonably practicable, a number of factors have to be taken into account. While it may be appropriate to commit appropriately equipped and trained personnel to a hazardous environment for the purpose of saving life, it may not be appropriate in a similar situation where there is no saveable life. To assist in the identification of saveable life the following should be considered:

- Are live casualties visible? Are they in line of sight? How long will it take to reach them?
- Are the casualties in open air? Volatile vapours will disperse much more readily in open air, reducing the risk for emergency responders.
- Are the casualties walking or unable to move? Walking casualties should be directed to a place of relative safety without committing crews to the hot zone. Consider use of loudhailers, PA systems, etc.
- Are the casualties located in a building or underground? A release within a building or underground may lead to higher concentration levels and the vapour may be slower to disperse.
- Incident commanders should consider the use of CCTV if available and any other means to establish the presence of live casualties before committing a reconnaissance team
- Estimate number of casualties? Minimum number of rescuers to achieve the task should be deployed
- Signs and symptoms? Traumatic injuries? Being trapped? Mental state?
- Communicate casualty symptoms to health responders and/or hazardous materials and environmental protection officers (HMEPOs) as soon as reasonably practicable, as this may inform the identification of the substance involved

- Estimate how long they have been exposed to the chemical agent(s). This may assist in assessing the toxicity of the agent and/or the level of concentration. For example, where it can be established that casualties have been exposed to a contaminant for 15 minutes or more and are still conscious and breathing, this may indicate a lower level of toxicity or a low level of concentration.

Control measure – Undertake deliberate reconnaissance

Control measure knowledge

Deliberate reconnaissance is defined as the planned, controlled deployment of suitably protected resources working within defined parameters in the inner cordon. These resources will be deployed to specific locations to achieve specific operational objectives.

Operational personnel must be competent to wear self-contained breathing apparatus (SCBA) and should be familiar with Annex D of the [JESIP Initial Operational Response Guidance](#). Incident commanders must be able to undertake the Joint Dynamic Hazard Assessment (JDHA) and service-specific risk assessment and apply the identified control measures effectively before committing personnel to undertake deliberate reconnaissance activities.

Control measure actions

Fire and rescue services should ensure their policies and procedures contain information relating to deliberate reconnaissance.

Incident commanders should consider the following when developing their tactical plan:

- If no living casualties are visible from outside, consider a deliberate reconnaissance by deploying teams into the potentially contaminated area of a structure for a maximum of 15 minutes to establish whether there are any living casualties
- Ensure, where possible, that the potentially contaminated area is viewed through a closed window, doorway or other reasonably safe location to gather casualty information

Control measure – Select appropriate personal protective equipment (PPE)

Control measure knowledge

Fire and rescue services should ensure that all personnel are familiar with Annex D of the JESIP IOR guidance. Operational personnel must be competent to wear self-contained breathing apparatus (SCBA) and be aware of the requirement for minimum crews of two personnel. They should be rigged in a minimum of structural firekit and SCBA, and, where available, should also wear nitrile type gloves (as per road traffic collision protocols) beneath their firegloves.

The use of firekit and SCBA should only be used during the initial stages of the incident to undertake immediate lifesaving activities, and the incident commander should confirm that there are saveable lives before implementing a rescue plan.

The presence of saveable lives can be confirmed through the casualties being in line of sight. In the event that casualties are not in line of sight but there is a reasonable suspicion, based on intelligence, that live

casualties are in the area, the incident commander may commit a deliberate reconnaissance team for a maximum of 15 minutes to provide confirmation.

The deliberate reconnaissance team should not undertake any rescue activity but confirm the presence of live casualties and observe casualty signs and symptoms to inform the JDHA.

During later phases, activities such as mass decontamination may be necessary. When carrying out such activities PPE, such as gas-tight suits (GTS) and powered respiratory protective suits (PRPS), identified in existing guidance, should be adopted.

Incident commanders should be able to undertake the JDHA and service-specific risk assessment and apply the identified control measures effectively before committing personnel to undertake deliberate reconnaissance and rescue activities in the hot and warm zones.

Operational personnel should be aware of the requirements to limit deployments in the hot zone for a maximum duration of 15 minutes for deliberate reconnaissance activities, and 30 minutes for rescue activities in the hot and warm zones. Incident commanders should note that personnel should only undertake one rescue in order to limit exposure.

