



Office for  
Nuclear Regulation

# Five Steps to Transport Emergency Planning



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# Five Steps to Transport Emergency Planning

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## 1. Introduction

- 1.1. Dutyholders wishing to transport class 7 (radioactive) dangerous goods into or within Great Britain (GB) by road, rail or inland waterway must comply with the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (CDG) [Ref.1].
- 1.2. An amendment to CDG came into effect on 21 April 2019 (known as the Carriage of Dangerous Goods (Amendment) Regulations 2019). The amendment changed the requirements for emergency plans and notifiable events for dutyholders such as consignors and carriers of Class 7 dangerous goods. The legal duties relating to emergency plans are now set out in paragraphs 1–13 of Schedule 2 of the amended version of CDG. (<https://www.legislation.gov.uk/uksi/2009/1348/contents>)
- 1.3. The purpose of having a CDG emergency plan (herein referred to as an ‘emergency plan’), before transport takes place, is to prevent or mitigate the consequences should a radiation emergency occur during transport. Having a plan in place should also ensure that certain information about the emergency is shared with relevant authorities.
- 1.4. ONR<sup>1</sup> has considered the requirements of Schedule 2 of CDG and incorporated these into five practical steps, which are set out in this guide. The five steps offer a logical approach to help dutyholders decide if an emergency plan is required and to subsequently prepare and implement the plan as necessary. This guide is applicable to the civil carriage of class 7 dangerous goods by road, rail or inland waterway. The guide is not applicable to sea or air transport or to any transport belonging to or under control of the armed forces.

## 2. Who should read this guide?

- 2.1. This guide is primarily aimed at:
  - I. GB based dutyholders with responsibility for ensuring radioactive materials are safely transported into or within GB by road, rail or inland waterway; and

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<sup>1</sup> ONR is the GB Competent Authority (CA) and Enforcing Authority for the civil carriage of UN class 7 (radioactive material) goods by road, rail and inland waterway. ONR enforces CDG and the Ionising Radiations Regulations 2017 (IRR17).

- II. dutyholders based overseas and involved in road, rail or inland waterways transport in GB, who have the same legal duties as GB based dutyholders which cannot be devolved to others<sup>2</sup>.
- 2.2. Safety professionals involved in advising dutyholders on their emergency plans, including dangerous goods safety advisers (DGSAs) and radiation protection advisers (RPAs), may require guidance in addition to this guide.

### 3. Who are the dutyholders?

- 3.1. CDG places the majority of duties on carriers and consignors of class 7 goods for emergency planning and notifiable events. For example, carriers and consignors are the dutyholders with regard to preparing, implementing and testing emergency plans and reporting of emergencies. CDG also places specific duties on those with a role in the emergency plan, for example consignees, drivers and vessel masters.
- 3.2. 'Escort commander' is a new role introduced by the CDG Amendment Regulations 2019. This duty is only applicable to transport by the Civil Nuclear Constabulary and the Ministry of Defence (MoD). Escort commanders have the same duties as drivers, carriers or consignors for civil transport. Hence, this guide does not consider further the role of an escort commander.

### 4. What is a transport radiation emergency?

- 4.1. 'Transport radiation emergency' means an unexpected situation arising during the carriage of class 7 dangerous goods that requires prompt (urgent) action to protect workers or members of the public from radiation exposure or risks to their health and safety, as a result of the situation or the perceived risks from that situation. A radiation emergency may involve a loss of radiation shielding, release of all or part of the radioactive contents of a package, or an uncontrolled criticality event.
- 4.2. Protection of workers and members of the public extends to include the protection of human life, health and safety, quality of life, property and the environment.
- 4.3. Events are not considered to be radiation emergencies where the estimated effective radiation doses are at or below 1 mSv to any individual over a period of one year following the emergency. This is because, in most cases, serious consequences do not occur below 1 mSv. Whether an emergency plan is required

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<sup>2</sup> To ensure compliance with GB specific legislation dutyholders based overseas should consult and may need to appoint suitably qualified and experienced Dangerous Goods Safety Advisers (DGSAs) and Radiation Protection Advisers (RPAs).

under CDG or not, the Ionising Radiations Regulations 2017 (IRR17) [Ref. 2] require 'contingency plans' to be made whenever a radiation accident is reasonably foreseeable, i.e. the 1 mSv dose limit is not applicable to contingency plans made under IRR17.

