CFOA National Resilience

National Ambulance Resilience Unit NARU

Police National CBRN Centre

Intelligent preparation for CBRN terrorism

OPERATIONAL GUIDANCE CIRCULATION

GUIDANCE FOR EMERGENCY SERVICES PERSONNEL RESPONDING TO INDIVIDUAL CHEMICAL EXPOSURE (ICE) EVENTS

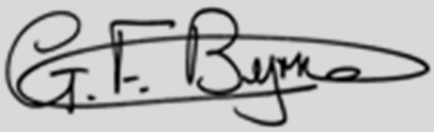
Circulation Number: 001/2015

Date of Circulation: 25/02/2015

Authorised By: Head of Centre, Gerry Byrne

Date: 12/01/2015

Original document must be signed prior to circulation:



.....

POLICE NATIONAL CBRN CENTRE, College of Policing Ltd, Leamington Road, Ryton on Dunsmore, Coventry CV8 3EN
Admin: 02476 516 333 • Admin Email: cbrnadmin@college.pnn.police.uk
24 Hour Hotline: 0845 000 6382 • Email: cbrnopscentre@college.pnn.police.uk

Operational Guidance from Police National CBRN Centre

Guidance for Emergency Services Personnel Responding to Individual Chemical Exposure (ICE) Events

This document has been produced by the Police National CBRN Centre (PN CBRN C). It is Operational Guidance considered as good practice by the PN CBRN C and Multi-Agency partners.

The guidance will be updated as appropriate in accordance with development of policy and tactics, or legislative changes.

This document has been produced in consultation with:

- Association of Chief Police Officers (ACPO) Disaster Victim Identification (DVI) co-ordinator
- Fire & Rescue National Resilience Team, Chief Fire Officers Association (CFOA)
- National Ambulance Resilience Unit (NARU)
- National CBRN Practitioners Group
- Public Health England

This document is classed as OFFICIAL and is NOT FOR THE PUBLIC DOMAIN.

Applications for disclosure under the Freedom of Information Act 2000 should be directed to the PN CBRN C.

All enquiries regarding this guidance should be directed to:

Police National CBRN Operations Centre
Leamington Road
Ryton-on-Dunsmore
Coventry
CV8 3EN

☎ 0845 000 6382
✉ cbrnopscentre@college.pnn.police.uk

Original Author: Sgt Gary Smith

Document updated by: N/A

Authorised for Circulation by: Head of Centre, Gerry Byrne

Date of Circulation: 25/02/2015

CONTENTS

1. Glossary of Abbreviations

- AS - NHS Ambulance Service
- ATEX - ATmospheres EXplosibles
- CBRN - Chemical, Biological, Radiological, Nuclear
- CO - Carbon Monoxide
- DIM - Detection, Identification, Monitoring
- DRA - Dynamic Risk Assessment
- DVI - Disaster Victim Identification
- EA - Environment Agency
- FLO - Family Liaison Officer
- FRS - Fire and Rescue Service
- GDS - Government Decontamination Service
- GTS - Gas Tight Suit
- HART - Hazardous Area Response Team
- ICE - Individual Chemical Exposure
- IED - Improvised Explosive Device
- IOR - Initial Operational Response
- JDHA - Joint Dynamic Hazard Assessment
- JDM - Joint Decision Model
- JESIP - Joint Emergency Services Interoperability Programme
- JRCALC - Joint Royal Colleges Ambulance Liaison Committee
- LA - Local Authority
- LEL - Lower Explosive Limit
- NHS - National Health Service
- NILO - National Inter-agency Liaison Officer
- NPIS - National Poisons Information Service
- PHE - Public Health England
- PLE - Pronounced Life Extinct
- PM - Post Mortem
- PPE - Personal Protective Equipment
- PPM - Parts per million
- PRPS - Powered Respirator Protective Suit
- ROLE - Recognition of Life Extinct
- SIO - Senior Investigating Officer
- UEL - Upper Explosive Limit

2. Introduction

2.1. This document has been produced with the intention of providing operational guidance and support to emergency services personnel who are required to respond to a suspected or confirmed Individual Chemical Exposure (ICE) event. ICE events are frequently characterised by the use of a chemical or a mixture of chemicals by an individual/s with the intent to self-harm predominantly via ingestion or inhalation.

2.2. The document intends to cover the period of time starting from the first trigger event being notified to an emergency services control centre. It then focuses on the saving of life in the early stages of a multi-agency response and concludes with either the removal of the casualty to health care or to the ultimate disposal of the deceased through burial or cremation.

2.3. This guidance has not been drafted with a view to cover Chemical, Biological, Radiological or Nuclear (CBRN) incidents (i.e. confirmed or suspected terrorism events) or any incident involving mass casualties (i.e. incidents that will utilise Disaster Victim Identification (DVI) procedures and protocols).

3. Aim

3.1. Strategic Intentions –

Throughout the document the aim is to provide guidance to achieve the following strategic intention and priorities:

- Preserve and Protect Life
- Mitigate and minimise the impact of an incident
- Inform the public and maintain public confidence
- Prevent, deter and detect crime
- Assist an early return to normality

Other important common strategic objectives flowing from this strategy are:

- To ensure the health and safety of all those responding to the incident
- To safeguard the environment
- To facilitate judicial, public, technical or other enquiries
- To evaluate the response and identify lessons to be learned

3.2. The content of this document takes cognisance of the legality, necessity, proportionality and transparency relevant to human rights legislation as detailed in the Human Rights Act 1998, and in particular, Schedule 1, Part 1, Article 2 of the Act (Right to Life).

4. Individual Chemical Exposure (ICE) Events

4.1. ICE events are frequently characterised by the use of a chemical or a mixture of chemicals with the intent to self-harm predominantly via ingestion or inhalation. These events commonly occur in sealed or partially sealed environments such as vehicles, residential bathrooms, hotel rooms and other enclosed areas where a small amount of gas can quickly reach lethal concentrations. Instructions on how to produce a range of associated chemical reactions and how to create the required environment are freely available on the internet. Any event involving exposure of an individual to chemicals or other hazardous substances may present a serious risk to the public, to the emergency services and to other health workers, such as hospital and mortuary staff, who may come into contact with the contaminated individual.

4.2. The most common type of events of this nature reported to the emergency services are:

Inhalation

- The combining of household or other chemicals to create a toxic gas. Commonly, hydrogen sulphide, hydrogen cyanide or phosphine gas have been produced by the mixing of substances such as lime sulphur, potassium cyanide or aluminium phosphide with bleach or acids. These incidents commonly occur in an enclosed area and may involve doors, vents and windows being sealed with tape to prevent the gas escaping.

- The use of asphyxiant gases such as helium or nitrogen that may involve plastic bags or hoods being placed over the victims head and are attached to a cylinder by rubber tubing. This can lead to death by asphyxiation.

- Barbeque fatalities commonly involve the lighting of a barbeque in a confined space which creates carbon monoxide (CO) gas. Incidents typically occur in a vehicle, a cupboard, a small room such as a bathroom or a tent. Duct tape or a similar material is often placed around vents and windows in order to contain the gas.

Ingestion

- The ingestion of a hazardous chemical such as cyanide, phosphide salts or sulphurous compounds e.g. lime sulphur. This is frequently ingested as a drink although ingestion via capsules has been noted. Although the majority of the hazard may be 'trapped' inside the victim's body after ingestion, there may still be a potential risk to others from off-gassing and/or contamination of clothing or the surrounding area.

