

United Kingdom Overseas Territories Aviation Circular

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92-1

Carriage of Dangerous Goods

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GENERAL

Overseas Territories Aviation Circulars are issued to provide advice, guidance and information on standards, practices and procedures necessary to support Overseas Territory Aviation Requirements. They are not in themselves law but may amplify a provision of the Air Navigation (Overseas Territories) Order or provide practical guidance on meeting a requirement contained in the Overseas Territories Aviation Requirements.

PURPOSE

This OTAC gives guidance on Dangerous Goods for shipment by air.

RELATED REQUIREMENTS

This Circular relates to OTAR Parts 91 and 92.

CHANGE INFORMATION

First issue.

ENQUIRIES

Enquiries regarding the content of this Circular should be addressed to Manager PQS, Air Safety Support International, to the appropriate Director of Civil Aviation or to any office of ASSI.

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Chapter 1 - General

1 Introduction

- 1.1 OTAR Parts 91, 92, 121, 125 and 135 contain requirements for the transport of weapons and munitions of war, sporting weapons and dangerous goods. The guidance material in this OTAC is intended to supplement those requirements and provide information which will be of assistance in meeting them. The OTAC gives guidance to Operators in a number of areas related to the transport by air of dangerous goods, weapons and munitions of war and sporting weapons. Guidance is also given on dealing with emergencies arising during the transport of dangerous goods - whether such goods are in passengers' baggage in the cabin or in cargo or baggage in the cargo/baggage compartments of the aircraft.
- 1.2 Unless the text makes it apparent otherwise, the guidance in this OTAC is applicable to both large and small aeroplanes and to helicopters. It applies even if helicopters carry dangerous goods under-slung. There is nothing in this OTAC which refers to articles carried for use in agriculture, horticulture, forestry or pollution control or carried by aircraft flying under the terms of a Police AOC.

2 Definitions / Terminology

The ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284-AN/905) contain definitions which are applicable to many of the terms used in this OTAC. Other terms used are explained below.

Dangerous Goods Transport Document

Throughout this OTAC, references are made to the Dangerous Goods Transport Document. This term is used in the Technical Instructions and Air Navigation (Dangerous Goods) Regulations and it describes the document which is usually referred to as the Shipper's Declaration; it may sometimes be called the Dangerous Goods Declaration Form.

Class B cargo compartment:

Class B cargo compartment is one in which:

- a) There is sufficient access in flight to enable a crew member to effectively reach any part of the compartment with the contents of a hand fire extinguisher;
- b) When the access provisions are being used, no hazardous quantity of smoke, flames or extinguishing agent will enter any compartment occupied by the crew or passengers; and
- c) There is a separate approved smoke detector or fire detector system to give warning at the pilot or flight engineer station.

Munitions of war:

Any weapon, ammunition or article containing an explosive or any noxious liquid, gas or other thing which is designed or made for use in warfare or against

persons, including parts, whether components or accessories, for such weapon, ammunition or article.

Sporting Weapon:

Any weapon, ammunition or article containing an explosive or any noxious liquid, gas or other thing which is **not** designed or made for use in warfare or against persons, including parts, whether components or accessories, for such weapon, ammunition or article; for example, Starter gun for sporting events

Technical Instructions:

The latest effective edition of the Technical Instructions for the Safe Transport of Dangerous Goods by Air (Doc 9284-AN/905), including the Supplement and any Addendum, approved and published by decision of the Council of the International Civil Aviation Organization.

3 Requirements

- 3.1 In the Overseas Territories the requirements for the transport of dangerous goods by air are contained in the Air Navigation (Dangerous Goods) Regulations (Schedule 10 to the Air Navigation (Overseas Territories) Order 2007). They apply to all aircraft registered in a Territory, no matter where they are operating, and to all aircraft operating in a Territory no matter where the aircraft is registered.
- 3.2 It is a requirement that dangerous goods may only be carried with the approval of the Governor and in accordance with the ICAO Technical Instructions. See also Chapter 3 paragraph 1 Approval to Transport Dangerous Goods.
- 3.3 An Approval may not be required when the dangerous goods are:
- (a) in aircraft equipment;
 - (b) carried as catering or cabin service supplies;
 - (c) for use in flight as medical aid for a patient;
 - (d) for use in flight as veterinary aid or a humane killer for an animal;
 - (e) in the possession of passengers and crew members.
- 3.4 Where no approval is required there are still conditions which apply to the carriage of these items; also there are requirements for training and the reporting of dangerous goods accidents and incidents which are applicable to all Operators - see Chapter 7.
- 3.5 Additional information covering these dangerous goods is given in Chapter 2.
- 3.6 An Approval **is** required for the carriage of dangerous goods that are replacements for items of aircraft equipment, catering or cabin service supplies.

3.7 **Technical Instructions and Supplement to the Technical Instructions**

- 3.7.1 The Technical Instructions contain all the detailed requirements for carrying dangerous goods by air and they apply to all aircraft, both pressurised and unpressurised. Throughout the Instructions "aircraft" is used; unless the context makes it apparent otherwise, it is intended that the requirements apply to both aeroplanes and helicopters.
- 3.7.2 There is a Supplement to the Technical Instructions that contains information of interest primarily to States. However, it does also contain quantity limitations, packing instructions and other information relating to dangerous goods that are forbidden on aircraft in normal circumstances, but for which there is a prescribed system of granting approvals to allow transport under special conditions.
- 3.7.3 There is nothing in the Technical Instructions and Supplement that prevents an Operator from having variations to them, providing these variations are more restrictive. If Operators have variations to the Technical Instructions it has become the practice for these variations to be filed in the IATA Dangerous Goods Regulations (see paragraph 3.8) against the relevant requirements as they are shown in that document.

3.8 **International Air Transport Association's Dangerous Goods Regulations**

The Dangerous Goods Regulations which are produced by IATA are used by many Operators in lieu of the Technical Instructions; the two documents are compatible in most respects. The Regulations are a field document; they contain an acknowledgement that the Technical Instructions are the only source of the legal rules for the transport of dangerous goods by air and that any differences from those Instructions do not have force of law. Use of the IATA Dangerous Goods Regulations in lieu of the Technical Instructions places a responsibility on an Operator to ensure that compliance with OTAR Part 92 and the Air Navigation (Dangerous Goods) Regulations is still achieved.