## 5. What is a notifiable event?

- 5.1. 'Notifiable events' are situations where a notification must be made to report the loss or theft of class 7 goods being carried. Details for notifying such events are covered under step 5 in this guide.

## 6. Who are emergency workers?

- 6.1. An 'emergency worker', for the purposes of CDG, is a person who might be exposed to radiation as a result of taking action in response to a radiation emergency. The person will have taken this action either because they have a defined role in the emergency plan as a Category 1 responder (see definition below), or because they have been identified in the plan to assist in the handling of the emergency.
- 6.2. Category 1 and Category 2 responders are roles specified within CDG, although the legal definition of the roles is from The Civil Contingencies Act 2004. This separate but related legislation governs emergency preparedness and response for most other types of emergency. Category 2 responders have a lesser set of duties than Category 1 responders. The definitions of these roles are as follows:
  - Category 1 responders: organisations at the core of the response to most emergencies, i.e. the emergency services, local authorities and NHS bodies.
  - Category 2 responders: ONR, the Health and Safety Executive (HSE), transport and utility companies.
- 6.3. Members of the public, persons without a defined role in the emergency plan and workers not specifically employed to assist in the transition from an emergency are not considered to be emergency workers.

## 7. What is an emergency exposure?

- 7.1. An emergency exposure is the radiation dose received by an employee in responding to an actual or potential radiation emergency (when the radiation emergency occurs and during the response phase). It is not the dose received from an event leading up to the radiation emergency (before the radiation emergency occurs). These doses are the subject of IRR17.

7.2. An emergency exposure results in a radiation dose that exceeds one of the dose limits stated in Regulation 12 of IRR17 [Ref. 1]. Emergency exposures are only permitted to be accrued by emergency workers during a radiation emergency to:

- Bring help to endangered persons;
- Prevent exposure of a large number of persons; or
- Save a valuable installation or goods.

## 8. Prior information to the public

8.1. CDG places a requirement on ONR to provide prior information to the public about the nature and effect of a radiation emergency. This information is made available by ONR on our website ([www.onr.org.uk/transport/prior-information-cdg09.pdf](http://www.onr.org.uk/transport/prior-information-cdg09.pdf)) and includes:

- Basic facts about radioactivity and its effects on persons and on the environment;
- The consequences of a radiation emergency;
- Emergency measures envisaged to alert, protect and assist the general public in the event of a radiation emergency;
- Appropriate information on action to be taken by the general public in the event of a radiation emergency; and
- The authority or authorities responsible for implementing the emergency measures and actions.

# Five steps to transport emergency planning

## 9. Step 1 – Evaluate whether an emergency plan is required

- 9.1. Regulation 8 of IRR17 requires employers (as the dutyholders) to perform a Radiation Risk Assessment (RRA) before doing work for the first time with radioactive material. This definition includes dutyholders carrying out work involving the transport of radioactive material. Dutyholders must ensure the RRA is suitable and sufficient and must review the assessment if there is reason to suspect it is no longer valid or there has been significant change in the work activity.
- 9.2. Dutyholders are responsible for making a suitable and sufficient RRA. This can be completed by any person deemed competent by the dutyholder and there are a number of training courses available. It is for the dutyholder to decide which training courses are suitable for its specific needs. However, as stated in IRR17 regulation 8 guidance paragraph 72, 'when conducting a radiation risk assessment, employers must consult an RPA about the matters to be considered'.
- 9.3. Dutyholders should use their RRA, prepared under IRR17, to determine whether a radiation emergency can occur during transport (i.e. are estimated effective radiation doses above 1 mSv to any individual over a period of one year following a transport emergency).
- 9.4. ONR has produced transport RRA [Ref.3] guidance that includes specific guidance on how effective radiation doses that could be accrued in an emergency situation should be assessed to inform the radiation emergency conclusion. Dutyholders should consult their appointed RPA for advice on estimation of these doses.
- 9.5. In most cases, there are no serious radiological consequences at or below a threshold of an effective dose of 1 mSv to any individual over a period of one year following the radiation emergency. Where the RRA indicates the possibility of an emergency situation resulting in a dose above 1 mSv, dutyholders must assume that a radiation emergency could occur and must prepare an emergency plan in accordance with CDG. This plan must also meet the requirements of IRR17 Regulation 13 contingency plans. Dutyholders should consult their appointed DGSA to determine the extent of emergency planning required under CDG.
- 9.6. Where the dutyholder reaches the conclusion that no radiation emergency could occur, there is no requirement for a CDG emergency plan. However, IRR17 Regulation 13 contingency plans will still be required to be produced.