Annex A of this document contains chemical datasheets produced by Public Health England (PHE) that may be referred to in order to assist in the identification of the specific type of ICE event and provide general safety advice to emergency responders. In addition to the datasheets, scientific advice can be accessed through the utilisation of each emergency services standard protocols or via the Police National CBRN Centre (PN-CBRN-C) on 08450 006382.

4.3. **Indications of an ICE Event** - It is important to note that the signs of an ICE event may not be immediately obvious, however there may be certain indications or manifestations at the scene that may alert emergency services personnel to the possibility that an ICE event is ongoing. These may include:

- The signs and symptoms being displayed by casualties and their severity. Casualties or emergency responders may be experiencing breathing difficulties and/or have irritation to the eyes and nose.
- The event is taking place in an unusual location e.g. a beauty spot in a rural area or a small enclosed room;
- Information has been received (e.g. from a witness) that a person at the scene may be in possession of chemicals or that there is some history or intelligence that suggests the person has attempted to self-harm on a previous occasion;

- Warning notes or safety data have been taped to vehicle or house/building windows or doors;
- Duct tape, plastic or towels have been used to cover air vents windows and/or doors in order to produce a sealed environment;
- Vehicle occupant/s appears unconscious or unresponsive;
- Presence of a 'suicide bag' or hood at the scene;
- Suspicious (possibly spilled or empty) containers or cylinders at the scene of an event;
- Unexplained vapour in the air or a strong chemical smell present at the scene e.g. the smell of rotten eggs, bitter almonds, garlic or decaying fish;
- The presence of a barbecue within a sealed or partially sealed environment;
- Disabled smoke alarms and/or carbon monoxide alarms.

5. Initial Phase of an ICE Event

5.1 Call handlers and control room staff within an emergency services control centre should obtain as much information and collate as much intelligence as possible regarding a suspected ICE event in order that an informed judgement can be made as to its nature and a decision can be made as to the resources that are required to deploy to the event. Following an evaluation of the information received, the control room should carry out an initial assessment of the incident and should consider carrying out the following priority actions:

- Identify and categorise the incident as one that is suspected to involve person/s exposed to chemicals;
- Deploy appropriate resources relevant to the risks/hazards identified at the scene. This should include resources that are suitably equipped and appropriately trained to **save life within a hazardous environment** (e.g. Fire and Rescue Service (FRS) and Ambulance Service (AS) Hazardous Area Response Team (HART) personnel);
- Identify and put in place an appropriate command and control structure for the event and notify specialist resources such as HART, CBRN Tactical Advisors, Detection, Identification and Monitoring (DIM) teams, FRS Hazmat Officer and National Inter-Agency Liaison Officers (NILO's);
- All information / intelligence gathered by call handlers/control room staff relating to hazards at the scene should as a matter of priority then be shared with other control rooms of responding assets. The use of Multi-Agency Interoperability Communication Talk-Groups should be considered in order to achieve this. During the initial stages of an incident, the emergency services should utilise the METHANE mnemonic to pass on information between control rooms and emergency responders:

M	• Major Incident declared?
E	• Exact Location
T	• Type of Incident
H	• Hazards present or suspected
A	• Access – routes that are safe to use
N	• Number, type, severity of casualties
E	• Emergency services present and those required

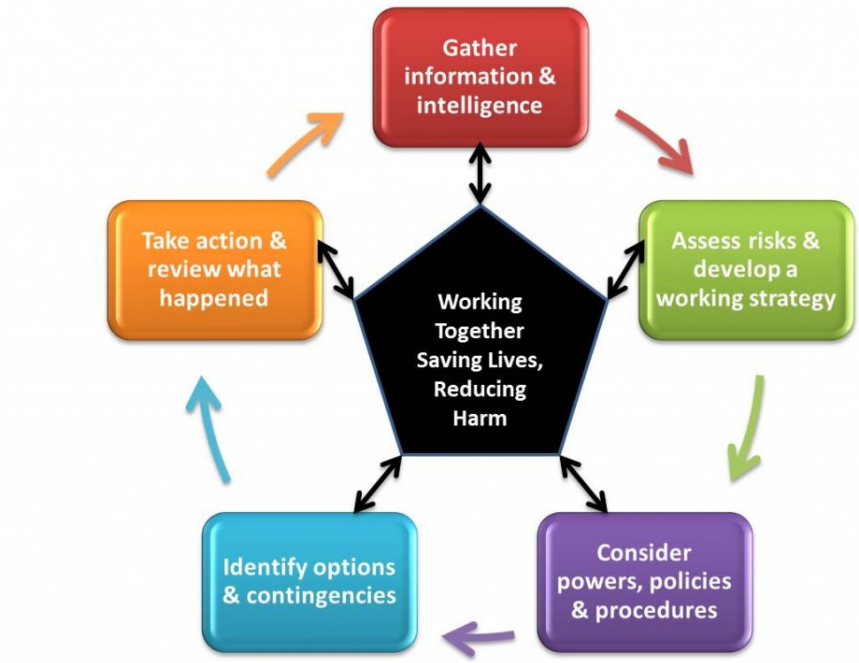
6. Emergency Responders Arrival at Scene

6.1. Multi-Agency Co-ordination –

6.1.1. Once the emergency services are aware that an ICE event is ongoing, then the incident will require a rapid multi-agency response and, to achieve the best outcomes, all responders must work together effectively as soon as they arrive on the scene. It is vital that the emergency services communicate and co-operate with each other so as to provide an effective response to such an incident in order to **PRESERVE AND PROTECT LIFE.**

6.1.2. **Annex B** of this guidance document contains a flow-chart that reflects the emergency services response to a typical ICE event.

6.1.3. In line with Joint Emergency Service Interoperability Programme (JESIP) principles, adhering to the Joint Decision Model (JDM) will enable efficient and effective joint working as well as help the emergency services determine their priorities for action:



6.1.4. The Emergency Services should approach the incident via a route that is safe and identify an appropriate RVP for other responders that is located in a

safe place and (dependent on the location of the incident) upwind of the suspected hazard. They should then:

- Undertake a **Joint Dynamic Hazard Assessment (JDHA)** in order to identify any hazards associated with the incident. The JDHA is a key component in achieving an effective multi-agency response to deliver a safe resolution to the incident. The information/intelligence for the JDHA may come from numerous sources, including scientific advice, but should also include the initial information received by call handlers and control room staff. The JDHA process should ideally be multi-agency but **should not prejudice any requirement for immediate life-saving actions and the non-attendance of a particular emergency service should not in itself stop this process from taking place** but may impact on any decision to deploy personnel. The process should be periodically reviewed and re-assessed to ensure that all new information and intelligence is captured and considered, and to ensure the tactics employed are safe and effective. Additionally, the decisions emanating from the JDHA should be recorded. It is acknowledged that in the early stages of the incident this may not be possible, but it should be noted that post-incident scrutiny inevitably focuses on the earliest decision making.
- Identify the tasks that are required to be carried out;
- Undertake an agency specific **Dynamic Risk Assessment (DRA)** reflecting the tasks/objectives to be achieved, their associated risks, and the proposed measures to eliminate or control them;
- Agree an operational plan.