4 **Handling Agents**

- 4.1 At some airports it is normal for an aircraft Operator to use the services of a handling agent to perform some or all of the Operator's functions. Whilst the text in the legislation and the various documents referred to in this OTAC may not make specific reference to a handling agent, there is nothing to prevent such an agent from undertaking the Operator's responsibilities in most respects. However, an Operator has a responsibility to ensure the handling agent carries out his functions correctly and in accordance with all the legal requirements; and the handling agent has a responsibility to ensure that he not only undertakes all that is required of him by the Operator but also acts in accordance with his own responsibilities as an organisation which causes cargo and/or passengers to be carried on an aircraft.
- 4.2 The agreement between an Operator and his handling agent should ensure that each knows the limits of the other's responsibilities, particularly in respect of the production of information, keeping of records and reporting of incidents.
- 4.3 This OTAC contains guidance material in relation to Operators' responsibilities and in general is addressed to Operators. The guidance material, however,

applies equally to handling agents when they are undertaking the various functions on behalf of Operators.

5 Operations Manual

- 5.1 Operations Manuals, where required, must include information and general guidance about dangerous goods and weapons, even if an Operator does not hold an Approval to carry dangerous goods. The areas that should be included and the depth to which any aspect is covered will, however, depend on whether or not an Approval is held.
- 5.2 Where an Operator uses a handling agent, he should provide that agent with a copy of the relevant parts of the Operations Manual to ensure the agent is aware of all the requirements, restrictions, etc., which are applicable to that Operator.
- 5.3 Guidance on Operations Manuals have been developed for use with OTARs; these are available at www.airsafety.aero and include references for dangerous goods and weapons. However, depending on the extent to which the Operator is involved in the air transport of dangerous goods, further information may need to be added in other manuals to ensure the subject is covered fully.

Chapter 2 - Dangerous Goods

1 Aircraft Equipment

1.1 For airworthiness or operating reasons, or for the health and comfort of passengers and crew, an aircraft carries items which are, or contain, dangerous goods by definition. In general these are:

- (a) Fuel;
- (b) Oxygen (gaseous/chemical);
- (c) Life-saving appliances;
- (d) Fire extinguishers;
- (e) First aid kits;
- (f) Batteries;
- (g) Insecticides;
- (h) Air fresheners.

1.2 Such items when carried for use are excluded from the requirements applicable to the transport of dangerous goods by air. However, it should be noted that some of the dangerous goods in aircraft equipment might be regarded as having a high hazard when transported as cargo and be subject to strict controls in such circumstances, including being forbidden for transport on passenger aircraft. It is essential that items intended as replacements for aircraft equipment be consigned in accordance with the Technical Instructions; these provide that the normal transport requirements be met, except that, when consigned by an Operator, containers which have been specifically designed for aircraft spares may be used in lieu of those specified in the appropriate packing instructions.

2 Catering or cabin service supplies

2.1 Alcoholic beverages, perfumes, aftershave, safety matches, liquefied gas lighters (excluding those which are disposable and those liable to leak when exposed to reduced pressure), aerosols and dry ice are often carried for use in flight or for purchase by passengers. As items of dangerous goods with primarily a flammable hazard (except for dry ice) there is the potential for them to cause a problem during flight unless they are stowed safely when not in use. When they are in use care should be taken to ensure they are not spilt or used if there is the possibility of them being ignited. Aerosols may present a particular hazard in this respect since they now usually have a flammable gas (butane/propane) as the propellant. Their stowage should ensure they are kept away from all sources of heat and when in use there is the need to avoid the contents being sprayed where there is the possibility of an ignition source being present. There are alternatives available for use instead of aerosols, many of them are pump-action and they are not regarded as items of dangerous goods if the contents are not flammable, toxic or corrosive.

- 2.2 Whilst items for catering or cabin service supplies when in use are excluded from the requirements applicable to the transport of dangerous goods by air, their replacements are not. They must be carried in full accordance with the Technical Instructions including the packaging provisions, since unlike replacements for aircraft equipment, there is no acceptable alternative to these.

3 Medical aid for a patient

- 3.1 Gas cylinders, drugs, medicines, other medical material (such as sterilising wipes) and wet cell or lithium batteries are the dangerous goods that may be provided for use in flight as medical aid for a patient; what is actually carried will depend on patient needs.

The items carried for medical aid must meet the following criteria:

- (a) Gas cylinders must have been manufactured specifically for containing and transporting that gas;
 - (b) Drugs, medicines and other medical material must be under the control of trained personnel when they are in use;
 - (c) Equipment containing wet cell batteries must be kept and, when necessary, secured upright to prevent the leakage of electrolyte; and
 - (d) Proper provision must be made to stow and secure all the equipment during takeoff and landing and at other times when thought necessary, in order to ensure aircraft safety.
- 3.2 This medical aid is not intended to be part of the normal equipment of the aircraft. It may also be carried on a flight made by the same aircraft to collect a patient or after that patient has been delivered when it is impracticable to load or unload at the time of the flight on which the patient is carried.

4 Veterinary aid or a humane killer for an animal

It is the drugs which are carried as veterinary aid and the cartridges for a humane killer which are likely to be items of dangerous goods. They should be under the control of trained personnel when they are in use and kept stowed securely at all other times. They may also be carried on a flight made by the same aircraft to collect an animal or after that animal has been delivered when it is impracticable to load or unload them at the time of the flight on which the animal is carried.

5 Passengers and crew members

- 5.1 Some dangerous goods are excluded from the normal requirements when they are carried by passengers or crew members, provided certain conditions are met. The main items are:

- (a) Alcoholic beverages, when the alcohol by volume is more than 24% but not more than 70%, they are in retail packaging, the individual receptacles do not exceed 5 litres net quantity and the total net quantity per person does not exceed 5 litres;
- (b) Medicinal or toiletry articles (including aerosols, hair sprays, perfumes and medicines containing alcohol), when the net quantity of each single article does not exceed 0.5 litre or 0.5 kg and the total net quantity of all articles does not exceed 2 litres or 2 kg;
- (c) Safety matches or a lighter when for personal use and when carried on the person;
- (d) A hydrocarbon gas powered hair curler, when the safety cover is securely fitted over the heating element, but refills cannot be carried.

