MINISTRY OF DEFENCE

Ministry of Defence

Local Authority and Emergency Services Information (LAESI) Edition 8

Def Sy/14/01/02
May 2011
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This document has been equality and diversity impact assessed in accordance with Departmental policy. This resulted in:

_ Part 1 screening only completed (no direct discrimination or adverse impact identified)

Contents

Section 1: Introduction

1.1. This document has been written by the MOD to provide information for the Emergency Services (Police, Fire and Ambulance) and Local and Health Authorities on contingency arrangements to be implemented in the unlikely event of an emergency, including those arising out of terrorist acts, during the transportation of nuclear weapons, special nuclear material [1] (SNM), including new and used submarine reactor fuel. Throughout this document these materials are referred to collectively as Defence Nuclear Material (DNM).

1.2. Her Majesty's Government possesses nuclear weapons to effect the policy of maintaining a minimum nuclear deterrent. The Royal Navy operates Trident, the United Kingdom's only nuclear weapon system, which is a submarine-launched ballistic missile. Provision exists for our United States (US) allies to have nuclear weapons based in the UK and/or to fly through UK airspace, and the Defence Nuclear Emergency Organisation (DNEO) will lead a joint response with the US in the unlikely event of an emergency involving a US nuclear weapon.

A Trident II D5 Missile breaking the surface - fired from HMS Vanguard

HMS Victorious in transit to the HM Naval Base Cylde

1.3. DNM movements are kept to the minimum necessary to meet operational requirements in support of the United Kingdoms fleet of nuclear powered submarines and the strategic deterrent, provided at all times by a Trident ballistic-missile equipped submarine (SSBN).

1.4. Rigorous safety procedures are implemented during all such operations. The limited movement of DNM together with inherent safety features and procedures lead to the conclusion that the probability of a transport emergency leading to a radiological hazard is highly unlikely. In accordance with the requirements of UK domestic legislation and MOD policy, the MOD maintains a capability to respond in the event of an emergency during the transport of defence nuclear assets.

There has never been an accident involving Defence Nuclear Material in the UK that has led to, or come anywhere near leading to, the release of radioactive material to the environment.

1.5. The response by the emergency services and local authorities to a transport emergency involving DNM will have much in common with the response to any major incident or emergency. The police provide strategic direction of any multi-agency response through the Strategic Coordinating Group. The principles laid down in the Cabinet Office publication "Emergency Response and Recovery" and the Scottish Government publication "Preparing Scotland" form the basis of MOD's own arrangements which are fully integrated into the overall response.

[1] Tritium, Uranium (both highly enriched and depleted) and Plutonium are used in the production of nuclear weapons and are generically termed Special Nuclear Materials.

Section 2: Defence Nuclear Material Transport Operations

2.1. DNM is moved by various transport methods. Nuclear weapons, SNM and new reactor fuel are transported by road. UK SNM is also moved by air, as are US nuclear weapons. Used fuel is transported by rail, but this may involve a short road journey to the railhead. A Special Safety Cell (SSC) monitors all road and air movements of DNM; Annex B provides further details of SSC procedures.

2.2. Containers used for transporting nuclear weapons and SNM, including new and used reactor fuel provide protection from impact, high levels of mechanical stress and fire. They are tested against International Atomic Energy Agency (IAEA) standards for abnormal environments. Intact containers will, in all cases, prevent any significant radiological hazard to personnel even if in close proximity.

2.3. All DNM movements are carried out by specially trained personnel. The safety procedures and operational aspects associated with the transport of these materials are summarised in this section. A list of local authorities which DNM may be transported through or fly over is provided at Annex A.

2.4. Nuclear weapon, SNM and New Reactor Fuel convoys maintain contact by radio and telephone with Task Control, MDP Central Control Room (TC MDP CCR), Wethersfield, Essex, who monitor their movement, and with the civil police force through whose area they are transiting. Police forces are always notified in advance of a convoy being routed through their area; this enables them to advise the convoy about any local traffic problems. Police forces may advise fire brigades of the presence of the convoy if it is moving into the vicinity of a fire brigade operation. By local arrangement between police and fire services, the latter may also be informed shortly before a nuclear weapon convoy enters their area of responsibility.

Nuclear Weapon Transport by Road

2.5. The road transport of UK nuclear weapons is the responsibility of Defence Equipment and Support (DE&S). When transported by road, nuclear weapons are moved in vehicles called Truck Cargo Heavy Duty (TCHD). The cargo bodies of these vehicles are designed to provide a high degree of protection to a weapon container and its contents, even in the environments likely to be experienced in a very severe road traffic accident.

2.6. The TCHDs containing the weapons are moved in a convoy of MOD vehicles with an escort provided by the Ministry of Defence Police (MDP). The convoy is made up of a highly trained crew, consisting of a first aid team, fire fighters, mechanics to enable roadside repairs, and personnel equipped to monitor for radiological hazards..

SNM Transport by road

2.7. The transportation of SNM is the responsibility of DE&S. SNM is transported in the UK either by road or air, in containers designed in accordance with IAEA standards. When transported by road SNM is moved in High Security Vehicles (HSV), which comply with UK transport regulations. The HSVs containing the SNM are moved in a convoy of MOD vehicles with an escort provided by the MDP. The convoy is made up of a highly trained crew, including a first aid team and personnel equipped to monitor for radiologica hazards.

New Reactor Fuel Transport by Road

2.8. Reactor fuel for nuclear powered submarines is manufactured at Rolls Royce in Derby. It is transported by road to Devonport Dockyard for installation into submarines undergoing refit. In addition, new reactor cores are transported to BAe Systems at Barrow-in-Furness for installation into new build submarines and, infrequently, to the Naval Reactor Test Establishment (NRTE) at Vulcan, Dounreay, in Scotland.

2.9. New fuel is transported in the form of separate modular units that are individually packaged into protective containers known as New Module Containers (NMC) which are designed in accordance with IAEA standards. The movements comply with UK transport regulations and the NMCs are loaded onto standard road transport vehicles that travel in convoy. The MDP escorts these convoys, and specialists travelling in separate vehicles provide technical support in areas such as radiation monitoring.

Used Reactor Fuel Transport by Road

2.10. Used fuel is transported by rail, but this may involve a short road journey to the railhead. The used fuel is transported in protective purpose-built containers (Used Fuel Flasks (UFFs)) which are designed in accordance with IAEA standards. The UFFs are loaded onto special wagons configured for rail as well as road use. Security and safety measures are equivalent to those provided during road transport of new fuel and transport arrangements comply with UK transport regulations.

Nuclear Weapon and SNM Transport by Air

2.11. UK nuclear weapons are not transported by air. Occasional movements of US nuclear weapons are conducted by air under stringent safety procedures, which include careful route selection. These stringent procedures also apply to the air transport of SNM. The Royal Air Force (RAF) maintains a response team and the SSC is at a state of readiness throughout the flight. Only multi-engined military transport aircraft are used to transport nuclear weapons or SNM by air. These aircraft are subject to an enhanced maintenance regime.