All personnel should be familiar with the requirements for responder decontamination and the safe undressing procedure detailed in the IOR guidance.

Control measure actions

Fire and rescue services should:

- Ensure they have policies in place that allow the use, decontamination, maintenance and testing of firekit for performing immediate lifesaving actions at a CBRN(E) incident
- Ensure these policies also consider national guidance for incidents involving hazardous materials ([Fire and Rescue Service Operational Guidance: Incidents Involving Hazardous Materials, 2012](#))

Control measure – Rotate crews

Control measure knowledge

Where casualties are trapped and cannot be released immediately, consideration should be given to providing some form of respiratory protection. Rescuers should not exceed the 30-minute deployment limit in order to continue with a protracted extrication but should hand over to another team or await the arrival of a team with a higher level of protection.

Control measure actions

Fire and rescue services should:

- Ensure they have procedures in place to allow for regular rotation of personnel when working in arduous conditions

Control measure – Use specialist capabilities

Control measure knowledge

Personnel should be aware of the specialist capabilities that are available to their respective fire and rescue service, such as urban search and rescue (USAR), technical rescue or line rescue, which may be able to assist in extricating and transporting casualties to an area of relative safety. Personnel should also consider the use of the specialist capabilities that exist within other agencies.

Control measure actions

Fire and rescue services should:

- Ensure that all personnel with relevant specialist operational skills, such as USAR, technical rescue, and line rescue, have received IOR training and are familiar with the hazards and risks associated with working in this type of environment
- Ensure that testing and exercising in this type of environment is considered as part of the training plans for specialist capabilities. The decontamination of specialist equipment should also be considered as part of the implementation of IOR

Hazard – Incorrect assessment of signs and symptomology

Hazard	Control measure
Incorrect assessment of signs and symptomology	Undertake a Joint Dynamic Hazard Assessment (JDHA).

Hazard knowledge

In a suspected or confirmed CBRN(E) incident, it is unlikely that it will be possible to identify the contaminant until detection identification and monitoring (DIM) equipment can be deployed. However, the signs and symptoms of the casualties will give an effective indication of the toxicity of the agent and whether it acts through inhalation or skin exposure.

The physical state of the material (solid, liquid or vapour) will affect the risk to responders. Structural fire kit will not provide significant protection against toxic liquids or powders, so direct contact with potential contaminants in solid or liquid form must be avoided. Multiple immediate fatalities attributable to poisoning are indicative of exposure to a contaminant that acts through inhalation.

The environment in which the hazardous material has been released will also vary according to the extent of the hazard and the degree of risk. Volatile vapours will disperse much more readily in open air, reducing the risk for emergency responders. A release within a building or underground may lead to higher concentration levels and the vapour may be slower to disperse.

Control measure – Undertake a Joint Dynamic Hazard Assessment (JDHA)

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Failure to evacuate ambulant casualties to an area of relative safety

Hazard	Control measure
Failure to evacuate ambulant casualties to an area of relative safety	Use the Initial Operational Response aide-memoire Ensure appropriate control room advice Use FireMet Undertake a Joint Dynamic Hazard Assessment (JDHA).

Hazard knowledge

In evacuating the ambulant casualties, fire and rescue service personnel should be aware of the difficulty in communicating with the casualties and the potential of failing to identify a place of relative safety. To minimise this hazard it is important that the place of relative safety is identified before personnel are committed to carry out rescues.

If members of the public believe that emergency responders are withholding information about an incident, trust and credibility can quickly be lost. Research on public responses to emergencies has shown that the public are willing to accept that much about the situation will be unknown in the early stages, particularly if they believe that emergency responders are working in their best interests. It is therefore important to clearly communicate what is known about the incident, what is being done to help casualties and how they can help themselves. This will help foster public trust and confidence in responding organisations and help promote compliance with emergency interventions.

Moving casualties away from the scene of contamination, followed by immediate disrobing and decontamination, is the most effective measure in saving life and improving casualty outcomes in a CBRN(E) event. Maximum benefit will be achieved within 15 minutes of exposure. These early operational activities should be considered an absolute priority.

Casualties should be directed away from the scene of contamination and point of release.