- 9.7. The National Arrangements for Incidents involving Radioactivity (NAIR) scheme cannot be claimed as being wholly or partially part of an emergency plan. The RADSAFE scheme can be claimed as part of an emergency plan, but does not alone constitute an emergency plan under CDG.
- 9.8. CDG emergency plans require more detailed planning for radiation emergencies than the contingency planning requirements set out in IRR17 Regulation 13. It may be possible to integrate CDG emergency plans and IRR17 contingency plans to reduce duplication in documentation and streamline emergency responses. However, if dutyholders choose to have one emergency plan covering multiple consignments that can and cannot result in a radiation emergency, it needs to be made clear which consignments can result in a radiation emergency and what additional actions are required to comply with CDG.

## 10. Step 2 – Preparing an emergency plan

### Required information

- 10.1. Emergency plans must be adequate to prevent or mitigate the consequences of the risks identified in the RRA. To be considered as “adequate”, such plans must contain certain information specified in CDG (subparagraphs (a) to (j) in Schedule 2, Part 1, paragraph 3(5)). A summary of this required information is as follows<sup>3</sup>:
- a. The name or position of the person authorised to set emergency procedures in motion;
  - b. The name or position of the person in charge of and coordinating the mitigation;
  - c. The plan should describe contacting, as soon as practicable, the Police (999 or 112) and other relevant emergency services, relevant local authority, the consignor, the carrier and ONR;
  - d. The plan should identify:

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<sup>3</sup> Dutyholders based overseas may need to provide documentation both in the language of the driver and in English to ensure there is no barrier to cooperation between the carrier, consignor, emergency services, local authorities and ONR in the event of a radiation emergency in GB. It may be appropriate for an overseas carrier or consignor to contract a GB provider to supply aspects of the emergency response and notify relevant bodies to ensure a timely response to transport emergencies.

- i. Events with the potential to give doses greater than 1 mSv, the consequence of these events and the strategy to deal with them;
  - ii. Details of any procedures and documents that support the plan;
  - iii. Details of personnel who have roles to play in the emergency response (see 'Additional information for responders' below);
  - iv. Details of the availability and function of emergency equipment; and
  - v. Details of the availability and function of other relevant resources.
- e. Arrangements for the driver (or vessel master) to initially carry out, followed by responses from carrier or consignor. It is good practice to include resilience in these arrangements if possible. Typical arrangements should include:
- i. Limiting risks to persons likely to be directly affected by a radiation emergency including those responding to the emergency; and
  - ii. Providing warnings to these persons.
- f. Communication plans containing appropriate information on how to identify and transfer information. This should include contact details for identified individuals and alternatives in case one form of communication fails (for example, provision of spare phones). Note that, in accordance with the Joint Emergency Services Incident Protocol (JESIP) for tier 2 responders, communications will be transferred to secure networks operated by the emergency services in the early stages of an emergency.

The information set out in the plan should cover communications to:

- i. People at the scene;
  - ii. The local authority;
  - iii. The emergency services; and
  - iv. Others identified in the plan. For example, communications with the media and through social media need proactive planning to ensure the public receive relevant facts at the appropriate time.
- g. Arrangements for assisting the relevant local authority including actions to mitigate the consequences of the emergency. Dutyholders should provide proactive assistance to the local authority, for example sharing their knowledge

and understanding of the packages, their contents and the risks arising from full or partial release of the contents or loss of radiation shielding. Note that:

- i. Transport that takes place within a single local authority will require arrangements specific to that local authority; and
  - ii. Transport involving a large number of local authority areas may require generic arrangements and rely on the responding emergency services to identify the relevant local authority for the dutyholder.
- h. Arrangements for providing information about the incident to ONR<sup>4</sup>.
- i. Arrangements for emergency exposures including:
- i. Appropriate dose levels for the purposes of putting the emergency plan into effect; and
  - ii. Agreement with the consignor, carrier, contractors and emergency services on the dose level(s) for the purposes of undertaking protective actions at the scene of the emergency.
- j. Arrangements to keep doses below a 100 mSv reference level (as specified in CDG, Schedule 2, paragraph 9(1)).
- k. Arrangements that the dutyholder, or their agent, consider may assist in the transition from a radiation emergency to a situation where no further intervention is required. Consignors, local authority, the police and other emergency services may all need to be involved in bringing about this transition. CDG does not require the emergency plan to cover the 'recovery phase' following the event as this is subject to other legislation. However, ONR considers package retrieval, and where appropriate decontamination, to be part of the emergency until a stable state is achieved, i.e. the radioactive material is contained in a safe location or able to be onwardly transported in accordance with CDG09.