RAF VC10 Aircraft

United States Air Force C17 Aircraft

Used Reactor Fuel

Transport by rail

2.12. The MOD is responsible for the consignment of used reactor fuel. It is transported by rail from Devonport (and occasionally NRTE Dounreay) to Sellafield. The used fuel is transported in UFFs. The train will carry one or two containers with each loaded onto a separate wagon.

2.13. All used fuel movements are escorted by the MDP in a further two rail vehicles arranged at either end of the container transporter wagon. Specialists familiar with the load and capable of providing technical support during the journey travel with the MDP in the escort rolling stock. The MDP regularly communicate their position to the MDP Central Control Room at Wethersfield, Essex and local police are informed in advance of the scheduled movement. The fire service would be informed by local agreement with the civil police.

Rail Transport of used fuel

Section 3: Nuclear Weapon Design and Safety

3.1. Nuclear weapons function by compressing a sub-critical mass of fissile material to increase its density and cause it to become super-critical. A conventional chemical explosive is used to achieve this compression. To generate the shock wave necessary to achieve super-criticality the explosive must be detonated in a very precise manner by the simultaneous initiation of a number of detonators by an electrical firing signal. All electrical signals are prevented from reaching the detonators until such time as a number of internal safety breaks are closed by the weapon experiencing a unique sequence of environmental events. In a ballistic missile delivery system, it is customary to use a prescribed sequence of missile acceleration and re-entry deceleration time histories. The firing signal, generated by the fuse at the correct time for detonation, can thus only reach the detonators once the weapon system has experienced the prescribed delivery flight. It is not possible to generate the series of environmental events in any other way.

3.2. Furthermore, to protect the warhead from initiation in an emergency situation, the safety breaks are purposely built and tested to be very strong and so remain safe under all credible abnormal environments. In contrast, parts of the firing chain are designed to be weak, in the sense that they will fail, thereby preventing the generation or transmission of a firing signal, before the safety breaks become unsafe.

3.3. As a further safety feature, to cater for abnormal events all UK and US nuclear weapons are designed to be "single point safe". Under this concept, inadvertent initiation of high explosive at one point, by for example the intrusion of a spigot if the warhead were to fall from a great height on to a sharp spike, cannot produce the conditions necessary for super-criticality. An inadvertent nuclear yield greater than a few pounds of TNT equivalent is therefore not possible.

3.4. Before a warhead design enters service it is tested rigorously against both the normal environmental conditions it would be expected to meet during its operational lifetime and against a range of abnormal environments, under which it must remain safe. Each year, a UK weapon is withdrawn from the stockpile and stripped to its components. These are carefully examined to ensure not only that the weapon would function if so required but that all its design safety features remain intact.

3.5. The UK and US's nuclear weapons are highly robust and are specifically designed to withstand massive mechanical stress and high temperatures induced by launch and re-entry into the earth's atmosphere. The robust design and safety features offer excellent protection against accidental mechanical shock and damage in transport.

Section 4: Ionising Radiation, Hazards and Protection

4.1. Three types of ionising radiation may emanate from DNM: alpha particles, beta particles, and gamma rays. The Health Protection Agency (HPA) publication "Living with Radiation" gives details on the properties of these types of radiation (see HPA website **www.hpa.org.uk**). For most DNM the main hazard will arise from alpha particles, principally from plutonium, with only a relatively small hazard presented by beta particles and gamma rays. For used fuel, the main hazard would be from the beta and gamma radiation.

4.2. Specific information relating to the hazards of and protection from emergencies involving nuclear weapons, special nuclear materials, new fuel and used fuel are as follows:

Nuclear Weapons

4.3. The hazards associated with a nuclear weapon emergency are related to the explosive, radioactive and toxic materials that the weapons contain. The explosive hazard is the same as that which is associated with any chemical high explosive. The main radioactive materials in a nuclear weapon are plutonium and uranium. Plutonium and uranium are both toxic and radioactive. The weapon may also contain other toxic (but not radioactive) materials such as beryllium and lithium.

Conventional hazards, which may arise in the event of an accident (i.e. fire, smoke and the remote possibility of explosively propelled debris), pose a much more immediate threat to life than any hazard possibly arising from radioactive or toxic materials

4.4. In the event of a nuclear weapon emergency MOD will advise the police that any persons within 600m should be evacuated as an immediate action to provide protection from the conventional effect of the emergency, in particular from the potential for a conventional explosion.

4.5. Beyond the immediate hazard area, the potential dispersion of airborne plutonium particles represents the dominant radioactive hazard and MOD will advise the police that members of the public should take shelter in order to provide protection. This advice and the extent of its application is derived from HPA (formerly National Radiological Protection Board - NRPB) guidelines "Emergency Reference Levels of Dose (ERLs) for Early Countermeasures to Protect the Public". Documents of NRPB, Vol1, No4 (1990)[2]

Protective measures taken against the dispersion of airborne plutonium particles will ensure adequate protection against toxic and other radioactive hazards

4.6. Alpha particles emitted from plutonium are unable to penetrate ordinary clothing or the unbroken outer layer of a person's skin. Simple decontamination techniques, such as showering and washing with soap and water, are effective in removing plutonium particles, and their presence on the skin should not compromise urgent medical treatment. Only if alpha emitting particles are taken into the body would any hazard to health result. The entry routes for this are inhalation (with particles lodging in the lungs), ingestion (particles in the digestive tract) or deep wounds. Entry by wounds should be minimised by deep-cleansing any potentially contaminated wounds. Plutonium and uranium in the particulate form which might be produced by a weapon emergency are highly insoluble. Even if taken into the body, the vast majority of the material will be excreted through the body's natural actions for passing particles through the digestive tract or dispelling inhaled

[2] More detailed guidance on how ERLs should be applied in the development of emergency plans can be found in "Intervention for Recovery after Accidents – Application of Emergency Reference Levels of Dose in Emergency Planning and Response" Documents of NRPB Vol 8, No 1, published in 1997.

particles from the lungs. Levels may be reduced still further by specialist medical techniques such as lung lavage to clear out the lungs.

4.7. Within the body, plutonium does not pose an immediate health hazard from either its radioactivity or toxicity, but may give rise to an increased long-term risk of developing cancer. In the unlikely event of a large lung intake, there is also a possibility of developing lung fibrosis though this would be countered using the techniques described above.

4.8. For those required to approach the emergency site, such as the emergency services, the most effective method of protection against the dispersed radioactive material is the use of respiratory protection.