5.2 In addition to the above, battery-powered wheelchairs or other mobility aids may be carried as checked baggage, under certain conditions. These are:

- (a) For non-spillable batteries: the battery is securely attached to the equipment, it is disconnected and the terminals insulated to prevent accidental short circuits;
- (b) For spillable batteries where the equipment can be kept upright at all times: the battery is securely attached to the equipment, it is disconnected and the terminals insulated to prevent accidental short circuits;
- (c) For spillable batteries where the equipment cannot be kept upright at all times: the battery is removed and packed in strong, rigid, leak-tight packaging, impervious to battery fluid; it is secured upright in the packaging, protected from accidental short circuits and surrounded by absorbent material in sufficient quantity to absorb the total liquid contents; the package is marked "Battery wet with wheelchair" or "Battery wet with mobility aid" and has on it an indication of its correct orientation and a "Corrosives" label; the package is stowed securely in the cargo compartment of the aircraft;
- (d) The Pilot in Command is informed of the location of a wheelchair or mobility aid with an installed battery or of a packed battery.

5.3 It is becoming increasingly common for passengers or crewmembers to carry consumer electronic devices, such as cameras and laptop computers; often these have lithium or lithium -ion batteries as the power source. When these are carried for personal use there is no restriction on the installed batteries. Spare batteries may only be carried in carry-on baggage providing they are individually protected from short circuits, they are in carry-on baggage and, for lithium metal or lithium alloy batteries, they have a lithium content not exceeding 2 g or, for lithium -ion batteries, they have an aggregate equivalent lithium content not exceeding 8 g. Not more than two spare lithium -ion batteries with an aggregate lithium content exceeding 8 g but not exceeding 25 g may also be carried providing they are individually protected and in carry-on baggage.

5.4 There are many other items, some of a specialised nature, which passengers and crewmembers may be permitted to carry. The full list can be found in the Technical Instructions.

6 Information for passengers

- 6.1 One of the biggest problems faced by Operators is passengers who take, or try to take, on to an aircraft items of dangerous goods that are prohibited. In these circumstances there is the potential for an incident to occur in flight, with disastrous results; and there have been such events in the past. To address the problem, there are requirements for information to be provided with the ticket and for notices.
- 6.2 Notices must be in sufficient number and prominently displayed so that passengers can see them easily during their normal progression through the departure procedures. They must appear:
- (a) At any place where passengers check-in;
 - (b) At airports where tickets are issued;
 - (c) At airports where boarding areas are maintained.
- 6.3 Information with the ticket includes having it on the ticket, on the ticket wallet or on a separate leaflet. Where an electronic ticket is issued, such as when a booking has been made on-line, the information is to be given in some other manner providing the passenger receives it prior to the check-in process. Any suitable method of giving this information may be used, including having it as part of the general information in the computerised booking system, providing the passenger cannot by-pass the information during the booking process.
- 6.4 The notices and ticket information must warn passengers about the types of dangerous goods which should not be carried on an aircraft; reference may also be made to those which are permitted. The information should be easily understood and may be conveyed by pictographs or similar and may be supplemented with text.
- 6.5 Providing visual information for passengers relies on them reading or seeing it; and experience suggests that sometimes they do not do so. Operators may benefit from supplementing the notices and ticket warnings with occasional verbal checks. For instance, it is recommended that check-in staff be instructed to ask passengers a direct question by pointing to the notice and enquiring if passengers have any items of the type depicted.
- 6.6 Making information for passengers noticeable has always been a problem for Operators. Whilst notices are the legal requirement, there may be other ways in which information can be provided that may attract the attention of passengers. One of the most attractive methods is to have display cabinets in the public areas of an airport, containing items that passengers cannot take on aircraft and pointing out that incidents can happen if forbidden items are taken on board. Operators considering this idea should consult with airport authorities. Information on this and other ideas on passenger awareness can be found in the Supplement to the Technical Instructions.

Chapter 3 - Transport of Dangerous Goods as cargo

1 Approval to transport Dangerous Goods

- 1.1 An Operator must hold a permanent approval from the Governor before dangerous goods can be carried by air. This permanent approval (other than when granted to a non-Territory Operator) will normally be part of the grant of the AOC but it may be granted separately. An application form for a permanent approval can be obtained from the OT aviation authority (OTAA). In addition to the information on the application, the OTAA will need to be satisfied that adequate training has been given, that all relevant manuals (e.g. ground handling manuals, Operations Manual, etc.) contain instructions and guidance material and that there are procedures in place to ensure the safe handling of dangerous goods at all stages of their transport by air.
- 1.2 In addition to the permanent approval, a further specific approval is required when:
- (a) The Technical Instructions indicate that an exemption is required from all the States concerned (which may be those of the origin, transit, overflight and destination of the consignment and that of the Operator); or
 - (b) The Technical Instructions indicate that an approval is required from the State of Origin of the goods (which is where they are to be first loaded onto an aircraft) - see paragraph 1.4 below regarding A1, A2 or A109 approvals.
- 1.3 Dangerous goods carried in accordance with an exemption or specific approval must comply with the conditions on that exemption or approval as well as those on the permanent approval, unless these have been varied.
- 1.4 The Technical Instructions indicate that some dangerous goods which are forbidden in normal circumstances can be carried subject to an approval having been granted by the State of Origin; these goods are identified in the Technical Instructions by special provision A1, A2 or A109. When they are to be carried on a passenger aircraft in a Territory under A1 or A2, specific approval is required from the OTAA irrespective of whether or not the Territory is the State of Origin for the goods. They may be carried into the Territory on a cargo aircraft under an A2 or A109 approval granted by the State of Origin, providing the OTAA has been notified in writing prior to the proposed flight date. Moreover, where the dangerous goods are explosives, advice should be sought from the OTAA in good time before the flight as to the suitability of the intended airport of landing for the handling of the explosives. This is because controls exist for the quantities of explosives that can be handled at certain airports at any one time. Failure to seek this advice may result in the aircraft being refused permission to land at the planned airport.