An area away from the main area of contamination (the suspected point of release and any subsequent contamination spread) should be identified, which, where practicable, should be upwind and ideally uphill of the incident. Any casualties who are able to walk should be directed to this area with the minimum direct physical contact from emergency responders. Consider using telephones or mobile phones, loudhailers and other means.

This area will still be deemed to be within the warm zone and should not be entered by responders without the most appropriate level of PPE, informed by the JDHA.

Control measure: Use the Initial Operational Response (IOR) aide-memoire

Control measure knowledge

The IOR aide-memoire has been issued to all operational personnel and provides a flowchart to enable responders to identify the appropriate actions to be taken where contamination of casualties is suspected. It provides further details on communication with casualties.

Control measure actions

Fire and rescue services should:

- Ensure that the IOR aide-memoires are provided and circulated to all operational personnel
- Implement systems to ensure that personnel carry the aide-memoire as part of their ancillary equipment?
- Consider making the aide-memoire available on fire appliances through mobile data terminals (MDT) and immediately accessible to control staff to assist in the provision of advice in the early stages of the incident

Control measure: Ensure appropriate control room advice

Control measure knowledge

Control room operators need to gather sufficient information to make an informed judgement as to the nature of the incident and the resources required to respond effectively.

Information gathered will also allow control room operators to give appropriate advice to callers at the scene to assist in achieving the initial lifesaving principles, including movement of casualties to an area of relative safety, removal of outer clothing, and decontamination.

Control staff should be familiar with obtaining [FireMet](#) information to identify an area of relative safety upwind of the incident, and only give advice appropriate to the situation.

Control measure actions

Fire and rescue services should:

- Ensure that control room operators are familiar with the JESIP IOR guidance and have access to the aide-memoire in order to be able to deliver the appropriate actions
- Ensure that control room prompts and standard operating procedures specify the information that must be obtained during the initial call, for incidents both in open air and in the built environment

Control measure – Use FireMet

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Undertake a Joint Dynamic Hazard Assessment (JDHA)

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Inability to undertake early decontamination of casualties

Hazard	Control measure
Inability to undertake early decontamination of casualties	Provide disrobe packs or alternatives Use the Initial Operational Response aide-memoire

Hazard knowledge

Failure to remove casualties to an area of relative safety and instigate disrobing in the shortest possible time will result in unnecessarily prolonged exposure to the contaminant, adversely affecting patient outcomes and impacting on survivability.

Control measure – Provide disrobe packs or alternatives

Control measure knowledge

The process of disrobing is highly effective at reducing reaction to CBRN(E) materials when performed within 15 minutes of exposure. If disrobing, followed by appropriate decontamination, is done effectively, scientific research has shown that contamination will be reduced to a level below that which, is considered harmful. Disrobing should therefore be considered the primary action following evacuation from a contaminated area.

Fire and rescue service disrobe packs are available on frontline appliances and contain a pictogram showing a safe undressing procedure that minimises spreading contamination from clothing to exposed skin. If these packs are not available, responders should consider improvising the disrobe procedures.

Control measure actions

Fire and rescue services should:

- Ensure that disrobe packs are distributed immediately to casualties once they are in a place of relative safety. Packs can be thrown to the casualties, removing the necessity to enter the warm zone
- Ensure that responders direct casualties to disrobe and follow the instructions on the pictogram contained within the disrobe pack
- If disrobe packs are not available, ensure that responders consider improvising the disrobe procedures, which might include only removing outer clothing. Such provisions should take careful account of the dignity of the contaminated casualty and of particular ethnic, cultural or religious sensitivities
- Ensure that undressing is systematic and consistent with the steps outlined in the fire and rescue service disrobe pack pictogram to avoid transferring any contamination from clothing to the skin or airway
- Ensure that responders consider the potential for hypothermia, as well as modesty concerns. If available, alternative clothing or blankets should be used
- Ensure that contaminated clothing is left in situ; it will be managed by specialists at a later point in time

Control measure – Use the Initial Operational Response (IOR) aide-memoire

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Failure to decontaminate responders effectively and safely

Hazard	Control measures
Failure to decontaminate responders effectively and safely	Wear personal protective equipment for decontamination Seek specialist advice Disrobe assistants Identify and set up decontamination area

Hazard knowledge

It may not be possible to fully decontaminate PPE and equipment which has become contaminated. This may be caused by the type of PPE that has become contaminated making decontamination difficult, insufficient or inadequate decontamination processes, or by further contamination occurring due to an incorrect undressing procedure.