## Principles and purposes

10.2. Paragraph 4 of Schedule 2 of CDG sets out certain principles and purposes that an emergency plan must adopt. These build on the requirements, set out in paragraph

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<sup>4</sup> Details of how to notify ONR for the purpose of transport incidents is provided on the ONR website under 'Notify ONR'. Information provided includes; emergency contact details for daytime or out of hours, incident notification forms and relevant guidance. ([www.onr.org.uk/notify-onr.htm](http://www.onr.org.uk/notify-onr.htm))

3 of Schedule 2 that are summarised above. To address these requirements, ONR expects that emergency plans will, as a minimum, describe the following:

- a. The means of communication, documentation and recording to be used during the emergency response.
- b. Making notifications as soon as practicable, including contacting the police and other emergency services as appropriate, the relevant local authority, the consignor and the carrier (a 24-hour telephone number is recommended for this purpose).
- c. Actions required to minimise driver (or vessel master) exposure including how to identify package damage, actions the driver (or vessel master) should take and correct use of Personal Protective Equipment (PPE).
- d. How to prevent the situation from getting worse, including use of fire extinguishers if it is safe and appropriate, restricting access to the scene and avoiding approaching significantly damaged packages.
- e. Actions to protect the public, where equipped and safe to do so. For example, cordoning off areas using simple methods such as barrier tape, markings or cones. Drivers should endeavour to keep people upwind of the event. The emergency plan should consider the possibility that the police in collaboration with the local authority may be required to secure the area, which could last several days for a major release. Consider the need to carry simple barriers.
- f. Actions to protect the emergency services, including information in the transport documentation about the material being carried, its form (special form, solid, liquid, gas), the amount of material (i.e. approximate volume, weight and radiation levels in units of Becquerels [Bq]), how it is dispersed in the container, and how likely is it to be dispersed into the environment or stay in the package.
- g. The number of packages and any other relevant safety information about the goods, for example, packages containing asbestos or other hazardous material.
- h. Actions to ensure the radioactive materials remain secure, including what to do if the vehicle or vessel is damaged to the extent that it is vulnerable, for example, where there are broken windows or doors are not lockable.
- i. Actions to be taken by the consignor, including arrangements to provide advice to the emergency services and make particular notifications.
- j. How to obtain specialist advice and support where damage to a package(s) is suspected, for example, from the consignor(s), the appointed DGSA or RPA.

- k. Requirements to notify ONR and other relevant regulators.
- l. Dutyholders, in association with a suitable DGSA, should consider arrangements to protect persons from subsidiary hazards resulting from the emergency, including explosive, chemical or biological.

### Additional information for responders

- 10.3. Where Category 1 or Category 2 responders have an identified role in the emergency plans, dutyholders must provide information to enable them to perform their roles safely and effectively. This information may include:
- Radiation protection arrangements;
  - General information about the nature of the class 7 goods;
  - The types of packages and their expected responses in accident conditions; and
  - The arrangements for the consignor, carrier or their agent to attend the scene.
- 10.4. Similarly, employees with a role in the emergency plan must be provided with suitable and sufficient information, instruction, training and equipment, including PPE and dosimetry. The aim is to allow them to perform their roles effectively whilst restricting their exposure to ionising radiation, so far as is reasonably practicable. Dutyholders must keep this information and training up to date and subject to regular review. For example, training records should be suitable to identify who has been trained, the nature of the training and when refresher training is needed. Employees are likely to require further information, instruction and training whenever changes are made to the emergency arrangements.

### Cooperation

- 10.5. Carriers and consignors have a duty to cooperate with each other (and any other CDG dutyholders) in the preparation of their emergency plans to enable each other to comply with the requirements of CDG. This includes cooperation with operators of in transit sheds (e.g. berths, rail or road depots and airport cargo sheds). This is important because emergency plans must be in place where required for consignments during storage in transit. It is important that these emergency plans align with any plans made by operators of transit sheds under other legislation.