2 Transport of radioactive materials - Quality Assurance programme

- 2.1 Operators who need to carry radioactive materials will need to have a quality assurance programme which includes procedures for the transport and in-transit

storage of such materials, with the aim of ensuring compliance with all relevant provisions. This requirement stems from the Regulations for the Safe Transport of Radioactive Material produced by the International Atomic Energy Agency. The quality assurance programme should cover the following elements:

- (a) Quality assurance procedures;
- (b) Organization;
- (c) Document control;
- (d) Inspection and test control;
- (e) Controls of use and care of packages;
- (f) Non-conformity control;
- (g) Corrective actions;
- (h) Records;
- (i) Staffing and training;
- (j) Audits.

2.2 Operators otherwise required to have a quality system to monitor compliance with, and the adequacy of, procedures to ensure safe operational practices, could incorporate the elements necessary to provide for the transport and storage of radioactive materials, or a separate programme can be devised.

3 Explosives

Operators wishing to carry explosives should ensure they are able to comply with the national regulations that may apply in relation to explosives in the country they are operating to or from. Operators who are uncertain of the regulations that apply should seek guidance from the OTAA. See also Chapter 4 paragraph 8 on the storage of explosives.

4 Acceptance for transport

4.1 An acceptance check is carried out to establish that a package of dangerous goods appears to be in a fit condition for transport and that the associated documents are complete and accurate. This initial inspection is a vital aid to ensuring the integrity of packages before they are accepted for transport and loaded on an aircraft. It should be carried out conscientiously and methodically, with attention paid to anything which appears to be unusual, such as a package being heavy for its size or having an uneven weight distribution as these could indicate it is not packed properly. However, minor tears or dents in an outer or single packaging should not result necessarily in rejection of the package; what matters is whether or not these have reduced the ability of the packaging to continue to perform its prime containment function.

- 4.2 An Operator carries out an acceptance check on all packages of dangerous goods, and the associated documents, before they are accepted for transport, to ensure that at the end of the check it can be established that:
- (a) the documents (e.g. the Dangerous Goods Transport Document and any Air Waybill) are in order, and
 - (b) that the package is marked and labelled correctly, and
 - (c) that from its external appearance it appears to be in a fit condition for transport.

Note: The IATA Dangerous Goods Regulations show model checklists which are suitable for meeting this requirement. The checklist needs to be capable of completion by the checker, whether this is by manual, mechanical or computerised means; if the checklist is computerised it needs to be capable of being printed out so that a copy of it can be obtained if required.

- 4.3 There may be occasions when packages of dangerous goods and/or their documents are found during the acceptance check not to be in total compliance with all applicable requirements. In these circumstances **they should not be accepted for air transport** but returned to the shipper or his agent with an explanation for the rejection. Whilst there is no legal requirement to do so, annotating the acceptance checklist with the reasons for the rejection can aid any future acceptance check on the corrected package/documents. It will also provide a record of the actions taken in relation to the original consignment which was offered for transport. Depending on the reasons for not accepting a consignment, there may be a need to retain the package(s) and document(s) since there is the possibility that the level of non-compliance is such that it is a potential dangerous goods incident. In this case, the OTAA needs to be informed (see Chapter 7).
- 4.4 Where an Operator uses the services of a handling agent to accept dangerous goods for transport, he should ensure that acceptance checks of the required standard are carried out. There must also be an agreement between them as to who will keep the completed acceptance checklist, where it will be stored and what action each will take in relation to consignments which are to be rejected.

5 Inspections for leakage or damage

It is important to ensure that leaking or damaged packages of dangerous goods are not loaded on an aircraft since this could lead to an incident in flight hazarding its safety. Any leaking or damaged packages which are found on board need to be removed without delay and the operator informed. An initial inspection of packages is carried out during the acceptance check; further checks must be made before the packages are loaded into an aircraft or a unit load device (ULD) and when they have been unloaded. This final check should be carried out as soon as possible after unloading to ensure that if leakage has occurred during either a flight or the loading/unloading process, the aircraft can be inspected for damage or contamination before undertaking another flight.

6 Loading and Stowage

6.1 There are loading and stowage requirements in the Technical Instructions which are intended to ensure that:

- (a) dangerous goods are separated from passengers and crew members (except for those which have to be accessible on cargo aircraft);
- (b) incompatible goods are kept apart;
- (c) there is securement to prevent movement in flight, and
- (d) there are restrictions on the stowage of "cargo aircraft only" dangerous goods on such aircraft.

6.2 These requirements ensure that there cannot be interaction between incompatible goods in the event of leakage and that any leakage cannot affect the passengers or crew. They also ensure that packages cannot suffer damage through movement (such as falling over). Finally, on cargo aircraft, the requirements are designed to ensure that most of the dangerous goods are accessible so that, if a problem arises, the crew can consider actions such as moving packages or containing/absorbing any leakage.

6.3 Some packages of radioactive materials emit a low level of radiation during transport; the permitted limit is set down in the Technical Instructions. To protect passengers and crew from this radiation, separation distances are laid down which detail how far a package of such radioactive material needs to be stowed from the nearest occupied area. Not all packages of radioactive materials require separation since not all of them emit radiation during transport. Those which do emit measurable radiation have labels which are half yellow and half white; whilst those which do not emit such radiation are all white in colour. Both types of labels have on them the trefoil (radioactive) symbol.

7 Damaged packages of Dangerous Goods and contamination

7.1 Not dealing with damaged packages at the time they are found may cause problems later, which may then be more difficult to deal with. Packages may be damaged in flight because of bad loading or the movement of cargo; they may be damaged on the ground due to bad stacking or handling or from being left in a place where a heavy item can fall on them or they can be run over by a fork-lift truck. See also Chapter 4 paragraph 6.