Decontamination is defined as reducing contamination to lower the risk of harm or further harm to contaminated persons and to lower the risk of cross-contamination.

Generally, in the very early stages of a CBRN(E) incident, improvised/emergency decontamination may be instigated for decontaminating first responders, where personnel have been committed for the purposes of immediate lifesaving activities.

The need to commence improvised decontamination depends on the type of contamination and the availability of a means of decontaminating/resources. Improvised decontamination is the use of an immediately available method of decontamination.

- Dry decontamination should be considered the default process, primarily for chemical incidents, and involves the use of dry, absorbent material such as paper tissue or cloth
- Wet decontamination should only be used where there are signs and symptoms of caustic substance and involves the use of water from any available source, such as taps, showers, hose-reels, sprinklers, etc.

There is a risk to personnel whenever an emergency decontamination is undertaken. This may involve a rescued casualty or personnel themselves when involved in a release of a CBRN(E) material. People who are processed through emergency decontamination should be triaged and may need to be subject to ongoing health monitoring.

Control measure – Wear personal protective equipment (PPE) for decontamination

Control measure knowledge

The level or type of decontamination selected will vary according to the nature and degree of the contaminants and the resources available. The type selected will dictate the level of PPE required by decontamination operatives.

The minimum level of PPE for decontamination operatives is firekit, self-contained breathing apparatus (SCBA) and nitrile gloves. Gas tight suits (GTS) or powered respirator protective suits (PRPS) should be used if available.

Control measure actions

Fire and rescue services should ensure they have policies and procedures in place to:

- Support the incident commander to implement the highest level of PPE available to provide a safe system of work (SSOW) and reduce risk of cross-contamination to decontamination operatives to as low as reasonably practicable
- Ensure that all fire and rescue service personnel are fully conversant with their own service's PPE policies and procedures, and with *Initial Operational Response to a CBRN Incident V1.0* ([JESIP](#), September 2013)

Control measure – Seek specialist advice

Control measure knowledge

All fire and rescue services have access to specialist advice both from their own resources and from external sources, including scientific advisers and Public Health England (PHE). These are good sources of specialist knowledge but are not always available immediately on the incident ground.

Control measure actions

Fire and rescue services should:

- Have policies in place that identify levels of specialist advice and how this advice can quickly be made available to the incident commander

[National Fire and Rescue Service Operational Guidance for Incidents involving Hazardous Materials](#) (TSO, 2012) provides guidance on the interpretation of specialist advice.

Control measure – disrobe assistants

Control measure knowledge

The process of undressing contaminated personnel presents a high risk of contamination passing from the PPE to the operative and responder. The application of a strict and well-rehearsed undressing procedure is important in preventing this. It is important for personnel involved in this process to fully understand their role and the procedures to be adopted.

Control measure actions

Fire and rescue services should:

- Develop and operate a safe undressing procedure at CBRN(E) incidents. This includes procedures for the emergency decontamination of any personnel on the incident ground. The preferred type of decontamination is dry.
- Ensure that personnel are trained in all aspects of decontamination

Control measure – Identify and set up decontamination area

Control measure knowledge

A restricted area around the inner cordon must be identified and implemented, and the numbers of staff entering the hot zone must be limited. The possibility of cross-contamination between contaminated personnel exiting the decontamination process and clean operatives must be considered.

The decontamination area must be carefully considered before implementation. Environmental conditions must be assessed to ensure the safety of personnel operating in the clean area and that any runoff is directed or contained as necessary.

Fire and rescue services should also consider [Fire and Rescue Service: Operational Guidance Incidents involving hazardous materials](#) (TSO, 2012),

Control measure actions

Fire and rescue services should:

- Have procedures in place for decontamination zone management, which should be readily available to incident commanders and officers with specific responsibility for decontamination on the fireground

Hazard – Adverse impact on the environment

Hazard	Control measure
Adverse impact on the environment	<p>Follow Initial Operational Response to a CBRN Incident (JESIP)</p> <p>Follow UK water protocol for contaminated waste</p> <p>Make early contact with the agency responsible for the environment, and water companies</p> <p>Use any local container available for containment of dry decontamination material</p>

Hazard knowledge

When attending an incident involving hazardous materials, whether general or relating to CBRN(E), there is potential for the environment to suffer harm. This may be as a result of the incident itself or the measures taken by the fire and rescue service to resolve the incident.