Protective masks of virtually any nature placed over the nose and mouth will significantly reduce the quantity of material inhaled. Members of the emergency services required to go into the 600 metre evacuation zone, for fire fighting and life-saving should don appropriate personal protective equipment

Personal Protective Equipment

Special Nuclear Materials

4.9. Uranium, plutonium and tritium, generically termed special nuclear materials (SNM), are used in the defence nuclear programmes. In a severe emergency, the principal hazard would arise from their combustion and subsequent release into the environment. For fires involving plutonium and uranium consignments, the hazards and appropriate protective actions are as described above for nuclear weapons. As well as alpha particles uranium emits small quantities of beta and gamma radiation which can present a very low external hazard. The simple decontamination techniques described in Para 4.6 are effective in removing uranium particles and the presence on the skin should not compromise urgent medical treatment. In all cases advice on the need for sheltering and evacuation will be provided by convoy staff to the civil police.

4.10. Tritium is a radioactive form of hydrogen. Tritium gas leaking from severely damaged containers could present a beta radiation hazard at an emergency involving a tritium consignment. However, owing to its rapid dispersion, the tritium hazard would only be significant in the immediate vicinity of breached containers. This hazard would be enhanced if the tritium gas were oxidised by exposure to fire. Fire Service personnel are most likely to be exposed to this hazard and should don appropriate personal protective equipment (PPE). Respirators do not offer protection against tritium because it passes directly through the protective filters. However, Self-Contained Breathing Apparatus (SCBA) will provide an effective means of protection against tritium gas, oxidised or not.

New Fuel

4.11. New, un-irradiated fuel consisting of highly enriched uranium (HEU), presents only a very small external radiation hazard, even when directly exposed. Dispersion of radioactive material is very unlikely even in a severe emergency, particularly as the risks from fire, the most likely dissemination mechanism, are very low. If such a release did occur, the principal hazard would be inhalation of uranium particles. Protective masks (of virtually any nature) placed over the nose and mouth would offer a high level of protection for those in the vicinity. Advice on the need for sheltering and evacuation will be provided by convoy staff to the civil police.

4.12. In addition to alpha radiation HEU emits a small amount of beta and some gamma radiation. The hazard presented by contamination of the skin with HEU is extremely low. The simple decontamination techniques described in para 4.6 are effective in removing uranium particles and their presence on the skin should not compromise urgent medical treatment.

Used Fuel

4.13. The exposure of used fuel following a transport emergency is exceptionally unlikely. Direct contact with or close proximity to exposed used fuel following a severe emergency could present a high external gamma and beta radiation hazard and such exposure would present the dominant radioactive hazard. Significant dispersion of radioactive material is highly unlikely even in the event of a severe emergency but any release would present a possible inhalation hazard from gamma and beta emitters.

4.14. The external radiation dose depends on how long an individual is exposed, the distance from the radiation source, and the amount of shielding between the individual and the source. In order to minimise the dose, personnel should spend as little time as possible near the source, remain as far away from it as practicable, and make use of any available shielding (buildings, rail transporters, metal structures etc). Contact with any water escaping from the container should be avoided. In the event of such contact, the areas of the body affected should be washed with soap and running water as soon as possible. Advice on the need for sheltering and evacuation will be provided by convoy staff to the civil police.

Section 5: MOD Response Capabilites in the Event of a Transport Accident Involving Defence Nuclear Material

Introduction

5.1. In the event of a defence nuclear emergency in the UK the MOD is appointed, by the Cabinet Office, as Lead Government Department (LGD) for the co-ordination of the central government response. As owner and operator of defence nuclear assets, the MOD has specialists who, in the event of a transport emergency involving DNM, make assets safe, remove them from the emergency site, and support site remediation operations. Despite the fact that an emergency leading to a release of radioactive material is highly unlikely, the MOD maintains a Defence Nuclear Emergency Organisation (DNEO), and necessary contingency plans. The MOD response would be graduated depending upon the severity of the emergency. These plans recognise the leading roles of the Civil Emergency Services (CES) and Local and Health Authorities in dealing with an emergency (in accordance with the guidelines in "Emergency Response & Recovery" and "Preparing Scotland"). The MOD also recognises that the responding Fire and Rescue Service may follow their CBRN protocols following a Defence nuclear emergency and deploy their Detection, Identification and Monitoring (DIM) capability to deal with it.

5.2. The MOD personnel who will respond in the area of a DNM emergency comprises of two elements: Immediate Response Forces (IRF) and Follow-on Forces (FoF). In addition, the HQ DNEO will form at the MOD in London to co-ordinate the central government response. In the event of an emergency involving US nuclear weapons, the response forces will include US personnel to support the MOD and Local Authorities and emergency services.

Immediate Response Forces

5.3. The IRF would be commanded by an MOD Incident Co-ordinator (IC). In the early phase of the response, the MOD IC would liaise with the police operational and/or tactical commander and, if appropriate, set up a joint Bronze Command Post. Details of the IRF for the different types of transport are detailed at Annex B.

Follow-On Forces

5.4. The scale of the Follow-on Forces (FoF) will depend upon the severity of the emergency, with a full deployment of the MOD resource only being required in the extremely unlikely event of an emergency leading to a release of radioactive contamination. In the event of a deployment on this scale, the FoF will be commanded by a senior MOD official known as the Military (or MOD if civilian) Co-ordinating Authority (MCA). The MCA will be responsible for co-ordinating the military response to any emergency involving DNM and has at his/her disposal a large suite of FoF response capabilities which will be called to the emergency site as required. The MCA is the MOD's senior representative at strategic level, and has responsibility for liaising with the police and Local Authorities and attending the Strategic Co-ordinating Group (SCG). In addition, the MCA will keep MOD HQ DNEO apprised of the developing situation. In

[3] www.ukresilience.gov.uk

the event of a smaller deployment associated with an emergency that has not resulted in a release of radioactive material, a senior MOD official will be deployed to co-ordinate the MOD response on the ground if necessary or if requested by local emergency services.

5.5. The MOD response forces are at a specified state of readiness during road, rail and air movements. Arrival in the incident areas would depend on journey time. The following specialist capabilities could be deployed if appropriate:

a. Radiological monitoring, Radiation Protection Advisers and radiation medicine.

b. Engineering support

c. Security

d. Communications, logistics, catering and administrative elements.

e. Public and media relations.

5.6. Annex C provides a diagram of MOD forces at the scene of an emergency that has resulted in the release of radioactive material, and their recommended interaction with local response forces.

MOD Headquarters DNEO

5.7. Command of the IRF and FoF in the event of a DNM transport emergency rests with the Chief of Defence Staff (CDS) in London. The MCA or other MOD official will be responsible to CDS for military operations, and will discharge this through the operations cell of the MOD HQ DNEO. A secretariat cell in MOD HQ DNEO will provide advice to Ministers and the defence press office on the response as appropriate to the scale of the emergency.

Central Government

5.8. Where the scale or complexity of an emergency is such that some degree of government co-ordination or support becomes necessary, a designated Lead Government Department (LGD) is responsible for the overall management of the government response. The MOD has been designated as the LGD, by the Cabinet Office, for all Defence nuclear emergencies and will co-ordinate the central government response.