7.2 Packages which are damaged on the ground must never be loaded on an aircraft. If a damaged package is found on an aircraft it should be removed, or arrangements made for its removal by a specialist organisation, and a check made to ensure no other piece of cargo on board is damaged and there is no contamination. Where, upon unloading from an aircraft or ULD, it is suspected that packages of dangerous goods have been damaged or are leaking, the aircraft should be checked without delay for damage or contamination and any found dealt with immediately. The cause of the damage or contamination should be identified quickly, since permanent damage to the airframe may need to be prevented and some types of spillages may need to be neutralised. Operators

and handling agencies should have procedures for notifying the maintenance organisation of any spillage or leakage of dangerous goods on an aircraft. This is especially important when the event occurs away from the main base, since further remedial action may need to be taken.

- 7.3 In flight the crew, even if they realise there is leakage from a package and can reach it, can only respond with first-aid measures intended to contain the immediate problem or land without delay. Specific action to deal with damaged and leaking packages can only be taken when they can be handled without obstruction, so that an assessment can be made of the extent of damage and leakage and the potential hazard to persons. Guidance for actions in emergencies may be shown on a package or on accompanying documents but in the absence of this it may need to be obtained from the shipper, consignee or a specialist organisation. Sufficient information must be given to them to enable accurate identification of the goods. However, if nothing can be ascertained, a "worst case" may have to be assumed, but any information on packages and documents should be believed unless there are positive indications that it is inaccurate.
- 7.4 Leaking packages of infectious substances and radioactive materials have the potential for spreading airborne contamination unless they are correctly dealt with. If a package of an infectious substance is found to be damaged or leaking it must be isolated, the public health authority notified and the shipper and/or consignee informed. If a package of radioactive material is found damaged or leaking, it must be isolated and a qualified person called to establish the extent of the leakage and whether there is any contamination. If there is contamination of an aircraft from radioactive material it must be taken out of service until such contamination is removed or reduced to levels specified in the Technical Instructions.
- 7.5 Damaged or leaking packages of dangerous goods must be disposed of safely, to ensure they cannot cause injury or property damage. Depending on the hazard of the goods, it may be possible to dispose of them locally or, if they are in transit, to have them re-packed and returned to the shipper or sent on to their final destination. The shipper or consignee should be able to advise on disposal. If they are to be re-packed for onward carriage the shipper will need to give instructions for this to be done and authorise an appropriate person to sign a new Dangerous Goods Transport Document on their behalf.

8 Contaminated Baggage or General Cargo

It is possible that baggage or general cargo on board an aircraft or which is to be loaded on an aircraft may become contaminated by leaking dangerous goods. Where it is suspected this has happened it should never be ignored, particularly if the baggage or cargo is in transit, since there may be a delayed reaction leading to a serious incident in flight. If it is thought that contamination of baggage or cargo has been caused by dangerous goods, the goods need to be identified in order to establish the hazard and the correct method of dealing with it. Baggage and cargo which has been contaminated should never be placed on an aircraft until the Operator is satisfied that all trace of the contaminant has been removed or neutralised.

9 Provision of information to the pilot-in-command (the NOTOC)

9.1 In the event that an aircraft carrying dangerous goods wishes to make an emergency landing, details of these will need to be conveyed to ATC for the benefit of the emergency services. It is also important that the pilot in command PIC is aware of where dangerous goods have been placed on the aircraft. To this end, he must be given written information about what has been loaded on board, and its location. This information is usually referred to as the "NOTOC" - Notification to Pilot in Command (formerly Notification to Commander); it may be produced manually or by computerised means and as a minimum it needs to show, for each package of dangerous goods:

- (a) The proper shipping name and UN/ID Number;
- (b) The class/division, any identified subsidiary risk(s) and, for explosives, the compatibility group;
- (c) The packing group, number of packages and net or gross quantity;
- (d) The category and transport index (for radioactive materials);
- (e) The loading location;
- (f) When for cargo aircraft only;
- (g) The airport of unloading;
- (h) Where State exemptions apply

9.2 It is not uncommon for some consignments to consist of packages of different net quantities of the same dangerous goods. When there is a consignment of multiple packages of the same dangerous goods, the NOTOC may show for each loading location only the total quantity and the net quantity in the largest and smallest package. The NOTOC is to include details of any dangerous goods which remain on board from a previous flight or which are temporarily offloaded and are to be reloaded for onward carriage. A telephone number may be included from where the information on the NOTOC can be obtained and which the pilot in command, in an emergency, can give to the air traffic services as an alternative to giving detailed information.

9.3 The NOTOC needs to be a dedicated form i.e. it should not consist of copies of Dangerous Goods Transport Documents. The information on it should be presented in a legible manner. It should include confirmation, either by a written signature or by some other indication, that there is no evidence that damaged or leaking packages have been loaded; and the PIC needs to acknowledge receipt of the information, by signature or in some other manner. The NOTOC is to be readily available to the PIC in flight.

9.4 As part of the requirements for dealing with emergency situations, there is a need to ensure that the information about what is on an aircraft is available from several different ground sources. A legible copy of the NOTOC needs to be retained on the ground at the departure airport and this copy should include the PIC's acknowledgement of the receipt of the information. This copy or the

information on it is to be readily accessible at the departure and scheduled arrival airports until after the flight has been completed.

9.5 On some flights there may be a large quantity of dangerous goods to be carried; this means that in an emergency it is likely to be impractical or impossible for the PIC to consider giving to the air traffic services detailed information about the dangerous goods on board. In such circumstances it is recommended that, in addition to the NOTOC, an Operator provide a summary of the information on it, giving at least the quantities and classes or divisions of the dangerous goods in each cargo compartment; this would assist the PIC in knowing what is the essential information to give over in the event of an in-flight emergency.

9.5 The NOTOC, or a copy of it, must be retained for a minimum period of three months but after the flight has been completed, the place of retention does not need to be readily accessible.

10 Retention of records

Paragraphs 4 and 9 refer to the need to retain the acceptance checklist and the NOTOC. Apart from these documents, a copy of the Dangerous Goods Transport Document must also be retained. Among other things, this is to ensure that full information is available on the ground about the dangerous goods on board an aircraft in case it should suffer a catastrophic accident in flight and there is a need to know what was on board. Therefore, the location at which the copy is kept, at least for the expected duration of the relevant flight(s), should allow for access to it within a reasonable period of time. After that it may be retained at some other point. The copy of the Dangerous Goods Transport Document is required to be retained for a minimum period of three months.