Fire and rescue service personnel responding to CBRN(E) incidents should be aware of the issues surrounding environmental protection, which is explained in greater detail in the national operational guidance for [Environmental Protection](#).

Control measure – Follow Initial Operational Response to a CBRN Incident (JESIP)

Control measure knowledge

Improvised and interim decontamination may result in contaminated waste water. At this stage, it is likely that there will be limited or no capability to contain water runoff. Emergency responders should understand the requirement to limit as much as possible the runoff of contaminated waste water into the water system, and this should be considered in the ongoing Joint Dynamic Hazard Assessment (JDHA) process. However, any identified immediate requirement to instigate improvised or interim decontamination in order to minimise injury or save life should not be delayed by the risk of contaminated runoff.

The agency responsible for the environment can provide advice on request, covering environmental impact, drainage issues and suitable mitigation measures. Fire and rescue service control rooms should have access to this advice.

Control measure actions

Fire and rescue services should:

- Ensure control rooms have access to advice that the agency responsible for the environment can provide on environmental impact, drainage issues, and suitable mitigation measures

Control measure: Follow UK water protocol for contaminated waste

Control measure knowledge

The protocol provides guidance on dealing with contaminated water and associated solid wastes arising from wash waters, firewater runoff, spillages and contaminated water, which could cause harm to human health, pollute the environment and/or damage the sewage treatment process. This will be achieved through effective communication, control and co-operation.

Control measure actions

Fire and rescue services should

- Have protocols in place for disposing of contaminated waste water

Control measure: Make early contact with the agency responsible for the environment, and water companies

Control measure knowledge

Sewerage undertakers and environment agencies must be consulted as soon as practicable before discharging any contaminated water to waste, or when contaminated water has already entered the drainage infrastructure. This will enable health and safety measures to be instigated in the sewerage system and/or enable contaminated water to be separated from the main flow at the treatment works, by diverting to storm tanks if available.

Control measure actions

Fire and rescue services should:

- Have protocols in place for liaising with the agency responsible for the environment
- Ensure that incident commanders are fully conversant with the requirements of such protocols

A flowchart detailing possible actions to be followed is shown below:

On receipt of call

If, during the emergency call, it is indicated that casualties are contaminated and in need of decontamination, Fire and rescue service control rooms should inform the respective sewerage undertaker and the agency responsible for the environment as soon as practicable



On arrival at the scene

If decontamination is required, the sewerage undertaker and the agency responsible for the environment should be informed as soon as possible. The wash waters should be contained and the contaminants identified as soon as practicable



If fire and rescue service decontamination structures are deployed, the minimum one-hour containment capability provided for both casualty and firefighter decontamination should be used. Additional containment equipment may be available on frontline fire appliances and/or fire and rescue service environmental protection units. Early notification to the sewerage undertaker and the agency responsible for the environment will assist them in discharging their responsibilities to provide timely guidance on containment and disposal options. If advice is not received in time and containment isn't possible, or containment capacity is exceeded, the following hierarchy should be used:



1. Locate the foul sewer and inform the sewerage undertaker of impending pollution as soon as possible afterwards. Place drain-tracing dye provided in runoff containment. Use fire hose to run waste to foul sewer.
2. In the absence of a foul sewer, place drain-tracing dye, if available, in the containment dam and run waste to surface water drains. Inform the agency responsible for the environment and water undertaker as soon as possible
3. In the absence of either of the above drains, run to watercourse or land, seeking advice from the agency responsible for the environment and water undertaker as soon as possible

Control measure – Use any local container available for containment of dry decontamination material

Control measure knowledge

Dry decontamination can produce large amounts of waste, both in the form of discarded clothing and decontaminated material. The disposal of this waste is likely to require specialist disposal companies, who are licensed to dispose of hazardous waste and will have trained their staff to do so safely.

To engage such a company, it will be important to have gathered as much information about the nature of the contaminant as possible.

Control measure actions

Fire and rescue services should:

- Have policies in place for disposing of contaminated materials. This would normally include identifying disposal companies.