6.2. Take Action – Saving Life

6.2.1. Once the JDHA and DRA process has taken place then the emergency services should take steps to PRESERVE AND PROTECT LIFE. The actions of the emergency services will be dependent on the nature of the incident but may include the following priority actions:

- communicate with persons who may be at risk from the incident and direct them away from the main area of contamination into a safe area;
- consider implementing an initial cordon and then, subsequently, an inner and outer cordon in order to control, safeguard and co-ordinate the response to the ICE event. Additionally, consider whether hot/warm/cold zones[1] should be designated in order that the incident can be controlled and managed as safely as practicable;
- consider ventilating the enclosed environment and removing the patient from the area of risk (from the source of exposure) to a place of relative safety (into a ventilated space) where either medical treatment/resuscitation can take place (e.g. through the use of a Fire and Rescue Service (FRS) 'snatch rescue' and the medical support of HART/SORT personnel). However, before ventilation takes place it is important to establish the destination of any vented gases and assess the risks to surrounding properties and the wider public. The decision as to the level of any personal protective equipment (PPE) to be worn by emergency service personnel whilst undertaking life-saving work and whether or not the appropriate decontamination of emergency services personnel will be required should be based on the results of the JDHA /DRA process and each agency's extant protocols and procedures.

[1] 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.
Warm zone: This is the area uncontaminated by the initial release of a substance, which may become contaminated by the movement of people or vehicles.
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.

6.2.2. If any suspicious devices, packages or equipment are observed at the scene that may indicate an explosive/improvised explosive device (IED) risk then emergency responders should comply with bomb scene management guidelines. Specialist support should then be requested.

6.2.3. The presence of certain gases or liquids within a confined space within an ICE scene may increase the risk of fire or explosion (e.g. hydrogen sulphide). The use of appropriate Detection, Identification and Monitoring (DIM) equipment, where available, should be considered in order to check oxygen levels /flammability limits (Lower Explosive Limits/Upper Explosive Limits) within the scene on initial entry. Additionally, the use of DIM equipment should be considered in order to conduct a hazard assessment of the scene. Swiftly establishing the nature of the hazardous substance will be beneficial in protecting first responders, support the clinical management of a contaminated casualty and will aid the Police investigation into the incident. Recourse to appropriate scientific advice and the utilisation of the PHE chemical datasheets attached to this document in Annex A should also be considered. Although the early identification of the chemical/gas at the scene would assist with the management of the ICE event, it should not delay the emergency services life-saving activities. Any equipment deployed into a risk area should be ATmospheres EXplosibles (ATEX) rated if there is a potential for flammable vapours or explosive atmospheres.

6.2.4. The NHS Ambulance Service (AS) has a responsibility to render treatment up to and including advanced life support resuscitation unless the casualty meets the Joint Royal Colleges Ambulance Liaison Committee (JRCALC) approved criteria for recognising life extinct. Unless a suspected ICE casualty can be formally recognised as life extinct by an approved medical professional[2], the casualty should be assumed to be a potential survivor in need of rescue and lifesaving interventions and appropriate medical care

[2] State Registered Paramedic, Registered Medical Practitioner or other medical professionals recognised by a HM Coroner and appropriate medical professional body to formally recognise life extinct.

should be provided until the casualty can be formally handed over to hospital staff. An exception to this is when another professional agency or responder is able to clearly confirm signs unequivocally associated with death and is competent in recognising and confirming those signs. It is, however, unlikely that such signs will be ascertainable in an ICE situation until the casualty has been accessed or removed to a ventilated area. Any casualty formally declared life extinct at the scene should be left in situ and the AS will be responsible for the completion of a ROLE (Recognition of Life Extinct) or a Pronounced Life Extinct (PLE) form.

6.2.5. Mouth to mouth/nose resuscitation should not be attempted on a contaminated casualty. The AS has access to advanced life-support equipment that can be utilised to treat casualties from an ICE event. First responders other than ambulance personnel should adhere to the Resuscitation Council guidelines for Adult Basic Life Support. Chest compression only resuscitation (i.e. without rescue breaths) is effective for a limited period only, so the casualty should be treated with advanced life-support equipment as quickly as possible. Following inhalational only exposures there will be minimal risk of secondary contamination from chest compression only resuscitation. If a toxic agent has been ingested the potential risks to responders and the PPE requirements should be determined by a JDHA taking into account chemical specific information in Annex A and/or scientific advice. In the absence of chemical specific information and to ensure a timely response, PPE with respiratory and dermal protection should be used.

6.2.6. A potential survivor of an ICE event may need to be subject to decontamination prior to arrival at a hospital. Where necessary, casualties should be de-contaminated at the scene in order to minimise risks to others and avoid contamination of emergency vehicles. The AS is responsible for providing the management of decontamination for people affected by a hazardous substance, prior to evacuation from the scene. This would be

conducted in accordance with scientific advice (Annex A of this document also provides advice on decontamination with regard to the more common types of ICE events). In addition, first responders involved in the incident may also require decontamination.

6.2.7. Decontamination after exposure to a chemical hazard is intended to reduce the risk of harm to the casualty, to others or to the wider environment. The presence of the chemical or contaminated vomit or other bodily fluids on the casualty's skin, hair or clothes, may indicate the need for external decontamination to reduce the risk of secondary contamination. External decontamination will not reduce the risk of exposure to toxic gases present in exhaled breath or evolved from vomitus. Generally, however, the risk of secondary exposure from a single patient's exhaled breath or vomitus is likely to be very low and once a casualty has been decontaminated it is unlikely they will present a secondary contamination threat. It is important, however, to perform a DRA for each case.

6.2.8. The risk of secondary contamination is also lower if the method of exposure is solely via inhalation of toxic gas (e.g. hydrogen cyanide, phosphine or hydrogen sulphide) rather than ingestion of a toxic solid, liquid or powder. In this situation, decontamination of the responders and the casualty may not be necessary, however scientific advice may be sought. Following exposure via ingestion, it is important to perform a DRA on the potential threat from any vomitus or exhaled air and hence assess the need for PPE to transport the casualty to hospital.

6.2.9. When decontaminating casualties, emergency service personnel involved should wear appropriate PPE. For ambulance staff (non-HART), appropriate advice on the level of PPE should be sought from the HART Team Leader or an Ambulance Tactical Advisor.

6.2.10. It is important that first responders inform the receiving hospital that a casualty is potentially contaminated prior to their arrival at the Emergency Department and of any potential risks the Department should be aware of.

Scientific advice may be used to communicate these risks. In the event that a contaminated casualty arrives at the Emergency Department, decontamination should be performed before the casualty enters the hospital. Staff conducting decontamination should wear appropriate PPE.

6.2.11. Following admission to hospital, incidences of secondary contamination can be significantly reduced by ventilating the clinical area, rotating staff away from the patient ('tag-team' system) and where possible ensuring the patient is treated in an isolated bay. In addition there is the potential risk of the spread of toxic vapours through the hospital ventilation or air-conditioning system. If the Emergency Department's air-conditioning system is connected to the rest of the hospital then, dependent on the incident and subject to a DRA, it may be necessary to switch it off. However, if the air-conditioning system is switched off then an independent air-conditioning system should be kept running as it will improve the ventilation of the Emergency Department and help to minimise airborne concentrations.

6.2.12. For specialist advice on the clinical management of cases of any poisoning, the National Poisons Information Service (NPIS) is available 24 hours to provide specialist and consultant medical advice to clinicians. They can be contacted on 0844 892 0111.

7. Investigation Phase

7.1 General Considerations

7.1.1 Once the initial life-saving work within the scene has been completed then the scene should be designated as a crime scene, a scene log should be opened and a Police investigation of the incident commenced. It is vital that all ICE events are approached by the emergency services with a view that a criminal act may have taken place and once a crime scene has been declared then all further actions within the scene will be conducted under the direction of a Police Senior Investigating Officer (SIO) who will be responsible for the co-ordination of the investigation. Dependent on the incident, the assistance of other agencies such as the Health and Safety Executive may be required. Advice from specialist resources such as Tactical Advisors and the PN CBRN C are also available to assist the SIO in forming an appropriate plan to investigate an ICE event.