## Further guidance

- 10.6. Further guidance on preparing an emergency plan can be found in IAEA Specific Safety Guide No. SSG-65, Preparedness and Response for a Nuclear or Radiological Emergency Involving the Transport of Radioactive Material [Ref. 4].

## 11. Step 3 – Test, review and revise the emergency plan

### Frequency

- 11.1. CDG requires emergency plans to be reviewed, tested and revised at intervals not exceeding three years (assuming the plan is to be used on more than one occasion). However, ONR's expectation is that emergency plans should be tested annually.
- 11.2. The purpose of regular testing is to take account of lessons learned from:
- Past emergencies involving the carrier or consignor; and
  - The United Kingdom's participation in national or international exercises.

### Purpose of the test

- 11.3. The purpose of the test is to demonstrate ability to implement the emergency plan. Tests should be sufficient to demonstrate that the plan is capable of bringing about a practical response to the emergency. For example, the test must demonstrate that the plan will protect workers, members of the public and the environment from exposure to ionising radiation or other health and safety consequences.
- 11.4. Testing of the emergency plan should be proportionate to the risks, based on the risk assessment and the potential for serious consequences of an event. Hence, the degree of planning, review and testing will not be the same for all class 7 goods and package types and dutyholders should be able to justify their approach to testing.

### Test methods

- 11.5. The extent to which the plan is tested should be considered by the dutyholder, taking into account the following considerations:
- time since last test
  - extent of last test
  - revisions made to the emergency plan from previous reviews

- principles and purposes set out in step 2 of this guide
  - emergency equipment availability and adequacy
  - effectiveness of everyone involved in undertaking their relevant roles
- 11.6. Testing methods may range from a desktop exercise (a discussion of the actions required for different emergency scenarios) to a full or partial simulation at a suitable site using vehicles and realistic props and involving all the relevant persons including technical advisors. It is often useful to test both the consignors' and carriers' emergency plans at the same time to ensure compatibility and avoid duplication of testing.
- 11.7. Scenarios should be made realistic and present an appropriate level of challenge including:
- coincident events
  - extreme weather
  - loss of equipment
  - loss of essential services, such as power or phone lines
- 11.8. Debriefing after testing should encourage a blameless culture where people are free to offer constructive challenge, so that dutyholders can identify and implement improvements.
- 11.9. It is important to note that testing should not take place on public roads and should not involve packages containing radioactive material. Emergency services and the Competent Authority should only be involved with their express prior agreement.

## Review / revise

- 11.10. The purpose of a review/revision is to take account of:
- changes occurring in the carriage of packages
  - changes within emergency services
  - new knowledge or guidance, technical or otherwise
  - changes to the RRA

- information and learning obtained from reports or reviews of any radiation emergency in the UK or overseas
- findings of previous tests of the emergency plan

11.11. Reviews should be recorded and brought to the attention of those responsible for implementing revisions, even if no changes were identified. Persons responsible for implementing revisions must be provided with the relevant information, instruction and training.

### Statutory reporting of tests to ONR

11.12. Dutyholders must prepare a report on the outcome of their test within 28 days after the test. This report must be sent to ONR within 56 days after the test.

11.13. The detail and length of the report should be proportionate to the extent of the test. ONR may assess the test report and make a judgment as to whether the emergency plan was adequate. In order to make this judgment, ONR expects the report to contain, as a minimum:

- An overview of the test, including the scenario, the format (i.e. desktop or simulation) and who took part;
- The identified strengths and weaknesses of the emergency plan, and in particular areas where the plan was insufficient or could not be implemented;
- Clear indication of areas where carriers' and consignors' plans were not aligned;
- Lessons learned and recommendations to resolve this learning; and
- Action plans, as appropriate, identifying timescales and owners of the actions to resolve any identified shortfalls or learning.

## 12. Step 4 – Implementing the emergency plan

### Actions by drivers (or vessel masters), carriers and consignors

12.1. Implementation of the emergency plan, once alerted of the transport emergency, requires a team effort involving drivers, carriers and consignors. The person leading the emergency response must be quickly identified to all persons involved.

12.2. Drivers should avoid unnecessary delays in making notifications, but CDG recognises that immediate notification is not always possible, for example, when drivers need to prioritise their actions or where they have become incapacitated.



Hence, the legal duty on drivers, carriers and consignors is to notify relevant bodies as soon as reasonably practicable rather than immediately.