- Consider putting in place a formal agreement or contract with specific disposal companies prior to an incident occurring

Hazard – Inability to undertake responder rescue in a contaminated environment

Hazard	Control measures
Inability to undertake responder rescue in a contaminated environment	Use emergency teams Undertake a Joint Dynamic Hazard Assessment (JDHA) Select appropriate personal protective equipment (PPE) Rotate crews Use specialist capabilities

Hazard knowledge

Where a CBRN(E) release has occurred in conjunction with explosives, access and egress may be restricted, and there may be a need to use specialist equipment and personnel to assist in undertaking rescues.

The rescue of responders who are physically trapped may be protracted and result in those personnel being exposed to any contaminant for an extended period. A protracted extrication may also increase the risk to rescuers, owing to extended exposure. Incident commanders should consider this as part of the Joint Dynamic Hazard Assessment (JDHA) and during the development of the tactical plan.

The environment may also contain physical hazards that may cause damage to PPE, in particular to gas-tight suits (GTS) and powered respirator protective suits (PRPS), which are susceptible to cuts and tears. Firekit and SCBA are less susceptible to cuts and tears, but incident commanders should balance this against the risk of exposure to the contaminant when deciding on the most appropriate level of PPE with which to undertake rescues.

The primary objective for all CBRN(E) incidents is to save 'saveable life', and responsibility for carrying out rescues rests with the fire and rescue service. The need for fire and rescue service resources to carry out immediate lifesaving actions could be significant. This must be recognised during the development of the tactical plan, to ensure that sufficient resources are available for providing emergency teams. In a mass casualty event, it is likely there will be public pressure to commit all available resources to effect casualty rescues. Incident commanders should ensure that sufficient resources are reserved for emergency teams to undertake responder rescue if required.

Where a CBRN(E) release has occurred in conjunction with explosives, access and egress may be restricted and there may be manual handling issues when attempting to extricate casualties. Incident commanders should therefore consider the use of specialist equipment and personnel to assist in accessing and extricating casualties from these types of environments, to mitigate manual handling issues.

Control measure – Use emergency teams

Control measure knowledge

Pre-planned breathing apparatus (BA) emergency procedures will facilitate the provision of suitable and sufficient emergency arrangements at an incident, which will significantly enhance the safety of operational BA wearers.

Control measure actions

Fire and rescue services should ensure that the following actions are considered when developing local policies and procedures:

- The provision of suitable and sufficient breathing apparatus emergency arrangements will require appropriate additional resources to be readily available at the incident, which should be taken into account when determining incident resourcing and operational tactics
- When determining breathing apparatus emergency arrangements and emergency team stand-by provisions at the entry control point, the planning and contingency process should take account of all reasonably foreseeable risks and eventualities
- Contingency planning should include the provision of suitable protection arrangements for breathing apparatus emergency teams and should also take into consideration the extreme physiological demands placed on breathing apparatus wearers tasked with assisting or rescuing colleague/s in distress
- The number of breathing apparatus wearers comprising the emergency team, as well as the number of emergency teams, should be suitable and sufficient to complete all reasonably foreseeable emergency tasks. The number of wearers making up an emergency team must be at least equal to that of the largest team deployed or likely to be deployed from that entry control point into the risk area
- The level of personal protective equipment provided for the emergency team will be determined by the requirements of the incident and risk assessment. However, emergency teams must be equipped with at least the same level of protection as those wearers committed into the risk area
- A separate BA entry control board should be provided at the entry control point, readily available to accommodate the deployment of emergency teams
- The BA emergency team shall be provided with such equipment considered to be suitable and sufficient to meet the needs of all reasonably foreseeable emergencies and should be readily available for immediate deployment

Control measure – Undertake a Joint Dynamic Hazard Assessment (JDHA)

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – select appropriate personal protective equipment (PPE)

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Rotate crews

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Use specialist capabilities

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Hazard – Failure to work effectively with others

Hazard	Control measures
Failure to work effectively with others	Multi-agency training Follow protocols Carry out Joint Dynamic Hazard Assessment

Hazard knowledge

An effective response to a CBRN(E) incident is dependent on close multi-agency working from the receipt of the first calls to the incident, through to the incident conclusion. Failure to achieve this interoperability could result in risk critical information being missed, or in a failure to undertake vital tasks (e.g. life saving) in an effective and timely manner. National operational guidance for Operations will cover this in more detail.