11 Cargo-only aircraft and carriage of operator's staff

11.1 Some dangerous goods are restricted to transport on "cargo aircraft only". In this context such an aircraft can also carry persons who, for other reasons, may be regarded as passengers.

They are:

- (a) an authorised representative of the OTAA, ASSI or other Authority;
- (b) a person accompanying a shipment on board, which is not necessarily a consignment of dangerous goods;
- (c) a member of the Operator's staff in an official capacity.

11.2 A member of the Operator's staff in an official capacity is intended to mean that they have duties concerned with the preparation or undertaking of the flight, or on the ground once the aircraft has landed although not necessarily in connection with any aircraft.

11.3 Dangerous goods are restricted to transport on cargo aircraft because of the quantity contained in a package or they are considered unsuitable for passenger aircraft in normal circumstances. Most "cargo aircraft only" dangerous goods are

required to be stowed in an accessible position on the main deck of the aircraft. If an incident occurs on a cargo aircraft carrying dangerous goods, the flight crew can consider a greater range of options than is possible on a passenger aircraft e.g. inspecting the packages to assess the problem, attempting to deal with it, using oxygen masks, reducing pressurisation. Carrying persons other than the flight crew on cargo aircraft may reduce this range of options; therefore, it should not become routine to do so. A number of factors need to be considered on each occasion, such as what is being carried, what Classes are represented, what net and total quantities are involved and the stowage location.

Chapter 4 - Transport of Dangerous Goods by air as cargo **- additional requirements in the Territories**

1 Additional requirements

The Technical Instructions contain all the requirements applicable to the transport of dangerous goods by air. In the Territories there are some circumstances when it is considered that either additional requirements or variations to the normal requirements are needed; these are identified below. When these require the grant of an exemption or specific approval it is the responsibility of the operator to apply for that exemption or specific approval. Similar exemption or approval may also be required from other States if part of the flight is in their territory.

2 Rescue and Fire-Fighting cover at airports

- 2.1 Operators should take careful note of any operating conditions placed on their Approval document that may require them to operate to and from certificated aerodromes only, or aerodromes with a certain level of rescue and fire-fighting provision.
- 2.2 Irrespective of the conditions on approvals, there may be occasions when it is safer to land at an aerodrome when the minimum RFF category is below that required rather than divert to another airport. An example of this is an emergency landing, or if in the pilot's opinion, a diversion or hold may introduce a more significant hazard.
- 2.3 Whilst it is the Operator's responsibility to ensure the condition is met, in practice the decision is likely to be placed on the PIC, since he will be in possession of all the required information, including what dangerous goods are on board. If an aircraft might use an airport where it is possible the RFF cover at the time of landing may not be at the minimum level specified in any approval, the Operator should discuss the problem with the OTAA and have contingency procedures in the Operations Manual to assist the PIC in his decision for landing or diverting.

3 Passenger aircraft without Class B main deck cargo compartments

- 3.1 On aircraft carrying passengers, dangerous goods can only be carried in any main deck cargo compartment when this meets the certification requirements for a Class B cargo compartment. There are many aircraft in operation which do not have such a main deck cargo compartment e.g. HS748, F27.
- 3.2 There are some dangerous goods which present a relatively low hazard and which, therefore, could be suitable for transport in aircraft where the only available cargo compartment is on the main deck but it does not meet the requirements for a Class B cargo compartment.
- 3.3 The Technical Instructions recognise that dangerous goods of the types shown below could be carried safely and have provided that the State of Origin may

exempt to allow them to be carried under certain conditions. The dangerous goods are primarily:

- (a) Division 1.4S explosives;
- (b) Division 2.2 gases;
- (c) a number of liquids and powders which are in Packing Group III and some articles of Classes 3, 8 and 9, Divisions 4.1, 5.1 and 6.1;
- (d) Division 6.2 infectious substances; and
- (e) Class 7 radioactive materials in excepted packages or those requiring White-I labels on the package.

3.4 In the event of leakage, none of these dangerous goods will produce fumes or any other reaction which could cause discomfort to passengers.

3.5 The OTAA may be prepared to grant an exemption to an Operator who wishes to carry dangerous goods but whose passenger aircraft only have main deck cargo compartments and these do not meet the Class B cargo compartment certification requirements. Advice can be sought from the OTAA.

4 Transport of Dangerous Goods on helicopters

4.1 The Technical Instructions use the term "aircraft" throughout the document. Often the wording suggests the provisions are relevant only to fixed-wing aircraft but unless it is apparent otherwise all the provisions are intended to apply to helicopters, no matter whether the dangerous goods are carried inside or outside. This does mean there may be some circumstances when it is impracticable or impossible for dangerous goods to meet the full requirements e.g. when they are underslung beneath a helicopter. The requirements are likely to be those concerned with packing, the marking of packages and loading.

4.2 There is a set standard of packing, including specifications and testing requirements for packagings, but other ways of achieving an equivalent level of safety are possible.

4.3 Whilst many of the markings on packages are necessary to ensure accurate identification of them and their contents, some of them do not make a direct contribution to safety and can be omitted in some circumstances. The loading requirements for passenger aircraft, as indicated in paragraph 3.2 above, restrict carriage on the main deck to being in cargo compartments meeting Class B certification requirements; this certification is inappropriate for helicopters and if there is an essential reason for doing so it may be possible to permit dangerous goods and passengers on the same helicopter, depending on circumstances and what needs to be carried.

4.4 The OTAA may be prepared to grant an exemption to an Operator to permit helicopters to carry dangerous goods other than in accordance with the normal requirements for packing, marking of packages and loading, providing it can be satisfied that the level of safety will be not less than that achieved by the normal

requirements and providing there are overriding reasons for allowing the variation. Advice can be sought from the OTAA.

5 Transport of radioactive material over a Territory

The Technical Instructions provide an internationally accepted means of carrying dangerous goods and, in normal circumstances, there is no need to impose operating conditions over and above those which are contained in the Instructions. However, there are some circumstances when it is felt that additional conditions are required in order to provide information that would be needed immediately should an aircraft suffer a catastrophic event whilst overflying a Territory. These circumstances are primarily when an aircraft is carrying certain types of high activity radioactive material. An Operator intending to carry packages of radioactive material containing an activity greater than:

- (a) for special form 3000 A1 or 100,000 A2, whichever is the lower; or
- (b) for all other radioactive material 3000 A2

must notify the OTAA at least three working days before the flight.