- 12.3. The actions required by CDG following an emergency are summarised in Table 1. In exceptional circumstances the emergency services may direct movement of the goods to a safe place or allow a recovery vehicle to move a road vehicle that has been involved in an accident or broken down.

**Table 1: Summary of key duties**

Dutyholder	Key duties
Driver	<ol style="list-style-type: none"> <li>a. Notify emergency services, relevant local authority, consignor and carrier;</li> <li>b. Initiate emergency plan; and</li> <li>c. Assist in handling a radiation emergency.</li> </ol>
Carrier	<ol style="list-style-type: none"> <li>a. Notify emergency services, local authority unless the driver has already done so;</li> <li>b. Notify ONR; and</li> <li>c. Assist in the handling of that emergency. This is likely to require the carrier to arrange for:               <ul style="list-style-type: none"> <li>• Notification to the consignor;</li> <li>• Examination of the load to determine whether contamination has occurred and confirm whether shielding has been affected;</li> <li>• Safe disposal as required; and</li> <li>• Decontamination of the vehicle, train or vessel if necessary.</li> </ul> </li> </ol>
Consignor	<ol style="list-style-type: none"> <li>a. Notify emergency services, relevant local authority and ONR of the event unless the driver or carrier has already done so;</li> <li>b. Provide ONR with details of the event;</li> <li>c. Assist in the handling of the emergency;</li> <li>d. Notify ONR that the plan is initiated even if no action is taken; and</li> <li>e. Ensure examination of the package to establish any damage or leaks that are not evident from a visual examination. Certify the package as suitable for onward transport (see 'Consideration of packages involved in an emergency' below for further details).</li> </ol>

## Consideration of packages involved in an emergency

- 12.4. A package that has been involved in an emergency must not be carried or caused to be carried unless the consignor, or consignor's agent, has undertaken an examination and issued a certificate to verify that the package complies with the requirements of CDG.
- 12.5. Before a package is certified as compliant with CDG after an emergency, consignors or their agents should consider whether there has been any:
- Package damage that might result in contamination in excess of allowable levels for that type of package and contents;
  - Shielding damage that could affect dose rate on the outside of the package;
  - Ingress of water that could have dispersed the contents, changed dose rates or affected the criticality safety index;
  - Movement or redistribution of the contents that could have changed the dose rates; or
  - Damage to labelling making it non-compliant for onward carriage.
- 12.6. There is neither a prescribed format nor specified contents for the certificate required to authorise onward movement of packages involved in an emergency. The certificate may be in electronic or hard copy format, but the carrier must be able to produce it during onward transport. For the certificate to be considered adequate, it should:
- State that it is being issued by the consignor (not on the consignor's behalf, by someone else);
  - Contain a clear and unambiguous statement that the consignor confirms that the package is compliant with the relevant requirements of CDG; and
  - State that it is suitable for onward carriage.
- 12.7. If the consignee and/or final destination of the package need to be changed as a result of the emergency, the consignor should amend or replace the transport document to reflect this.

## Emergency exposures

- 12.8. Where a dutyholder has identified, as a result of the RRA, that emergency exposures could be incurred, they should seek expert advice on protection from these emergency exposures. Emergency plans should also identify the need for expert advice to be available as the radiation emergency develops. Experts may be the dutyholder's appointed DGSA, RPA or other suitably qualified and experienced persons.
- 12.9. The management framework for controlling the exposure of emergency workers should contain the following generic elements:
- Pre-planning: identifying and preparing emergency workers who may need to receive emergency exposures.
  - Implementation: checking that those who have agreed to receive emergency exposures are fit to be exposed, properly equipped and instructed. Their exposure must be adequately managed.
  - Documenting the emergency exposures: ensuring dose records are made and kept by approved dosimetry services.
- 12.10. The generic principles of the management framework set out above should be supported by a set of arrangements capable of demonstrating that emergency exposures are kept As Low As Reasonably Practicable(ALARP). The arrangements should include:
- Identification of employees who may be subject to emergency exposure;
  - Provision of information, instruction and training to employees who may receive emergency exposures;
  - Provision of equipment to deal with the emergency and restrict exposure;
  - Provision of advice to emergency services and other responders on the suitability of personal protective equipment;
  - Arrangements for medical surveillance by appointing a doctor or an employment medical advisor;
  - Arrangements with an approved dosimetry service to monitor doses from emergency exposures;

- Arrangements to ensure that dose assessments are provided to the appointed doctor or employment medical adviser;
- Arrangements to notify ONR of the set dose levels for emergency workers 28 days before transport is carried out for the first time. Where such doses no longer become appropriate and new dose levels need to be determined, ONR must be notified 28 days before the new doses are formally determined; and
- Arrangements for providing advice to other emergency workers, such as the emergency services. Emergency services and other responders should be able to obtain expert advice from the consignor and/or carrier.