Safe systems of work are based on information gathered about the nature and impact of an incident. At a CBRN(E) incident it is very likely that the three emergency services will gather information/intelligence from different sources and the information/intelligence gathered by one service may contain risk critical information relevant to the other services. Failure to share information/intelligence appropriately between

the three emergency services may result in risk critical action not being taken and subsequently, public and responder safety being put at risk.

Individual fire and rescue services are required to produce a risk management plan in order to respond to the identified risks within their area. There is no requirement to standardise equipment, resources and procedure across fire and rescue services in a region or area and therefore there are often variations in the equipment, procedures and resources across fire and rescue services. This can create operational difficulties when resources from different fire and rescue services are required to work together at an incident on or near the border between them.

Control measure – Multi-agency training

Control measure knowledge

Getting the emergency services together to undertake training can be very difficult due to varying priorities and different service capacities. A variety of multi-agency training methods should be considered and used to ensure that all emergency service personnel are aware of the roles and responsibilities of other agencies at CBRN(E) incidents.

Control measure action

Multi-agency training with a focus on other agencies' roles and responsibilities must be added to training plans to ensure that personnel remain up to date.

Control measure – Initial Operational Response protocols regarding sharing of information/intelligence

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Control measure – Joint dynamic hazard assessment (JDHA)

Control measure knowledge

[Link to section above](#)

Control measure actions

[Link to section above](#)

Glossary

Term	Acronym (if applicable)	Description (for 'hover over' feature)
As low as reasonably	ALARP	Reducing the residual risk as low as reasonably practicable. Where the benefit of reduction justifies the control measure

National Operational Guidance – Initial Operational Response to a Chemical%2c Biological%2c Radiological or Nuclear Explosive first edition version one (ARCHIVED on 20-09-2017) (1)

practicable		
Breathing apparatus (sometimes referred to as Self-contained breathing apparatus)	BA (or SCBA)	Self-contained respiratory protective equipment
Chemical, Biological, Radiological or Nuclear (Explosives)	CBRN	<p>CBRN terrorism entails the assumption or knowledge, based on intelligence or actual evidence, of actual or threatened dispersal of chemical, biological, radiological or nuclear material (either on their own or in combination with each other or with explosives), with deliberate criminal, malicious or murderous intent, targeted at a given population or economic or symbolic points.</p> <p>CBRN terrorism includes the release of chemical hazards where this has been done deliberately or where it is not likely that the release is accidental (i.e. incidents eventually classified as HAZMAT) and incidents involving biological infections which are confirmed as not having occurred spontaneously.</p> <p>It involves an immediate, co-ordinated, multi-agency response, requiring concurrent investigations, including specialist advice, a clear and consistent media and public reassurance strategy and customised procedures, plans, training and equipment (e.g. personal protective equipment (PPE), detection equipment, decontamination, evacuation and managing fatalities)</p>
Cold Zone		This is the uncontaminated area between the inner cordon and the outer cordon. It is the area within which key operational command positions and other essential activities will be set up. The Police Service, in liaison with the Fire and Rescue Service and the Ambulance Service, should decide whether members of the public need to be evacuated from the cold zone
Cordon		Exclusion zone. Inner Cordon and Outer Cordon provide exclusion for members of the public and non-essential responders respectively
Decontamination	Decontam	Process for removing contamination from personnel or equipment
Detection, Identification and Monitoring	DIM	DCLG has provided a suite of Detection Identification and Monitoring (DIM) equipment to the fire and rescue service. Detection – The recognition of the presence of a CBRN material. Identification – The determination of which CBRN material is present. Monitoring – A continuous or periodic process of qualitatively or quantitatively determining the presence or absence of CBRN material
Disrobe		Process of removing contaminated clothing from members of the public who may have been contaminated
Disrobe Pack		Pack containing over suit to allow modesty to be maintained when undertaking mass decontamination
Entry Control Board		Board used to store breathing apparatus tallies and record information relating to breathing apparatus wearers
Entry Control Point		Entry point through which breathing apparatus wearers must pass when entering and exiting the hazard area
Environment Agency	EA	Government body responsible for environmental protection within England and Wales. Similar bodies exist in Scotland and Northern Ireland
Firekit		The generic term for PPE provided for structural fire fighting.