7.1.2 It is essential that the emergency services continue to communicate effectively and that the JDHA is regularly reviewed. If necessary, appropriate scientific advice should be sought at each stage to ensure that the investigation of the incident is conducted in a safe manner. In particular, the use of DIM equipment should be considered in order to establish whether the scene is safe for personnel to work in and whether PPE requires to be worn by personnel conducting investigate activity within the scene.

7.2 Investigative Options

7.2.1 The following actions should be considered as part of the investigation phase:

- Clarify what actions, if any, have been taken at the scene by either members of the public or initial emergency service responders. If the incident is deemed suspicious then persons who have entered the incident scene will need to be identified and formal accounts of their

actions obtained for investigative purposes. Statements may be required from those witnesses and members of the emergency services who have attended the scene.

- Conduct relevant enquiries that will help in establishing the nature of the incident and whether any crime may have been committed e.g. house to house enquiries, the conducting of enquiries with the family of the casualty, the viewing of relevant CCTV etc. Consider the evidential capture of the scene through photography or video and whether a forensic examination of the scene will be required. The scene should be subject to a search to locate items that may be deemed as evidential value such as chemicals, chemical data sheets, hazard warning signs and suicide notes. In particular, personal computers and mobile telephones will often contain valuable information about the victim's state of mind/plans and may be of benefit in establishing the circumstances leading up to the incident (e.g. websites recently browsed). In addition, a deceased person at the scene may also require searching before recovery in order that any evidence or means of identification are captured at the scene.

- In the event of a death, the Coroner/Procurator Fiscal should be notified of the incident at the earliest opportunity. This will assist in deciding upon the process for the removal of the deceased, the maintenance of the identification standards and any subsequent post-mortem procedure. This direction will help formulate the recovery strategy and will assist in identifying an appropriate mortuary that will be suitable for accepting the deceased.

- A media strategy may be required to be put in place in response to an ICE event and this should be developed in partnership with other agencies.

8. Recovery Phase

8.1 Guidance on Recovery of the Deceased from an ICE Event.

8.1.1 It will be the responsibility of the Police Service working on behalf of the Coroner/Procurator Fiscal to recover the deceased and conduct an identification process.

8.1.2 The recovery of fatalities can be taxing for those directly involved and is a generally emotive issue. The process must be carefully handled, balancing the need to preserve the integrity of the crime scene with the safety and welfare of the staff undertaking the process and the dignity of the deceased.

8.1.3 ICE events can present complex challenges with regard to the identification, the recovery of the deceased and the recovery of personal property or evidence from within a scene. Dependent on the circumstances of the incident and following an appropriate DRA, DVI trained staff may be utilised to assist and provide expert advice to the Police SIO in order that the deceased is recovered safely in accordance with DVI procedures and protocols.

8.1.4 There may be the potential for off-gassing from the body of the deceased following an incident and moving the deceased may reintroduce the risk of secondary exposure. Therefore, the safe handling of a contaminated fatality is considered to be a critical part of the management of the scene. A review of the JDHA and the individual agency's DRA should be conducted as part of the planning process before the deceased is recovered from the scene and the deceased should be handled in such a way that any health and safety risks are adequately controlled. Appropriate control measures and safe systems of work should be implemented and scientific advice may be sought as to whether or not to initiate decontamination procedures for those personnel who are involved in the recovery process. In addition, the deceased's property or evidence within the scene may also require to be

recovered and this property may be contaminated, therefore scientific advice may need to be sought as to how this can be safely achieved.

8.1.5 Chemical resistant body bags (also known as CBRN body bags or gas tight body bags) are designed to provide a physical barrier to particulate, liquid, vapour and gas materials. Annex A of this document provides PHE advice on whether a chemical resistant body bag may be required with regard to the more common types of ICE events. The body bags come in various sizes: large adult, medium adult and infant/fragment and generally have a minimum breakthrough time of 48 hours although this may be dependent on the concentrations of the relevant chemical at the scene and therefore **the decision to determine whether a chemical resistant body bag should be utilised for a particular ICE event should be dependent on scientific advice.** Each bag has a filter that allows gases produced from the decomposition of the body to escape whilst retaining any harmful chemicals. Therefore, it is important that scientific advice is obtained if a contaminated casualty is being left enclosed inside a chemical resistant body bag for longer than the 48 hour period. The outside of a chemical resistant body bag can become contaminated during the body recovery activity. The risk of this occurring can be decreased through the use of a groundsheet or similar that can provide a protective layer between the ground and the body bag. Chemical resistant body bags may need to be decontaminated or 'washed' prior to the transportation of the deceased from the scene. Scientific advice should be sought as to the most appropriate way for this to be done. The FRS may be able to assist with this process. Further information regarding the use of a chemical resistant body bag can be obtained through the PN CBRN C or by referring to the current in service (as of 2015) body bag information sheet shown in Annex C of this guidance document. (Note: In cases only involving the inhalation of toxic gases, the potential for off-gassing is reduced and the use of a chemical resistant body bag is unlikely to be necessary).

8.2 Transportation of the Deceased to a Hospital Mortuary.

8.2.1 The JDHA should be reviewed and a DRA conducted prior to the transportation of the deceased. It is vital that the appropriate scientific advice has been obtained to allow an informed DRA process to be undertaken. Any risk assessments and scientific advice must be shared with those who are transporting the deceased (i.e. undertakers) and with mortuary staff to assist with the safe handling of the deceased. Scientific advice may recommend that a suitable vehicle used for transportation of the body should have a ventilated load area and be separated from the driver's compartment.

8.3 Remediation.

8.3.1 The Police SIO may have declared the contaminated area as a crime scene and therefore the clean-up of the scene should not take place until it has been authorised by the SIO. In most circumstances the clean-up of the scene will be the responsibility of the property owner or the Local Authority (LA) employing specialist contractors. The Government Decontamination Service (GDS) may also be able to assist in identifying a suitable contractor to undertake the clean-up at an incident. Generally, contaminated waste that has been collected should be bagged and clearly labelled as potentially contaminated waste. LA employed specialist contractors may arrange disposal but the Environment Agency (EA) can be contacted for advice regarding the disposal of such waste. It is important that the scene is formally 'handed over' to the owner/LA by the emergency services and that this process is appropriately documented. The property/LA must be advised of any known or suspected hazards that may exist at the scene.

9. Post Incident Phase

9.1. Post-Mortem Considerations.

9.1.1. The very nature of an ICE incident may mean that fatalities cannot be handled in the same manner as other deaths. It is important that the dignity and social, ethnic and religious sensitivity of the deceased and their family should be considered throughout. The deceased's family should be provided with accurate and timely information with regard to post-mortem arrangements and, to assist this, the SIO should consider whether to deploy a Family Liaison Officer (FLO) to assist with issues that may arise from these types of events. In some circumstances it may not be possible for the family to view the deceased and this should be considered as part of the ongoing DRA. In addition there may also be difficulties in the return of contaminated personal effects and property.