Ministry of Defence Head Office

The government maintains dedicated crisis management facilities (COBR) and supporting arrangements which are only activated in the event of a national emergency. The Prime Minister, Home Secretary or another senior Minister will normally chair key meetings involving Ministers and officials from relevant departments as appropriate.

5.9. A diagram showing the relationship between the HQ DNEO, wider MOD forces, local organisations and the Central Government Organisation is at Annex D.

Section 6: Action in the Event of a Transport Accident Involving Defence Nuclear Material

Introduction

6.1. This section describes the actions to be taken in the unlikely event of an emergency during the transportation of DNM that has resulted in the release of radioactive material.

6.2. The response has been split into three phases, immediate, medium and long-term. The exact activities in the medium and long-term phases (and indeed whether there is a long-term phase) would depend on the type of consignment involved, the severity of the emergency and any consequent hazard.

Immediate Actions

6.3. Immediate actions by their very nature have to be pre-planned and thus are prescribed in detail. It would be inappropriate to prescribe too closely the longer term actions, as they will be largely dependent upon the actions needed to arrange recovery and remediation. It is anticipated that the civilian and MOD response forces will work together to formulate plans bearing in mind the circumstances of the emergency and the principles outlined below. The immediate actions can be summarised as follows:

a. Alerting

1. **Road transport** – Initial alerts are passed to the control rooms of the police, fire and ambulance services by both the convoy team and the SSC. This alert is passed in clear speech with details of the load and suggested precautionary countermeasures and public protection advice. This information is also sent by fax to the control rooms of the Emergency Services in the area.

2. **Air transport** – The SSC will notify by telephone and fax the police, fire and ambulance services in the crash area. This alert is passed in clear speech with details of the load and suggested precautionary countermeasures and public protection advice.

3. **Rail transport** – For rail emergencies involving used reactor fuel consignments, the MDP Commander will immediately notify the local police and the MDP CCR. The local police should alert other emergency services. In the very unlikely event that all escort personnel are incapacitated during the emergency alerting will be via rail personnel through Network Rail Services Production Control.

b. Public Protection Advice

While the MOD will pass precautionary public protection advice to the Emergency Services, the police will be responsible for coordinating the provision of public safety information to the media (e.g. evacuation and sheltering). In all cases the public protection advice will be passed in clear speech by the MOD alerting authorities. The advice is detailed at Annexes E and F. Information actually issued by the Emergency Services could also include additional information specific to the area.

If it is necessary for police or other members of the Emergency Services to enter a downwind shelter zone

to provide information to the public they should wear PPE.

c. Casualty Handling

It is expected that the management of casualties will be undertaken in accordance with extant ambulance and/or local authority fire service policy and guidance which should include arrangements for decontamination as appropriate. Ambulance trusts now have embedded Radiation Protection Supervisors and the HPA provide a dedicated Radiation Protection Adviser service at all times.

The following extract is from The Ambulance Service Guidance on Dealing with Radiological Incidents and Emergencies[4] **"Priority 1 patients with life threatening injuries should not have their treatment and transfer delayed for decontamination. However, it is recognised that the removal of clothing, to assist in diagnosis and to provide clinical access, constitutes a form of decontamination. Clothing that has been removed should be treated as contaminated waste. Treatment at the scene and whilst in transit should be in accordance with the protocols surrounding the wearing of Electronic Personal Dosimeters and the advice given by the trust Radiation Protection Supervisors. The receiving hospital should be notified of the patient's contamination status prior to arrival."**

Priority 2 and 3 contaminated or potentially contaminated casualties should, if possible, be decontaminated at the scene before transfer by ambulance to hospital. The receiving hospital should be notified that the patients have been decontaminated, even if the decontamination is believed to have been successful.

d. Radio and Mobile Telephones

In the event of an emergency involving nuclear weapons, it is recommended that all radio frequency transmitters (including personal and vehicle radios, and portable cellular telephones) should be switched off within a radius of 10 metres of a weapon or any of its components, which have been scattered by the emergency. Radio frequency transmitters with an Effective Radiated Power output of greater than 5 watts should be switched off within a radius of 50 metres of a weapon or any of its components which have been scattered by the emergency. This can be taken to apply to all vehicle-mounted transmitters.

e. Debris

In the event of a nuclear weapon emergency and if there has been an explosion, there is the potential for weapon debris to be scattered in the vicinity of the damaged weapon. In addition to pieces of radioactive and toxic material, this might include pieces of explosive, possibly sensitised, which might have the appearance of wax, chalk or gravel. The FoF will undertake removal of debris. Only if it is essential, for example to provide access to the emergency location for the fire service, should non-specialist personnel move such debris and then with extreme care. In the event of a severe emergency involving SNM contaminated debris may be scattered around the emergency site. In the event of an aircraft crash the emergency site could cover a large area.

f. Media Liaison

The police will lead in co-ordinating the provision of information to the media. MOD personnel in the IRF carry pre-scripted press statements, including public safety information, which will be offered to the police to assist in their initial media briefing. The MOD expects the police will wish to lead at all media briefings.

[4] www.dh.gov.uk

Medium Term Actions

6.4. These actions lead naturally from those taken in the immediate phase and can be summarised as follows:

a. Radiation Monitoring and Review of Protection

The primary aim of the MOD will be to refine the public protection advice. To achieve this, monitoring for the release of radioactive contamination in the immediate vicinity of the emergency will take place. Additionally, as resources become available monitoring by MOD personnel will be extended. Any monitoring will be undertaken in consultation with the appropriate civil authorities.

b. Hospital Actions

The treatment of contaminated casualties should be undertaken as detailed in the Strategic National Guidance and NHS Guidance. The MOD FoF would deploy radiation medicine specialists able to provide specialist advice.

c. Fatalities

If the emergency has resulted in fatalities the police (together with the coroner, or the procurator fiscal in Scotland) will consider setting up facilities equipped to accept contaminated bodies. The principles for dealing with casualties set out in "Emergency Response & Recovery" and "Preparing Scotland" would apply.

d. Information for the Public, Media and Parliament

The police will continue to be responsible for coordinating instructions relating to public safety, with the MOD continuing to proffer advice. The MOD recognises the role of the media in reporting an emergency involving DNM and will provide information to the media to enable them to report comprehensively and informatively. The MCA's Strategic Media Advisory Cell representative will be responsible for co-ordinating the MOD input into any media cell put in place locally. The MOD will manage defence policy issues in London. Ministers may also wish to issue statements to Parliament (if in session) and to the media during this phase. Depending on the location of the emergency, the Welsh Assembly Government or the Scottish Government, as appropriate, will invoke their respective briefing and media handling arrangements.

e. Department for Communities and Local Government (DCLG)

DCLG will provide a representative to support the MCA in the delivery of his/her duties, facilitating co-ordination between Government and local bodies.

f. Central Government

Central Government support will continue in the medium and long- term phases.