National Operational Guidance – Initial Operational Response to a Chemical%2c Biological%2c Radiological or Nuclear Explosive first edition version one (ARCHIVED on 20-09-2017) (1)

		Generally includes helmet, hood, gloves, tunic, over trousers and boots
FireMet		Service, provided by the Met Office for emergency responders, to assist in predicting extent of spread of a chemical or smoke plume
Gas Tight Suits	GTS	A coverall suit which offers a high level of protection from ingress of chemicals in any form including gas or vapour
Hazard area		This is an area that contains hazards with the potential to harm life and the environment to which a risk assessment should be applied in order to determine safe areas and a suitable inner cordon. A hazard area is not necessarily an 'exclusion zone' and would encompass both the hot and warm zones if they exist.
Hazard Manager		Hazard Manager is a one-stop information source for the emergency response community. It is an interactive web portal using maps which can be overlaid with weather and incident related information. It allows users to access their services in one location, using a single username and password. "Events" are posted when there is an active incident, essential for keeping cat 1&2 emergency responders up-to-date with the very latest information and developments as they happen.
Hazardous Materials and Environmental Protection Officer	HMEPO	Specialist Officer who attends an incident to provide the incident commander with tactical advice on hazardous materials and environmental protection issues.
Hot Zone		This is the contaminated area(s) where the initial release occurs or disperses to. It will be the area likely to pose an immediate threat to the health and safety of all those located within it and is the area of greatest risk. It is located within the inner cordon and is part of the hazard zone.
Initial Operational Response	IOR	The initial responding crews to a CBRN(E) incident, who do not have specialist training or knowledge
Inner Cordon		Cordon established to secure the immediate scene and provide a measure of protection for personnel working within the area
Joint Decision Model	JDM	A decision model presented within the JESIP joint Doctrine and used to make analytical decisions
Joint Dynamic Hazard Assessment	JDHA	An assessment of risk taking into account the requirements of all emergency response organisations present at an incident
Joint Emergency Services Interoperability Programme	JESIP	Joint Emergency Services Interoperability Programme Two year programme aiming to improve the way in which the three blue light services work together at major and complex incidents
Liquid Tight Suits	LTS	A coverall suit which offers a high level of protection from chemicals but is not gas tight
Mass decontamination	MD	The planned and structured procedure delivered by the Fire and Rescue Service using purpose designed decontamination equipment where there are large numbers of contaminated casualties
Mobile Data Terminal	MDT	Device which allows incident commanders to access vital operational information at the scene of the incident. It may also be used for mobilisation and location information
Multi-Agency		Response or activity carried out by more than one response organisation. Usually these are category one or category two organisations as defined by the Civil Contingencies Act

Outer Cordon		Cordon established around the vicinity of an incident, and encompassing the inner cordon, to control access to a wider area around the scene, to allow the emergency services and other agencies to work unhindered and in privacy
Powered Respirator Protective Suits	PRPS	A Protective Suit which is designed to be worn without the need for self contained breathing apparatus
Public Health England	PHE	Public Health England is an executive agency of the Department of Health in the United Kingdom . Its formation came as a result of reorganisation of the National Health Service (NHS) in England outlined in the Health and Social Care Act 2012 . It took on the role of the Health Protection Agency , the National Treatment Agency for Substance Misuse and a number of other health bodies
Rendezvous Point	RVP	A point at which emergency responder meet before deploying into the hazard zone
Secondary Device		Secondary devices are bombs placed at the scene of an ongoing emergency response that are intended to cause casualties among responders
Standard Operating Procedure	SOP	A standard way of working at a defined type of incident. Generally this is in the form of a written procedural document
Step 1-2-3 (+)		Procedure for assessing approach to Hazmat or CBRN(E) incident.
Traffic Cordon		Supplementary cordon around the outer cordon to control internal traffic access for emergency and other vehicles
Urban Search and Rescue	USAR	Specialist fire and rescue capability for working in, and carrying out rescues from an urban environment which has suffered catastrophic failure such as collapse
Warm Zone		The area uncontaminated by the initial release of a substance, which may become contaminated by the movement of people or vehicles. It is surrounded by the inner cordon and is part of the hazard zone but usually contains lower risks than the hot zone
Safe System of Work	SSOW	Approved method of working following a full risk assessment either at the time or prior to the task being carried out.

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