9.1.2. In consultation with the Coroner/Procurator Fiscal, it must be established whether the circumstances of the death will require a post-mortem (PM) examination. If an examination is to occur, then the level of examination must be established. Examination can in some circumstances be limited to inspection of the body without any invasive procedures and in certain cases taking a blood sample and subsequent analysis of the sample may provide sufficient evidence for the coroner to determine the cause of death without a post mortem being required. In other scenarios, an invasive procedure may be required in order to reliably establish the cause of death. Whether a mortuary can be utilised for an ICE fatality will be dependent on the specific circumstances of the incident (i.e. the chemical involved, the DIM readings recorded at the scene of the ICE event and the facilities within the mortuary itself). Designated mortuaries that may be able to carry out post-mortem examinations for an ICE fatality have been identified in some regional areas through local arrangements (e.g. Local Resilience Forum's). It is important to ensure that the PM can be carried out safely, without compromising the ability of the staff to undertake any necessary work, and that the staff at

the mortuary are appropriately trained to carry out such a PM. To minimise any risks the PM should be performed in a well-ventilated environment such as a mortuary suite with adequate ventilation and air exchanges, negatively pressured in relation to surrounding rooms and ideally with a down draft across the examination table. The mortuary suite should also have a suitable fume hood or cupboard where the upper gastrointestinal tract, lungs and other contaminated tissues can be examined.

9.1.3. Scientific advice should be sought as to whether there will be a requirement for any ongoing DIM monitoring of the deceased or (if applicable) of a chemical resistant body bag within the mortuary environment. Annex A provides information for individual chemicals where DIM monitoring may be useful. The use of environmental or detection and monitoring equipment, before and during the post-mortem, may aid the risk assessment.

9.2. Final Disposal of Contaminated Bodies.

9.2.1. Once a body has been released for final disposal, the method used may well be determined by the nature of the contaminant. The general principal is that burial or cremation are available options. It will be the decision of the Coroner/Procurator Fiscal as to how to dispose of the deceased. In either event, advice may be sought from the EA, Public Health Agencies (e.g. PHE) and the Federation of Burial and Cremation Authority. The viewpoint of the deceased's family with regard to any religious/cultural sensitivities around burial or cremation should also be considered before a final decision on disposal is taken.

9.3. Welfare of Emergency Services Personnel.

9.3.1. Supervisors should ensure that any member of staff who may be suffering ill effects from their attendance at an ICE event should seek medical advice/treatment as soon as possible. Additionally, support, advice and guidance from an appropriate Occupational Health Department should be

considered. Effective debriefing has been shown to provide an appropriate mechanism for identifying post-event welfare issues.

9.4. Joint Learning.

9.4.1. In order to facilitate operational debriefing and to provide evidence for inquiries (whether judicial, public, technical, inquest or of some other form), it is essential to keep records. Single agency and inter-agency debriefing processes should aim to capture information while memories are fresh. For this reason a joint hot debrief should be undertaken by commanders as soon as practicable following the event. Critical Incident debriefs should be considered for individual members of staff.

10. AUTHORISED SIGNATORY

Name:	**JOHN CAMPBELL**
Position:	**ACC, ACPO CBRN Lead**
Contact Details:	**Email: john.campbell@thamesvalley.pnn.police.uk**
Location:	**Thames Valley Police Headquarters** **Oxford Road** **Kidlington** **Oxon.** **OX5 2NX**
Signed:	***Signed copies held in HoC's Office, PN CBRN C**
Date:	
Signed for on behalf of the Association of Chief Police Officers (ACPO)	
Name:	**KEITH PRIOR**
Position:	**Assistant Chief Ambulance Officer**
Contact Details:	**Email: keith.prior@nhs.net**
Location:	**National Ambulance Resilience Unit** **c/o Police National CBRN Centre** **Leamington Road** **Ryton-on-Dunsmore** **Coventry** **CV8 3EN**
Signed:	***Signed copies held in HoC's Office, PN CBRN C**
Date:	
Signed for on behalf of National Ambulance Resilience Unit (NARU)	
Name:	**RON DOBSON**
Position:	**Commissioner London Fire Brigade**
Contact Details:	**Email: ron.dobson@london-fire.gov.uk**

Location:	**London Fire Brigade Headquarters** **169 Union Street** **London** **SE1 8LL**
Signed:	***Signed copies held in HoC's Office, PN CBRN C**
Date:	
Signed for on behalf of Chief Fire Officers Association (CFOA)	

11. Reference/Supporting Documents

CBRN incidents: clinical management and health protection, Health Protection Agency (2008).

Civil Contingencies Act 2004.

Coroners Act 2009.

Fire and Rescue Services Act 2004.

Fire and Rescue Service Decontamination of Body Bags Operating Procedure 2012.

Fire and Rescue Service Operational guidance Incidents involving chemical, biological, radiological, nuclear and explosives (CBRN (E)), Department for Communities and Local Government 2012.

Fire and Rescue Service *Operational guidance Incidents involving hazardous materials*, Department for Communities and Local Government, 2012.

Guidance on the Management of Chemical Fatality and self-harm incidents, Health Protection Agency 2010.

Health and Safety at Work etc. Act 1974.

Health Protection Legislation (England) Guidance, Department of Health 2010.

JESIP: Initial Operational Response to a CBRN Incident and The Interoperability Framework (2013).

Public Health Guidance on the Management of Chemical Fatalities and Self-harm Incidents, Public Health Agency (Northern Ireland) 2013.

Respirex *Body Bag information sheet* 2011 (attached below).

Strategic National Guidance: The Decontamination of People Exposed to Chemical, Biological, Radiological and Nuclear substance or Materials, Home Office, 2004.

Suicide Act 1961 (chapter 60 9 and 10 Eliz 2).

The Safe Handling of Contaminated Fatalities Guidance Document, Home Office (2009).

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

The Police Tactical Management of CBRN Events (ACPO 2010).

UK Ambulance Service Clinical Practice Guidelines 2013.

UK Resuscitation Council. Resuscitation Guidelines 2010.
http://www.resus.org.uk/pages/guide.htm

12. Annex A – PHE Chemical Datasheets for ICE Events

Note: The following Public Health England datasheets are intended as guidance only. Emergency services personnel, in addition to the datasheets, may consider seeking further scientific advice relevant to the confirmed or suspected hazards associated with the specific incident. This advice can be accessed through the utilisation of each emergency service's standard protocols.

Appendix 1: Hydrogen Cyanide and Cyanide Salts

Appendix 2: Hydrogen Sulphide (H_2S)

Appendix 3: Phosphine (PH_3)/Metal Phosphides

Appendix 4: Sodium Azide/Hydrazoic Acid

Appendix 5: Asphyxiant Gases

Appendix 6: Carbon Monoxide (CO)

13. Appendix 1 to Annex A

Hydrogen Cyanide (HCN) and Cyanide salts (e.g. sodium / potassium cyanide).

Properties: Hydrogen cyanide (HCN) is a flammable, colourless gas with an odour of bitter almonds, whilst cyanide salts are generally white solids with a faint bitter almond odour.

Routes of toxicity	Cyanides are absorbed by inhalation, ingestion and through intact skin. Cyanides act very rapidly via inhalation or ingestion and can be fatal within minutes. Toxicity from skin exposure requires a large surface area to be in contact with a cyanide salt and symptoms may be delayed for several hours.
Symptoms of exposure	Early features: headache, nausea, dizziness and anxiety followed by confusion, drowsiness, tachycardia, palpitations and tachypnoea. There may be a "bitter almond" odour on the patient's breath Moderate toxicity: brief episodes of loss of consciousness, convulsions, vomiting and hypotension Severe toxicity: deep coma, cardiovascular collapse and respiratory depression
Risk of secondary Contamination	HCN Gas: Minimal risk of secondary contamination from **inhalation** of HCN once the patient has been removed from the site of exposure. HCN vapour is less dense than air and disperses rapidly. Cyanide salts: If a cyanide salt has been **ingested** or if clothing is contaminated with cyanide salts they may react with gastric acid, water or residual chemicals and release HCN. This could pose a hazard to first responders, hospital and mortuary staff.
Is a chemical resistant body bag required?	HCN Gas: A chemical resistant body bag is unlikely to be required following **inhalational** exposures to only HCN. Cyanide salts: A chemical resistant body bag would usually be required following exposure via **ingestion**. Cyanide salts may continue to react with stomach acid to release HCN following death.