6 Ground Handling and Storage

- 6.1 Ensuring the safe handling and storage of dangerous goods in warehouses, transit sheds etc., is not primarily within the responsibility of the OTAA. The appropriate competent authority may be the Government body responsible for Health & Safety, for the Environment or, in some circumstances, the Police.
- 6.2 Operators may require, either as part of their own safety management system, or in response to additional local legislation, to make an assessment of all the risks to the health and safety of their employees to which they are likely to be exposed whilst at work (and to non-employees who might be affected by the work activities); this requires a proactive approach to health and safety as well as a reactive one. The assessment should establish if there are any foreseeable ways in which packages of dangerous goods could become damaged through, for example, bad handling or storage and identify good working practices to reduce the possibility of this happening. For example:
 - (a) segregating packages from vehicle routes to prevent damage by fork-lift trucks;
 - (b) not storing packages in an insecure manner at a height where they are liable to fall;
 - (c) segregating significant quantities of incompatible dangerous goods from each other;
 - (d) ensuring there is adequate ventilation (e.g. natural ventilation) in the vicinity of packages of gases, flammable liquids, self-reactive substances and organic peroxides;
 - (e) ensuring packages are stored in the direction of any orientation arrows.

- 6.3 The risk assessment may show that, despite the precautions which have been taken, it will still be possible for damage and leakage to occur. In order to deal with spillages and leakages there should be contingency planning for what to do if such an event should occur; it would need to identify different levels of response depending on the type and quantity of material involved.
- 6.4 If dangerous goods handled at an airport are subsequently forwarded by road or rail there are various sets of regulations dealing with the different modes of transport which will apply.

7 Handling and Storage of Radioactive Materials

- 7.1 Operators undertaking work with ionising radiation will need to consider the storage and moving of the material as well as its carriage within the aircraft. An operator carrying radioactive material should establish a framework for ensuring that exposure to ionising radiation arising from work activities is kept as low as reasonably practicable and does not exceed the dose limits specified by the International Atomic Energy Agency. The Operator should provide key working instructions setting out the arrangements for restricting exposure in a particular area, and should consider appointing one or more radiation protection supervisors (RPS) to supervise work health and safety in such areas. Where necessary, Operators should seek appropriate specialist advice.
- 7.2 Records need to be maintained of all radioactive materials which are in transit. If it is believed a package of radioactive materials has been lost or stolen, it has to be reported as soon as possible to the OTAA and to the Police.

8 Storage of Explosives

National legislation may require that explosives are stored only in licensed or approved areas. In this instance it is likely that explosives would therefore need to be brought to the airport only a short time before the flight and the acceptance check will have to be carried out immediately prior to loading. Explosives need to be kept under secure conditions at all times when stored, to preclude unauthorised access to them and to prevent accidental damage which may affect the integrity of their packaging. It is suggested that, depending on the type and quantity, the loss of explosives whilst in the care of the Operator be reported to the Police.

9 Training

- 9.1 There are specific requirements for training; these appear in both the Technical Instructions and OTARs.
- 9.2 They apply to all Operators, even when an approval to carry dangerous goods is not held. Where the Operator uses the services of a handling agent there is a responsibility on the Operator to ensure the staff of that agent are trained to the level necessary to perform their functions.

- 9.3 Training programmes are required to be established and maintained for all flight and cabin crew and appropriate ground staff (e.g. those involved in passenger check-in, acceptance of dangerous goods, cargo and baggage handling). Refresher training has to be given at intervals of not longer than two years. The level of training and the areas to be covered depend on the responsibilities of the individual; and the time taken to perform the training will depend on the level and the areas to be covered.

Chapter 5 - Munitions of War

1 General

- 1.1 Under the International Convention on Civil Aviation, member States have the right to control the air transport of munitions of war through their territory. However, unlike the transport of dangerous goods, there are currently no internationally agreed standards and it has been left to each individual State to develop its own requirements depending on circumstances and national needs.
- 1.2 The Air Navigation (Overseas Territories) Order contains the requirements for munitions of war; it applies to aircraft registered in a Territory, no matter where they are operating, and to aircraft registered in a country other than a Territory when they are operating in Territory airspace. In addition, there is other, non-aviation, legislation and aviation security legislation that may apply to munitions of war during their processing for air transport and after their carriage by air. Any such legislation is not covered in this OTAC; the onus is on the Operator or handling agent to ensure all relevant legislation is met when dealing with munitions of war for carriage by air.
- 1.3 Article 57 of the Air Navigation (Overseas Territories) Order 2007, defines munitions of war. "Weapons and ammunition" includes component parts and accessories. Where there is doubt as to whether or not a weapon, ammunition etc. is a munition of war, the OTAA should be consulted.
- 1.4 If a firearm is not a munition of war, it should be treated as a sporting weapon for the purposes of its carriage on an aircraft (see Chapter 6).

2 Approval to transport

Munitions of war can only be carried on aircraft with the approval of all the States concerned. These may be the States of origin, transit, overflight and destination of the consignment and that of the Operator. In the Territories each aviation authority is responsible for considering applications for the grant of an approval.

3 Conditions for transport

- 3.1 Once an approval has been granted, munitions of war may only be carried on an aircraft when they are stowed in a place which is inaccessible to passengers during flight and, in the case of firearms, when they are unloaded. In exceptional circumstances they may be carried under different conditions providing an appropriate approval has been granted.
- 3.2 No matter how it is intended that munitions of war be carried on an aircraft, the PIC must be informed before a flight of what are to be carried and where they are located.

4 Munitions of war which are also Dangerous Goods

Some munitions of war are also dangerous goods by definition e.g. ammunition, bombs, torpedoes etc. In such circumstances the requirements for the transport of dangerous goods will also apply and where these indicate that an exemption or specific approval is needed, this is separate to that applicable to them as munitions of war.