Long Term Actions

6.5. Much of the detail of the long term response will be worked out and agreed by the responding services and forces taking into account the emergency circumstances and principles stated below:

a. Management of Incident at Local Level

It is expected that at some stage during the long-term response the co-ordinating role would transfer from the Police to the local authority. The MOD will continue to support and work with the local authority in the same manner as they had with the Police. MOD personnel will remain until it is agreed that their role has ceased.

b. Reassurance Monitoring and Follow Up

MOD specialists will still be available to assist medical authorities locally. Should the local health authorities require assistance with additional monitoring of those who had been de-contaminated during evacuation, the MOD can provide advisors to assist in establishing the monitoring priorities. Additionally

the MOD can assist with monitoring of members of the public who think they may have been contaminated.

c. Remediation

MOD will assist other authorities with remediation.

d. Compensation

The MOD will generally be liable to meet personal injury or property damage claims where the injury or loss is attributable to a Defence nuclear emergency involving the release of radioactive material from MOD owned nuclear assets or facilities.

e. Formal Inquiry

A formal inquiry is likely to be held following a DNM emergency. The Inquiries Act 2005 provides a comprehensive statutory framework for inquiries set up by Ministers. MOD would seek advice from the Ministry of Justice as to whether such an inquiry would be conducted under the Act.

6.6. The actions (immediate, medium and long-term) described, cover an extremely unlikely emergency that has resulted in a release of radioactive material. Where no release has occurred, this would obviate the need for some actions. A summary of key actions for emergencies involving nuclear weapons and SNM, including new and used reactor fuel is provided at Annex E.

6.7. It is MOD policy to neither confirm nor deny (NCND)[5] the presence of nuclear weapons at any particular time or place. The Convoy Commander or MCA would set aside this policy in the interests of public protection in the following circumstances:

- Where there is a potential or confirmed radiological or explosive risk to the public or emergency services.
- Where there is no radiological or explosive risk, but where life and limb is imperilled, and where the emergency services request details of any hazard that may be present at the scene.
- Where there is no radiological or explosive risk but where emergency action is needed to stabilise the situation i.e. fire fighting and where emergency services request details of any hazards that may be present at the scene.

[5] NCND does not apply to SNM.

Section 7: DNM Transport Exercises and Training

MOD Exercises

7.1. As lead government department (LGD) for the response to a Defence nuclear emergency, the MOD organises regular exercises to test the effectiveness of its emergency response planning and arrangements. A key aspect of these exercises is the co-operation of the different agencies that would contribute to the response. There is at least one Defence nuclear emergency exercise per year that requires the emergency services, other government departments and local agencies to participate as appropriate.

MOD Participation in Emergency Service or Local Authority Exercises

7.2. In addition to the above MOD-led exercises, elements of the Defence Nuclear Emergency Organisation may be available to participate in tabletop or small command-post exercises at the invitation of individual emergency services or local authorities. Initial contact on exercises of this nature should be made through the Assistant Head of Nuclear Security & Emergency Planning (Nuc Sy & EP AH).

MOD Training

7.3. The MOD recognises the knowledge and expertise of emergency services personnel in responding, as part of a multi-agency response to a defence nuclear and/or radiological safety incident. In maintaining and developing its engagement with the emergency services, as well as providing an overview of what the MOD's response will be to this highly unlikely event, the MOD organises training and can provide briefings supplementary to this document as follows:

a. Radioactive Materials Accident Response Course

This is a 2 day course delivered by DE&S & Director Defence Academy College of Management & Technology (DDACMT) in Beckett House, Shrivenham & the Clyde Off-Site Centre, Helensburgh; it covers the arrangements for the safe transport of DNM. The aim of the course is to enable personnel (both military and civilian) with a management role in planning for and responding to a DNM incident to be better prepared to discharge their responsibilities in a manner consistent with an integrated all agencies response and provide the optimum level of safety for workers and the general public. Personnel from the emergency services and local authorities with emergency planning responsibilities may apply to attend the course. 2 courses are run per year, one in Shrivenham and one in Helensburgh; nominations should be forwarded to:

Dr Ian Holloway,
Rutherford Building,
HMS Sultan,
Military Road,
Gosport,
PO12 3BY.

b. Regional and Local Resilience Forums

A member of the DE&S Nuclear Emergency Organisation is available to speak at these forums or relevant sub groups to give a short brief on DNM operations and the DNEO response.

c. Police Headquarters on Convoy and other DNM routes

A MDP Convoy Commander and DE&S NM Operations Officer visit Police HQs and brief selective audiences of Police and other members of the emergency services. This will cover both convoy operational matters as well as the DNEO response.

d. Police National CBRN Centre

A short DNEO briefing explaining the similarities and differences between the DNEO response and that for CBRN will now be included as part of their GOLD, SILVER and BRONZE courses.

MOD Participation in other training

7.4. In addition to members of the DE&S Nuclear Emergency Organisation being available, Nuc Sy & EP AH is also available to give lectures or talks on the MOD's Defence nuclear emergency response arrangements. This will include where appropriate, Brigade level Study Days or any other similar forum. Initial contact should be made through DE&S Abbey Wood or Nuc Sy & EP AH at the following addresses:

Head of Strategic Weapons
Threat Reduction Manager
Rowan # 8005
MOD Abbey Wood
Bristol
BS34 8JH

Assistant Head of Nuclear Security & Emergency Planning
1.H.09
MOD Main Building
Whitehall
London
SW1A 2HB

Annex A: Routes used during the Transportation of Defence Nuclear Material in the UK

Local Authorities which Defence Nuclear Material may travel through or fly over

1. Defence Nuclear Material may pass through or fly over the following Local Authorities. It is not intended to imply the authorities included are the lead in the production of response plans. The attribution of such responsibilities is a matter for decision at local level between the agencies involved. Although the following list indicates the areas that will be transited most often, there may be occasions when routes need to be varied for operational reasons. **It must be stressed that this list in no way precludes the use of alternative routes if the circumstances so demand.**

England

Barnsley	**Exeter**	**North Somerset**
Bath & North East Somerset	**Gateshead**	**North Tyneside**
Bedfordshire	**Gloucestershire**	**North Yorkshire**
Birmingham	**Halton**	**Northamptonshire**
Blackburn	**Hampshire**	**Northumberland**
Bolton	**Hartlepool**	**Nottinghamshire**
Bracknel Forest	**Hereford**	**Oldham**
Bristol	**Hertfordshire**	**Oxfordshire**
Buckinghamshire	**Kingston upon Hull District**	**Plymouth**
Bury	**Kirklees**	**Reading**
Calderdale	**Knowsley**	**Redcar & Cleveland**
Cheshire	**Lancashire**	**Rochdale**
Coventry	**Leeds**	**Rotherham**
Cumbria	**Leicester City**	**Salford**
Darlington	**Leicestershire**	**Sandwel**
Derby City	**Lincolnshire**	**Sheffield**
Derbyshire	**Liverpool**	**Slough**