Is decontamination required?	HCN Gas: Unlikely to be required. Cyanide salts: Likely to be necessary if clothing or skin contaminated with cyanide salts or contaminated vomit.
Personal Protective Equipment (PPE)	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders:	Only responders with access to appropriate PPE should enter the 'hot zone' or carry out rescues Self-contained breathing apparatus and PPE (e.g. fire kit) may be considered for immediate rescues to preserve life Full PPE such as Gas Tight Suit/ Powered Respirator Protective Suit may be used for scene assessment and body recovery
Hospital:	PPE for chemical hazards unlikely to be required for patient only exposed via inhalation. Following ingestion be aware of potential risks of off gassing from patient / any contaminated vomit. NHS PRPS PPE may be required
Mortuary Staff:	Following ingestion appropriate PPE may be required. PPE for chemical hazards would not usually be indicated for inhalational exposures.
Antidotes:	Use is dependent on the severity of poisoning: Oxygen (recommended as part of treatment) Sodium thiosulphate Hydroxocobalamin Dicobalt edetate and dextrose Sodium nitrate **Contact the National Poisons Information Service (24 hr. number: 0844 892 0111) for advice on the use of antidotes for cyanide poisoning.**
Post-mortem considerations	
Potential hazards	Following ingestion off gassing from the gastric cavity may pose a hazard (even if the body cavity is not opened). Gastric contents and the body cavity may retain hazardous levels of cyanide.

Is DIM monitoring beneficial at post-mortem	**Yes** (following cases of ingestion)
Exposure limits (ppm)	
Odour threshold	1 to 5 (but not detected by 60 to 70% of population)
UK 15min workplace exposure limit	10
UK 8 hour workplace exposure limit	N/A
Explosive limits (ppm)	
Lower (LEL)	56,000
Upper (UEL)	400,000

14. Appendix 2 to Annex A

Hydrogen Sulphide (H_2S).

Properties: A Colourless gas with a characteristic odour of rotten eggs. Odour is detectable at levels that do not cause toxicity although humans maybe desensitised to smell at high concentrations. Extremely flammable and may form explosive mixtures in air.

Routes of toxicity	Inhalation - rapidly absorbed by the lungs into the bloodstream and widely distributed throughout the body. Ingestion unlikely as it is a gas at room temperature.
Symptoms of exposure	Irritant to the respiratory tract, eyes and skin. High concentrations lead to collapse, respiratory paralysis, cyanosis, convulsions, coma, cardiac arrhythmias and death within minutes
Risk of secondary contamination?	Minimal risk of secondary contamination once the patient has been removed from the site of exposure. If clothing or skin is contaminated with chemicals used to generate H_2S this may present a hazard to first responders, hospital and/or mortuary staff through physical contact with clothing or from breathing in vapours.
Is decontamination required?	Not usually required if the patient has only been exposed via inhalation of H_2S. If the body or clothing is contaminated with chemicals used to generate H_2S decontamination may be required.
Is a chemical resistant body bag required?	Unlikely to be required for exposures from inhalation of H_2S. A chemical resistant body bag may be required following **ingestion** of sulphurous compounds e.g. lime sulphur, where H_2S may continue to be released following death.
Personal Protective Equipment	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders:	Only responders with access to appropriate PPE should enter the 'hot zone' or carry out rescues

	Self-contained breathing apparatus and PPE (e.g. fire kit) may be considered for immediate rescues to preserve life Full PPE such as GTS/PRPS may be used for scene assessment and body recovery.
Hospital / A&E staff:	PPE for chemical hazards unlikely to be required for patient only exposed via inhalation. Following **ingestion** of sulphurous compounds be aware of potential risks of off gassing from patient / any contaminated vomit. NHS PPE may be required
Mortuary Staff:	PPE for chemical hazards unlikely to be required for inhalational exposures. Following ingestion appropriate PPE may be required.
Antidote:	No specific antidote. **Contact the National Poisons Information Service (24 hrs. number: 0844 892 0111) for advice on treating patients following exposure.**
Post-mortem considerations	
Potential hazards	Off gassing is unlikely to pose a hazard even if the body cavity is opened. However, in rare cases where a body has been saturated with a gas there may be a risk of release of residual H_2S.
Is DIM monitoring beneficial?	Yes provides reassurance due to low odour threshold and inexpensive hand held monitoring devices available
Exposure Levels (ppm)	
Odour threshold	0.008 (but olfactory paralysis can occur at 100)
UK 15min workplace exposure limit	10
UK 8 hour workplace exposure limit	5
Explosive limits (ppm)	
Lower	43,000
Upper	460,000

15. Appendix 3 to Annex A

Phosphine (PH_3) / Metal Phosphides (e.g. Aluminium phosphide).

Properties: Phosphine gas is colourless, extremely flammable, reactive and highly toxic. Commercial grade PH_3 has the odour of garlic or decaying fish whereas pure grade is odourless. Aluminium phosphide is a yellow or dark grey crystalline solid that is non-flammable and has a garlic-like odour.

Routes of toxicity	**Ingestion of metal phosphides is highly toxic** as phosphine is released in the stomach. Inhalation of phosphine may occur when metal phosphides are exposed to moisture or water. Absorption through the skin/eyes is not considered a significant route of exposure.
Symptoms of exposure	Inhalation causes irritation to the mucous membranes of the nose, mouth, throat and respiratory tract. Nausea, vomiting and diarrhoea may be acute. Weakness, chest pain, fever, tremor, headache, dizziness, and ataxia have been observed. Ingestion may cause stomach pain, nausea, vomiting, diarrhoea and dysponea. Haematemsis may occur. Severe poisoning may result in tachycardia, hypotension, convulsions, coma, cardiac arrhythmias and death.
Risk of secondary contamination	Phosphine: Minimal risk of secondary contamination from **inhalation** of phosphine once the patient has been removed from the site of exposure. However, it is denser than air so may accumulate in low lying areas. Metal phosphides: Ingestion of phosphide salts leads to reaction with stomach acids releasing phosphine and small amounts may also be exhaled unaltered in expired air. First responders, hospital and mortuary staff could be affected by breathing in vapours from off-gassing of phosphine from the gastric lumen (intestine) and in expired

	breath. Phosphine may also be released from vomitus or if residual metal phosphides on clothing come into contact with moisture.
Is decontamination required?	Phosphine: Unlikely to be required if the victim has only been exposed to phosphine gas. Metal phosphides: Likely to be necessary if clothing or skin contaminated with phosphide salts or contaminated vomit **NB: Consider dry decontamination due to risk of phosphine release in contact with water**
Is a chemical resistant body bag required?	Phosphine: A chemical resistant body bag is unlikely to be required following inhalation exposures to phosphine gas alone. Metal phosphides: A chemical resistant body bag may be required following significant ingestions of metal phosphides.
Personal Protective Equipment	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders:	Only responders with access to appropriate PPE should enter the 'hot zone' or carry out rescues **Self-contained breathing apparatus and PPE (e.g. fire kit) may be considered for immediate rescues to preserve life** Full PPE such as GTS/PRPS may be used for scene assessment and body recovery
Hospital:	PPE for chemical hazards unlikely to be required for patient only exposed via inhalation. Following ingestion be aware of potential risks of off gassing from patient / any contaminated vomit. NHS PRPS PPE may be required
Mortuary Staff:	Following ingestion appropriate PPE may be required. PPE for chemical hazards would not usually be required for inhalational exposures.