12.11. Consignors, carriers, emergency services or other responding organisations will need to have appropriately trained appointed persons in charge of managing the exposure of their emergency workers. A vital function of these appointed people is to authorise emergency workers to receive emergency exposures (see CDG Schedule 2, Part 1, paragraph 7(1)(g)).

### Disapplication of dose limits

12.12. CDG allows for the disapplication of dose limits that appear in IRR17. This applies to an emergency worker where:

- The emergency worker is engaged in preventing the occurrence of a radiation emergency; and/or
- The emergency worker is acting to mitigate the consequences of a radiation emergency.

12.13. Disapplication of dose limits only applies where normal dose limits cannot be maintained during the emergency, despite suitable and appropriate management of the emergency. Dose limits cannot be disappplied in relation to events which could not lead to a radiation emergency.

12.14. A procedure for the disapplication should be written into emergency plans. The procedure should:

- Identify, by their role, the person(s) making decisions on whether to invoke disapplication, who must be suitably trained to undertake the task;
- State how the decision-maker will be advised; and
- State whom the decision-maker will inform.

- 12.15. Although the dose limits from IRR17 may be disapplied to allow radiation emergencies to be addressed, the whole body effective dose for emergency workers is still restricted to a maximum of 500 mSv.
- 12.16. Every effort should be made to re-apply IRR17 dose limits as early as possible to keep doses ALARP. Disapplication of dose limits cannot be justified once the reasons for disapplication cease to exist, for example:
- Help has been provided to endangered persons;
  - Exposure has been prevented to other persons; or
  - A valuable installation or goods have been saved.

## Reference levels

- 12.17. The overriding requirement is for the emergency plan to prioritise keeping doses below an overall reference level of 100 mSv or to a lower reference level set in the plan.
- 12.18. Reference levels relate to the whole body effective dose that could be received during the response to an emergency and should be set in the range of 20–100 mSv effective dose (effective dose is the dose which may be received as a result of the emergency, either as an acute dose or over the course of a year). It is not sufficient to simply keep doses just below the reference level; optimisation should be applied in all cases to restrict doses so far as is reasonably practicable to minimal levels.
- 12.19. The local authority for the area where the event occurs may set lower reference levels to limit doses to responders and these may vary depending on the responder's role. The local authority must take advice from the person(s) with relevant competency identified in the emergency plan.

## 13. Step 5 – Reporting requirements after an emergency

### Assessment and report to ONR

- 13.1. CDG Schedule 2, Part 1, paragraph 6 (6) and (7) places a legal duty on both the carrier and the consignor to assess any emergencies that have occurred and then provide ONR with a report of their assessment findings. ONR's expectation is that carriers and consignors will collaborate to assess their own emergency plans then jointly produce and submit a single report covering the combined findings on both emergency plans. The steps that carriers and consignors must follow to comply with the legal requirements are summarised, as follows:

- a. **Make a provisional assessment:** as soon as reasonably practicable after the emergency, a provisional assessment must be made by the consignor and carrier. This must describe the circumstances and consequences of the emergency. To do this, carriers and consignors must consult with:
  - the emergency services;
  - the health authority in the area within which radiation emergency took place;
  - the local authority, in the area within which radiation emergency took place;
  - United Kingdom Health Security Agency, Public Health Wales or Health Protection Scotland as appropriate; and
  - any other person, body or authority “which has functions under the carriers or consignors emergency plan”.
- b. **Make a full assessment:** within 12 months (or longer if ONR agrees) of the radiation emergency, a full assessment must be made. This builds on the provisional assessment and must describe the circumstances of the emergency, its consequences and the effectiveness of the plans.
- c. **Produce a report:** within 28 days of completion of the full assessment, a report of the assessment findings must be made. This report must be retained for a period of 50 years.
- d. **Report to ONR:** a copy of the assessment findings report made above must be provided to ONR within 28 days of its completion. This report should include details of any emergency exposures, medical surveillances and treatment received by emergency workers. Any information relating to emergency exposures, medical surveillances or treatment should be kept for the same period as the dose records of those personnel.