Devon	Manchester	Solihull
Doncaster	Middlesbrough	Somerset
Dudley	Milton Keynes	South Gloucestershire
Durham	Newcastle upon Tyne	South Tyneside
East Riding of Yorkshire District	Norfolk	St Helens
Essex	North Lincolnshire District	Staffordshire
Stockton on Tees Borough	Wakefield	Windsor & Maidenhead
Stoke on Trent	Walsall	Wokingham
Suffolk	Warrington	Wolverhampton
Sunderland	Warwickshire	Worcestershire
Surrey	West Berkshire	York
Swindon	Wigan	
Trafford	Wiltshire	

Wales

Blaenau Gwent	Monmouthshire	Swansea
Bridgend	Neath Port Talbot	Torfaen
Caerphilly	Newport	Vale of Glamorgan
Cardiff Powys	Powys	
Merthyr Tydfil	Rhonda Cynon Taff	

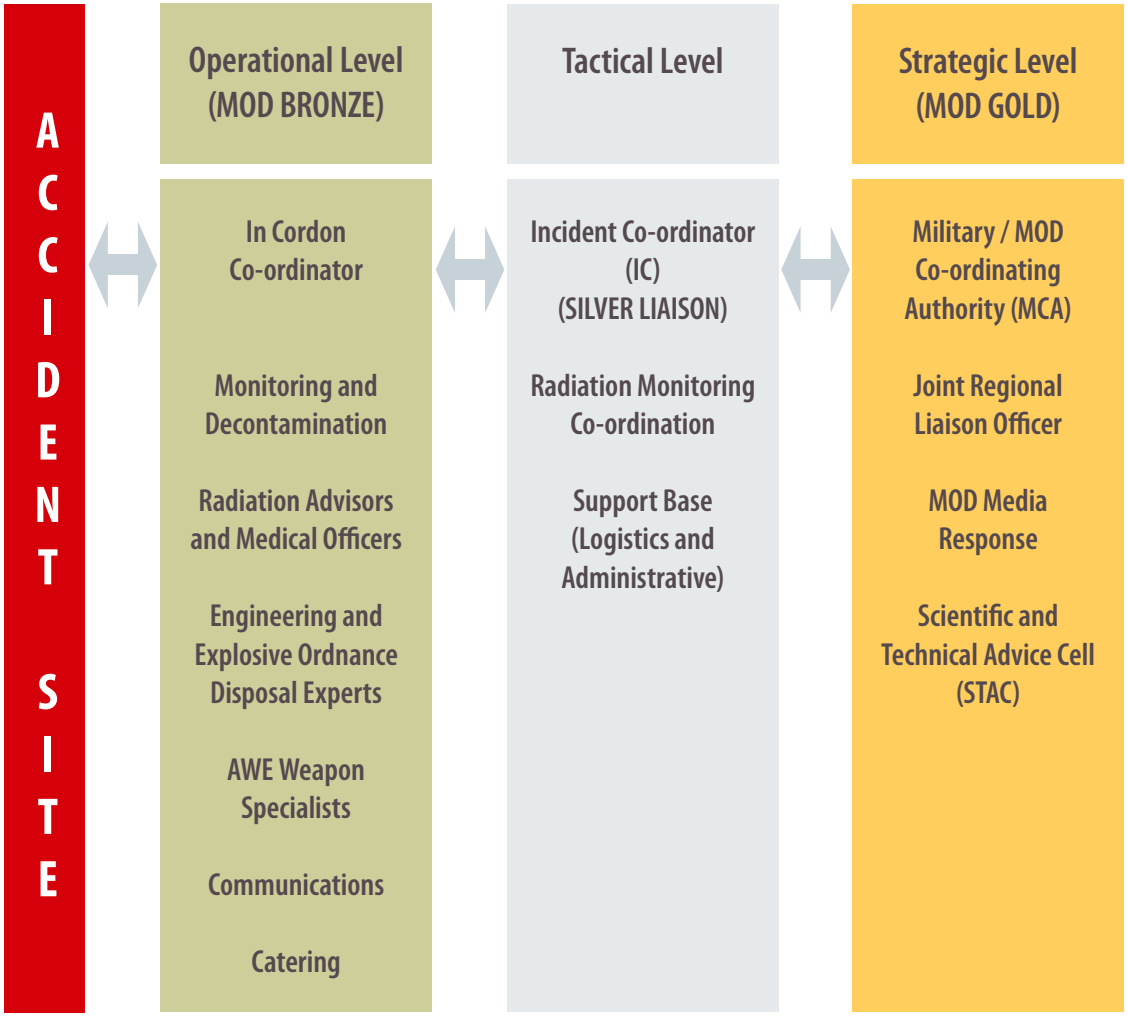
Scotland

Argyll & Bute	East Lothian	Perth & Kinross
City of Edinburgh	East Renfrewshire	Renfrewshire
City of Glasgow	Falkirk	Scottish Borders
Clackmannanshire	Fife	South Lanarkshire
Dumfries & Galloway	Highland	Stirling
East Ayrshire	Midlothian	West Dunbartonshire
East Dunbartonshire	North Lanarkshire	West Lothian