Antidote:	No specific antidote **Contact the National Poisons Information Service (24 hrs. number: 0844 892 0111) for advice on treating patients following exposure.**
Post-mortem considerations	
Potential hazards	Following ingestion off gassing from the gastric cavity may pose a hazard (even if the body cavity is not opened). Gastric contents and the body cavity may retain hazardous levels of phosphine.
DIM monitoring beneficial at post-mortem	Yes for ingestion, pest control companies e.g. Rentokil may be able to assist
Exposure Levels (ppm)	
Odour threshold	0.1-0.2 (although pure phosphine is odourless)
UK 15min workplace exposure limit	0.2
UK 8 hour workplace exposure limit	0.1
Explosive Limits (ppm)	
Lower	18,000
Upper	No data

16. Appendix 4 to Annex A

Sodium Azide / Hydrazoic acid.

Properties: Sodium azide is a colourless and odourless white solid. It is soluble in water, forming the toxic compounds hydrazoic acid and hydrogen azide gas. The gas has a pungent odour. Its formation can be explosive causing combined traumatic and toxicological effects.

Routes of toxicity	**Ingestion of sodium azide is highly toxic** and is the most likely route of exposure Inhalation of hydrazoic acid vapour or hydrogen azide gas may occur when sodium azide is exposed to moisture or water. The extent of sodium azide absorption through the skin is unclear but systemic toxicity has been reported.
Symptoms of exposure	Ingestion causes headache, nausea, vomiting, diarrhoea, pallor, blurred vision, dilated pupils, restlessness, faintness, muscle weakness, sweating and hypothermia. This can lead to coma and respiratory failure. Inhalation also causes coughing, nasal irritation and bronchospasm In severe cases there may be profound hypotension, bradycardia, ventricular tachycardia and fibrillation. Acute lung injury, cerebral oedema and cardiomyopathy may occur.
Risk of secondary contamination	Hydrazoic acid/ hydrogen azide gas: Minimal risk of secondary contamination from **inhalation** once the patient has been removed from the site of exposure. Sodium azide: Hydrazoic acid/hydrogen azide gas may be exhaled following ingestion of sodium azide.

	First responders, hospital and mortuary staff could be affected by breathing in exhaled vapours, off-gassing from vomitus or if residual sodium azide on clothing comes into contact with moisture.
Is decontamination required?	Hydrazoic acid/ hydrogen azide: Unlikely to be required if the victim has only been exposed to vapour. Sodium azide: May be necessary if clothing or skin contaminated with sodium azide, contaminated vomit or other chemicals. **NB: consider dry decontamination due to risk of hydrazoic acid/hydrogen azide release in contact with water.**
Is a chemical resistant body bag required?	Hydrazoic acid / hydrogen azide: A chemical resistant body bag is unlikely to be required following inhalation exposures. Sodium Azide: A chemical resistant body bag may be indicated following significant ingestions
Personal Protective Equipment	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders: **Hospital:** **Mortuary Staff:**	Only responders with access to appropriate PPE should enter the 'hot zone' or carry out rescues **Self-contained breathing apparatus and PPE (e.g. fire kit) may be considered for immediate rescues to preserve life** Full PPE such as GTS/PRPS may be used for scene assessment and body recovery PPE for chemical hazards unlikely to be required for patient only exposed via inhalation. Following ingestion be aware of potential risks of off gassing from patient / any contaminated vomit. NHS PRPS PPE may be required Following ingestion appropriate PPE may be required.

	PPE for chemical hazards would not usually be required for inhalational exposures.
Antidote:	No specific antidote **Contact the National Poisons Information Service (24 hrs. number: 0844 892 0111) for advice on treating patients following exposure.**
Post-mortem considerations	
Potential hazards	Off-gassing may pose a hazard even if the body cavity is not opened. Harmful products are to be expected in the stomach as well as the body cavity.
DIM monitoring beneficial at post-mortem	Yes for ingestion.
Exposure Levels (ppm)	
Odour threshold	No data
UK 15min workplace exposure limit	0.1
UK 8 hour workplace exposure limit	0.3
Explosive Limits	
Lower	No data but highly explosive.
Upper	

17. Appendix 5 to Annex A

Asphyxiant Gases (e.g. Nitrogen, Helium, Carbon Dioxide, Methane, Nitrous Oxide).

Properties: Simple asphyxiants include nitrogen, carbon dioxide (CO_2), helium (He), Nitrous oxide, and some gaseous hydrocarbons (e.g. methane (CH_4), propane (C_3H_8), and butane (C_4H_{10})). Methane, propane and butane are highly flammable and may form explosive mixtures in air.

Routes of toxicity	Inhalation of asphyxiant gases reduces or displaces the normal oxygen concentration in breathing air and can lead to death by asphyxiation. Asphyxiant gases are of greatest risk in confined spaces. The gases may be colourless and odourless, and their presence in high concentration may not be noticed.
Symptoms of exposure	Initial euphoria, headache, nausea , drowsiness, progressive loss of consciousness
Risk of secondary contamination	None. Emergency responders should be aware of potential low oxygen environments when undertaking rescues
Is decontamination required?	Not required
Is a chemical resistant body bag required?	No
Personal Protective Equipment	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders: **Hospital:** **Mortuary Staff:**	Self-contained breathing apparatus may be required to perform rescues from low oxygen atmospheres. None required. None required
Antidote:	Oxygen (recommended as part of treatment). **Contact the National Poisons Information Service (24 hrs. number: 0844 892 0111) for advice on treating patients following exposure.**
Post-mortem considerations	
Potential hazards	None

DIM monitoring beneficial at post-mortem	No						
Exposure Levels (ppm)	**Carbon dioxide**	**Nitrous oxide**	**Butane**	**Methane**	**Propane**	**Helium**	**Nitrogen**
Odour threshold	None	None	None	None	None	None	None
UK 15min workplace exposure limit	15,000	100	750	N/A	N/A	N/A	N/A
UK 8 hour workplace exposure limit	5,000	N/A	600	N/A	N/A	N/A	N/A
Explosive Limits (ppm)							
Lower explosive limit	N/A	N/A	19,000	55,000	23,000	N/A	N/A
Upper explosive limit	N/A	N/A	85,000	140,000	95,000	N/A	N/A