## Handover report to recovery authority

- 13.2. Responding emergency services, in consultation with the local authority, will take responsibility for determining the transition from emergency to recovery phase and recovery authorities will be appointed during the emergency response. The recovery authority will depend on where the emergency takes place. For example, the Department for Environment, Food and Rural Affairs (DEFRA) would be likely to lead a recovery in England.
- 13.3. Consignors, in consultation with the carrier, must prepare a handover report to the recovery authority as soon as reasonably practicable after the completion of the

examination of the load. Arrangements for producing this handover report must be included in the transport emergency plan.

13.4. The handover report covers the transition from emergency to recovery phase and is in addition to providing ONR with the assessment report described above. The purpose of the handover report is to highlight to the recovery authority any risk of environmental contamination in the area where the event occurred. The handover report should include:

- Details of the incident;
- A statement on whether the emergency plan was initiated and if so, the actions taken;
- A statement on whether any part of the load was contaminated, and if so, the steps taken for the safe disposal of the relevant part of the load, and any steps necessary to decontaminate the relevant vehicle, train or vessel;
- A statement on any anticipated effects to the environment; and
- Any other relevant information to transition from an emergency state.

13.5. CDG requirements for transport radiation emergencies do not extend to the recovery phase. However, during the recovery phase, whilst transitioning from a radiation emergency to normal operations, other CDG requirements will continue to apply regarding the packaging and transport of material from the scene along with relevant requirements from IRR17. Other legislation not enforced by ONR will also apply, for example, legislation relating to environmental matters.

### Notifiable events

13.6. In addition to setting requirements for radiation emergencies, CDG also requires a 'Notification' whenever a driver, carrier or consignor discovers, or has reason to believe that there has been, the loss or theft of class 7 goods being carried.

13.7. Where there is reason to believe that an attempted theft of class 7 goods has taken place this is also considered a notifiable event, regardless of why the theft failed. ONR considers that the theft, or attempted theft, of a vehicle or train whilst carrying class 7 goods is also a notifiable event, if it is believed that the class 7 goods were not the primary focus of that theft.

13.8. Notifiable events should be reported as soon as is reasonably practicable after discovering, or having reason to believe, that the loss or theft of class 7 goods has

occurred in relation to the vehicle, train or in transit storage facility. The notification duties for each dutyholder are as follows:

- **The driver** must notify the police (999 or 112) and the consignor that the loss has occurred. They should also notify the carrier, so that they are informed to take any necessary actions;
- **The consignor and carrier** must notify the police (if the driver or vessel master has not already done so) and ONR; and
- **The carrier** must provide a report of the loss or theft to ONR. The description of the event in the report should include:
  - i. whether loss or theft is suspected;
  - ii. the nature of the class 7 goods lost or stolen (including the radionuclide(s), physical form, individual and total activity) and the number and type of packages involved;
  - iii. where and when the loss or theft is believed to have taken place, and whether it was from a vehicle, train, vessel or during storage in transit;
  - iv. contact details of the notifier and their role (driver, vessel master, carrier or consignor) and organisation;
  - v. identity of the consignor, carrier and consignee;
  - vi. whether other relevant regulators have been informed, e.g. environmental regulators and HSE; and
  - vii. other information as specified by ONR.



## 14. References

1. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009, UK Government, 2009.  
<https://www.legislation.gov.uk/ukxi/2009/1348/contents>
2. Work with ionising radiation, Ionising Radiations Regulations 2017, Approved Code of Practice and Guidance, Health and Safety Executive, 2018.  
[www.hse.gov.uk/pubns/books/l121.htm](http://www.hse.gov.uk/pubns/books/l121.htm)
3. ONR Guidance Document, TD-TCA-GD-003, Ionising Radiations Regulations 2017 (IRR17) Regulation 8 – Radiation Risk Assessment Guidance in Relation to the Civil Transport of Radioactive Material by Road, Rail and Inland Waterway.  
[td-tca-gd-003.docx \(live.com\)](http://td-tca-gd-003.docx (live.com))
4. IAEA Specific Safety Guide No. SSG-65, Preparedness and Response for a Nuclear or Radiological Emergency Involving the Transport of Radioactive Material.  
[https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1960\\_web.pdf](https://www-pub.iaea.org/MTCD/Publications/PDF/PUB1960_web.pdf)

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