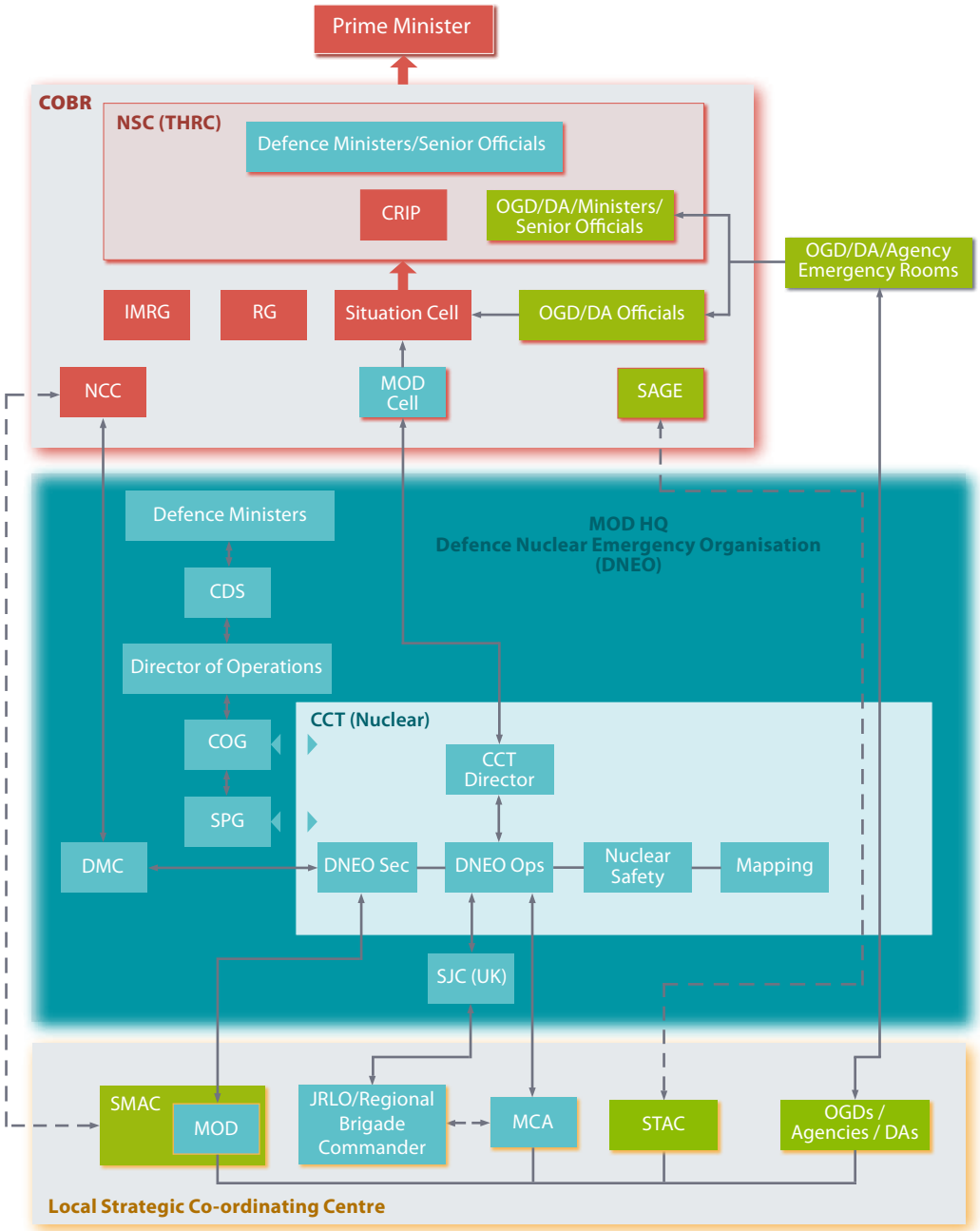
Annex B: Immediate Response Forces - Organisation

Road	The IRF is embedded within the convoy and the convoy commander would act as MOD Incident Co-ordinator (IC). There would be sufficient equipment and trained personnel to alert and brief the Police, Fire and Ambulance services, to assess whether or not there has been a release of radioactive material, and to assist the police in establishing an initial safety and security zone. Additionally, trained personnel would co-ordinate with the police in providing information for the media. Convoy personnel are cross-trained to enable them to undertake other roles should the designated personnel be incapacitated in the emergency. A Special Safety Cell (SSC) monitors all road movements of DNM and would activate any additional response needed to support the IRF. The SSC would contact the Police immediately to inform them of an emergency that has or may have resulted in a release of radioactive material and to provide them with precautionary public protection advice on sheltering and evacuation. In the event of a serious road traffic crash that has no release of radioactive material, the SSC would also contact the police to discuss any additional support requirements.
Air	The RAF maintains a Station NARO Team (SNT) at immediate readiness during the flight of aircraft carrying nuclear weapons or Special Nuclear Material (SNM). This team would form the IRF for an air crash. Its Commanding Officer would become the MOD IC. The team is equipped and trained to identify any radiological hazard and provide advice and support to local emergency responders. The SSC monitors all air movements of DNM and would activate the SNT in the event of a nuclear weapon or SNM emergency. The SSC would also contact the police immediately to inform them of the emergency and to provide them with precautionary public protection advice on sheltering and evacuation if appropriate.
Rail	The rail convoy, like its road equivalent, has embedded within it all the necessary equipment and personnel to alert and brief the emergency services, determine whether there has been a release of radioactive material, and assist the local police to set up and manage a safety cordon. The convoy commander, a Ministry of Defence Police (MDP) Inspector, would be the MOD IC.

Annex C: MOD Forces at the Scene of an Emergency Involving the Release of Radioactive Material and Their Recommended Interaction with Local Response Forces



Annex D: Central Government Organisation and Interaction with the Local Strategic Co-ordinating Centre



NSC THRC - National Security Council - Threats, Hazards, Resilience and Countermeasures
COG - Current Operations Group
SAGE - Scientific Advisory Group for Emergencies
CCT - Current Commitments Team
SPG - Strategic Planning Group
SMAC - Strategic Media Advisory Cell

STAC - Scientific & Technical Advice Cell
NCC - News Co-ordination Centre
IMG - Impact Management Group
RG - Recovery Group
MCA - Military/MOD Co-ordinating Authority
JRLO - Joint Regional Liaison Officer

Annex E

Summary of Key Emergency Actions for a Nuclear Weapon Emergency

1. Immediate actions in the event of:
   a) explosion of weapon thought to be imminent
   b) fire was engulfing the weapon
   c) the IRF so advised:

   - **Evacuate non-essential personnel to 600 metres**

   - Shelter public to 5 kilometres downwind in a 45º arc centred on the wind direction

   - Approach from upwind if possible

   - Protect the nose and mouth

   - Extinguish any fires

2. Continue to operate as follows:

   - Cool weapons/containers by water spray

   - Do not move weapon or container

   - Restrict radio frequency transmissions within 50 metres

3. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved a nuclear weapon.

   - There is no risk of an "atomic bomb" type of explosion.

   - There is a risk of radioactive particles being carried downwind.

   - The area immediately around the scene of the emergency is being evacuated for safety reasons.

   - People in the following areas (....name locations....) should take these precautions to minimise the hazard from inhaling or ingesting radioactive particles.

   - Go indoors and stay there.

   - Close all doors, windows and ventilators. Switch off any ventilation or air conditioning systems drawing air from outside the building.

   - Do not leave the shelter of a building until advised that you may do so by the police.

   - Do not try to collect children from school unless told to do so. The school authorities will look after them.

   - Keep tuned to local radio/TV (names stations, frequencies). Emergency services and MoD forces are responding to the emergency. You will be informed when these precautions are no longer necessary.

Summary of Key Emergency Actions for a Tritium SNM Emergency during Transport by Air

1. At all times:

   - Evacuate non-essential personnel to 100 metres

   - Extend evacuation zone to 600 metres downwind from the hazard over a 45º arc

   - Approach from upwind if possible

   - Only personnel wearing personal protective equipment (PPE) should enter the evacuation zone

   - Extinguish any fires

   - Do not touch damaged containers or spilt material

   - Remove undamaged containers from heat source

2. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved Special Nuclear Material.

   - There is no risk of an "atomic bomb" type of explosion.

   - There is a risk of a plume of radioactive gas being carried downwind.