18. Appendix 6 to Annex A

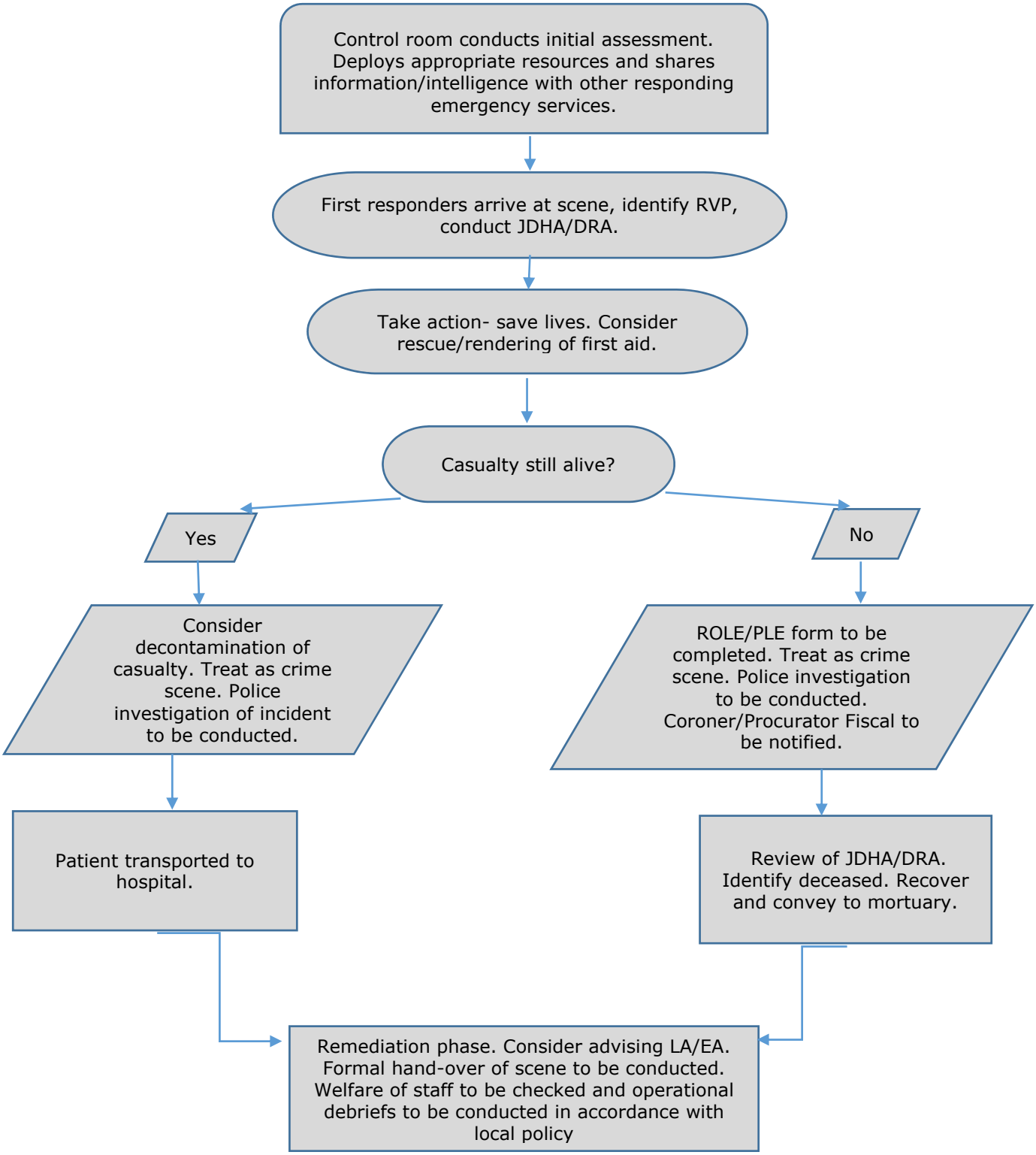
Carbon Monoxide (CO).

Properties: Carbon monoxide (CO) is a flammable, colourless and odourless gas from the incomplete combustion of fossil fuels (e.g. disposable barbecues).

Routes of toxicity	Inhalation - rapidly absorbed by the lungs into the bloodstream where it binds to haemoglobin, forms carboxyhaemoglobin and can lead to hypoxia. Skin contact and ingestion are not significant routes of exposure. CO is of greatest risk in confined spaces and its presence in high concentration may not be noticed.
Symptoms of exposure	Following short-term exposure symptoms such as headache, dizziness, confusion, and disorientation may occur leading to fainting, low blood pressure, coma and death in severe cases.
Risk of secondary contamination	None, emergency responders should be aware of potential low oxygen environments when undertaking rescues.
Is decontamination required?	Not required
Is a chemical resistant body bag required?	No
Personal Protective Equipment	**The following is generic advice. Always follow site specific dynamic risk assessment**
First responders: **Hospital:** **Mortuary Staff:**	Self-contained breathing apparatus may be required to perform rescues from low oxygen atmospheres. None required. None required
Antidote:	Oxygen (recommended as part of treatment). **Contact the National Poisons Information Service (24 hrs. number: 0844 892 0111) for advice on treating patients following exposure.**
Post-mortem considerations	
Potential hazards	None
DIM monitoring beneficial at post-mortem	No
Exposure Levels (ppm)	

Odour threshold	Odourless
UK 15min workplace exposure limit	200
UK 8 hour workplace exposure limit	30
Explosive limits (ppm)	
Lower	125,000
Upper	750,000

19. Annex B: ICE event flow-chart



20. Annex C – Current in service Body Bag (as of 2015) Information Sheet.

RESPIREX

BODY BAG INFORMATION SHEET

- Permanently attached heavy-duty PVC base providing excellent abrasion resistance
- Sufficient carrying handles to enable lifting and transportation over rough terrain. Straps manufactured from heavy-duty PVC.
- A laminated viewing window to enable casualty identification (adult & medium sizes only).
- Heavy-duty gas tight zipper fitted around three sides of the bag with large Viton ring on slider to allow for ease of zipping/unzipping when wearing CPPE gloves
- Fitted with two JFR 85 filters providing a breakthrough time of 48 hours in accordance with the tender specification.
- Exhaust valves that prevent over pressure in the bag. These can be covered by screw caps to prevent any outflow from the bag during handling.
- A4 size waterproof document pouch permanently attached to the bag over the viewing window. This enables the viewing window to be obscured if necessary.
- A small transparent pouch below the viewing window to contain an audit ID label.
- Interior of bags equipped with plastic backed super absorbent sheets
- Labelling "DANGER CBRN CONTAMINATION" with black and yellow toxic, chemical, biohazard and radioactive pictograms permanently attached below the document pouches. "HEAD" and "FEET" labels placed at the top and bottom of the bag respectively (adult and medium sizes only)
- Body bag is tested to EN464:1994 for leak tightness
- Body bag supplied sealed in a polythene bag and packed into a waterproof, tear resistant, puncture and abrasion resistant PVC stowage bag with webbing straps and handles.

BODY BAG CAPABILITY

Large
2360mm long x 950mm wide x 160mm deep
Weight up to 130kgs

Medium
1750mm long x 700mm wide x 160mm deep
Weight up to 80kgs

Issue 01
12/01/2011
Form. 222

Respirex International Limited,
Unit F, Kinsfield Business Centre,
Philanthropic Road, Redhill,
Surrey RH1 4DP. England

RESPIREX

1- Unpack the body bag from its PVC stowage bag (fig.1)

2- Remove from its sealed polythene bag and unfold body bag (fig.2)

3- Inside the stowage bag between the folded body bag there is a pack of two JFR 85 filters (fig.3)

Fig.1

Fig.2

Filter Pack

Fig.3

4- Unzip the heavy duty gas tight zipper with the large Viton ring on slider (fig.4)

5- The interior of the body bag (fig.5) has:

a. super absorbent sheets (x3)

b. filter housing (x2) to fit JRF 85 filters

Fig.4

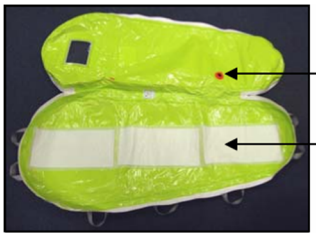


Fig.5

6- Unwrap filters, remove white plastic caps (fig.7a) and fit them inside the body bag on the filter housings (fig.7b). When fitting the filter(s) ensure that the protruding lugs on the filter engage with the two lugs on the filter housing so they "click" into place.

7- When static, open the valve protection caps (x2) on the outside of the body bag (fig.8a and 8b). When moving, during wet decontamination or exposed to heavy rain, the valve protection caps must be closed.

Fig.7a

Fig.7b

Fig.8a

Fig.8b

8- Highlight or cross out symbols (fig.9) to show the type of contamination

Fig.9