   - The area immediately around the scene of the emergency and downwind from it is being evacuated for safety reasons.

Summary of Key Emergency Actions for a Tritium SNM Emergency during Transport by Road

1. At all times:

   - Evacuate non-essential personnel to 100 metres

   - Shelter public to 1 kilometre downwind in a 45º arc centred on the wind direction

   - Approach from upwind if possible

   - Only personnel wearing personal protective equipment (PPE) should enter the evacuation zone

   - Extinguish any fires

   - Do not touch damaged containers or spilt material

   - Remove undamaged containers from heat source

2. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved Special Nuclear Material.

   - There is no risk of an "atomic bomb" type of explosion.

   - There is a risk of a plume of radioactive gas being carried downwind.

   - The area immediately around the scene of the emergency is being evacuated for safety reasons.

   - People in the following areas (….name locations….) should take these precautions to minimise the hazard.

   - Go indoors and stay there.

   - Close all doors, windows and ventilators. Switch off any ventilation or air conditioning systems drawing air from outside the building.

   - Do not try to collect children from school unless told to do so. The school authorities will look after them.

   - Keep tuned to local radio/TV (names stations, frequencies). Emergency services and MOD forces are responding to the emergency. You will be informed when these precautions are no longer necessary.

Summary of Key Emergency Actions for a Uranium/ Plutonium SNM Emergency

1. At all times:

   - Evacuate non-essential personnel to 100 metres

   - Shelter public to 1 kilometre downwind in a 45º arc centred on the wind direction

   - Approach from upwind if possible

   - Protect the nose and mouth

   - Remove undamaged containers from heat source

   - Do not touch damaged containers or spilt material

2. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved a Special Nuclear Material consignment.

   - There is no risk of an "atomic bomb" type of explosion.

   - There is a risk of a plume of radioactive particles being carried downwind.

   - The area immediately around the scene of the emergency is being evacuated for safety reasons.

   - People in the following areas (....name locations....) should take these precautions to minimise the hazard from inhaling or ingesting radioactive particles.

   - Go indoors and stay there.

   - Close all doors, windows and ventilators. Switch off any ventilation or air conditioning systems drawing air from outside the building.

   - Do not leave the shelter of a building until advised that you may do so by the police.

   - Do not try to collect children from school unless told to do so. The school authorities will look after them.

   - Keep tuned to local radio/TV (names stations, frequencies). Emergency services and MoD forces are responding to the emergency. You will be informed when these precautions are no longer necessary.

Summary of Key Emergency Actions for a New Reactor Fuel Emergency

1. At all times:

   - Evacuate non-essential personnel to 100 metres

   - Approach from upwind if possible

   - Protect the nose and mouth

   - The use of water to cool flasks is strictly prohibited

   - Heed MOD advice on other necessary protective countermeasures

2. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved Special Nuclear Material.

   - There is no risk of an "atomic bomb" type explosion.

   - The area immediately around the scene of the emergency is being evacuated for safety reasons.

Summary of Key Emergency Actions for a Used Reactor Fuel Emergency

1. At all times:

   - Evacuate non-essential personnel to 100 metres

   - Heed MOD advice on likely radiation hazard before approaching flask

   - If a flask is severely damaged and fuel modules are exposed evacuate to 500 metres

   - Approach from upwind if possible

   - Protect the nose and mouth

   - Make use of available shielding (buildings, rail cars etc) when approaching flask

   - The use of water to cool flasks is strictly prohibited

2. Key points for the public announcement are:

   - An emergency occurred at (TIME) (PLACE) which involved Special Nuclear Material.

   - There is no risk of an "atomic bomb" type of explosion.

   - The area immediately around the scene of the emergency is being evacuated for safety reasons.

Annex F: Summary of Precautionary Public Protection Advice

This table summarises the precautionary public protection advice that would be provided to the civil police by MOD response forces for road, air and rail emergencies involving Defence Nuclear Materials where either radioactive material is released or the severity of the occurrence is such the possibility of a release cannot be excluded.

	Transport Details	Evacuation Zone (360º)	Downwind Shelter Zone (45º)
Road	Weapon	600 metres	5 kilometres
	SNM (all consignments)	100 metres	1 kilometre
	New fuel	100 metres*	
Air	Weapon	600 metres	5 kilometres
	SNM shipments of plutonium or uranium	100 metres	1 kilometre
	SNM shipments of tritium	100 metres plus downwind evacuation to 600 metres over a 45º arc	
Rail	Used fuel In case of severe damage to flask such that fuel modules are exposed*	100 metres 500 metres	

*Cooling of the containers with water is strictly prohibited

Annex G: Abbreviations

CBRN	Chemical Biological Radiological Nuclear
CCR	Central Control Room
CCT	Current Commitments Team
CDS	Chief Defence Staff
CES	Civil Emergency Services
COBR	Cabinet Office Briefing Room
COG	Crisis Operation Group
CRIP	Common Recognised Information Picture
DA	Devolved Administration
DE&S	Defence Equipment & Support
DNEO	Defence Nuclear Emergency Organisation
DCLG	Department for Communities and Local Government
DNM	Defence Nuclear Material
ERLs	Emergency Reference Levels
FoF	Follow on Forces
HEU	Highly Enriched Uranium
HPA	Health Protection Agency
HQ	Headquarters
HQ DNEO Sec	HQ Defence Nuclear Emergency Organisation Secretariat
HSV	High Security Vehicle
IAEA	International Atomic Energy Agency
IC	MOD Incident Co-ordinator
IMG	Impact Management Group
IRF	Immediate Response Force
JRLO	Joint Regional Liaison Officer
LA	Local Authority
LAESI	Local Authority and Emergency Service Information on Defence Nuclear Material Transport Contingency Arrangements
LGD	Lead Government Department
MCA	Military/MOD Co-ordinating Authority
MDP	Ministry of Defence Police
MOD	Ministry of Defence
NCC	News Co-ordination Centre
NCND	Neither Confirm Nor Deny
NHS	National Health Service

NMC	New Module Containers
NRTE	Naval Reactor Test Establishment
NSC THRC	National Security Council - Threats, Hazards, Resilience and Countermeasures
OGD	Other Government Department
PPE	Personal Protective Equipment
RAF	Royal Air Force
RCCC	Regional Civil Contingency Committee
RG	Recovery Group
SAGE	Science Advisory Group for Emergencies
SCBA	Self Contained Breathing Apparatus
SMAC	Strategic Media Advice Cell
SNM	Special Nuclear Material
SNT	Station NARO Team
SPG	Strategic Planning Group
SSBN	Ship Submersible Ballistic Nuclear
SSC	Special Safety Cell
STAC	Scientific & Technical Advice Cell
TCHD	Truck Cargo Heavy Duty
TC MDP CCR	Task Control, Ministry of Defence Police, Central Control Room
UFF	Used Fuel Flask
UK	United Kingdom