5 Reporting of Incidents

Incidents which arise from the transport of munitions of war should be reported in accordance with OTAR Part 13, no matter whether they are contained in cargo, mail, passengers' baggage or crew baggage. An initial report must be made within 72 hours of the incident unless exceptional circumstances prevent this. The initial report may be made by any means but a written report should be made as soon as possible. The report should be comprehensive and contain all data known at the time it is compiled; if all relevant information is not available at first, the initial report should be sent stating what is known and a follow-up report sent when the full details are available.

Chapter 6 - Sporting Weapons

1 General

- 1.1 There are no internationally agreed standards for the carriage of sporting weapons on aircraft but there are security requirements which will apply to them.
- 1.2 Article 57 of the Air Navigation (Overseas Territories) Order 2007 contains the requirements applicable to sporting weapons; however, OTAR Part 92 may also relate.
- 1.3 Sporting weapons include hunting knives, bows and other similar articles. A firearm is any gun, rifle or pistol which fires a projectile. The following firearms are generally regarded as being sporting weapons:
- (a) those designed for shooting game, birds and other animals;
 - (b) those used for target shooting, clay pigeon shooting and competition shooting, providing the weapons are not those on standard issue to military forces;
 - (c) airguns, dart guns, starting pistols, etc.
- Any firearm which is not a munition of war is treated as a sporting weapon for the purposes of its carriage on an aircraft
- 1.4 Although a weapon may be defined as sporting in the Air Navigation Order, this does not mean it would be excluded other legislation they may prohibit its carriage. The aims of the Air Navigation Order and other national legislation for firearms will differ. Also, there may be other non-aviation legislation or aviation security legislation that may or will apply to sporting weapons during their processing for air transport and after their carriage by air. The onus is on the Operator or handling agent to ensure all relevant legislation is met when dealing with sporting weapons for carriage by air.
- 1.5 Where there is doubt as to whether or not a weapon is a sporting weapon, the OTAA should be consulted.

2 Conditions for transport

No specific approval is required for the transport of sporting weapons providing certain conditions are met. These are:

- (a) the Operator takes all reasonable measures to ensure he is informed of the intended carriage of the weapons;
- (b) the weapons are stowed in a place which is inaccessible to passengers during flight;
- (c) for firearms or other weapons that can contain ammunition, they are unloaded.

3 Ammunition for sporting weapons

Ammunition for a sporting weapon is dangerous goods by definition and as such it is covered by the requirements of the Technical Instructions. Where the ammunition is in a passenger's baggage, it may be carried, subject to the agreement of the Operator, provided that:

- (a) it is in checked baggage;
- (b) it is in Division 1.4S (see the Note);
- (c) it is for the person's own use;
- (d) it is securely boxed;
- (e) the quantity does not exceed 5 kg gross weight; and
- (f) it does not contain any explosive or incendiary projectiles.

NOTE:

Division 1.4S is a classification assigned to an explosive. It refers to cartridges which are packed or designed so that any dangerous effects from the accidental functioning of one or more cartridges in a package are confined within the package unless it has been degraded by fire, when the dangerous effects are limited to the extent that they do not hinder fire fighting to other emergency response efforts in the immediate vicinity of the package. Cartridges for sporting use are likely to be within Division 1.4S

Chapter 7 – Accidents, incidents and emergencies involving Dangerous Goods

1 Notification of Dangerous Goods following an aircraft accident or incident

- 1.1 If a catastrophic accident or serious incident happens to an aircraft it will be essential for information about any dangerous goods on board to be passed quickly to the State where the accident or serious incident occurred. This will be needed to ensure the safety of persons involved in dealing with the accident or serious incident and to minimize the hazard to persons, property and the environment. The responsibility is on the Operator or handling agent to give the information without waiting to be asked. The notification may come from the Operator or handling agent, from a Territory base or from an operating base outside the Territory, providing the information is supplied immediately and is accurate. A point of contact should also be given when notifying so that, if further information is required, it can be obtained without delay.
- 1.2 In the first instance the information is to be given directly to the emergency services or to whoever is collating information for their use. As soon as possible the information is also to be given to the aviation authority of the State where the accident or serious incident occurred, or as directed by that State, as well as to the State of the Operator and to the OTAA if it is neither. The information required is that which is on the NOTOC for the relevant flight (see Chapter 3 paragraph 9). However, it should be realised this may mean that some dangerous goods in cargo would not be notified since they do not appear on a NOTOC (e.g. excepted radioactive materials). Sending the NOTOC details is not to be delayed whilst checks are made for the presence of excepted radioactive material; details of these should be sent as soon as possible. If there are copies available of the Dangerous Goods Transport Documents, these may be useful at a second stage, when it may be necessary to identify more precisely what is in a particular package. Since it is important to ensure that any dangerous goods on an aircraft involved in an accident or serious incident are notified without delay, there should be procedures in place and reference made to them in the contingency plan for responding to accidents and serious incidents.
- 1.3 If there is an aircraft incident, information only needs to be provided if it is requested; but depending on the seriousness of the incident and what is being carried, giving the information without waiting to be asked may assist in the early stages of dealing with it. Any information needs to be given as soon as possible; initially, it is given to the emergency services or to whoever is seeking it on their behalf and, subsequently, to the aviation authority of the State where the incident occurred, or as directed by that State.

2 Dangerous Goods emergencies

- 2.1 An emergency situation concerning dangerous goods could arise at any time whilst they are in air transport. Such emergencies can range from the discovery of leaking or damaged packages during their preparation for transport, to a major incident (e.g. a fire) on an aircraft. Also, passengers may deliberately or inadvertently take into the cabin dangerous goods which they are not entitled to

have. The ability to respond correctly and efficiently to an incident involving dangerous goods should not rely on an instinctive reaction to a situation, but on having established procedures and training.

- 2.2 An emergency involving dangerous goods can occur not only to declared dangerous goods; it might also arise on the ground with undeclared dangerous goods and on an aircraft through the actions of a passenger. Therefore, some of the information in both this Chapter and Chapter 8 is appropriate irrespective of whether or not the Operator holds an approval to carry dangerous goods.

3 Information requirements

- 3.1 An Operator must provide information in manuals on the actions to be taken in emergencies; this information is applicable to all staff, whether they are crew members or ground staff. Instructions need to be given on the actions to be taken in dealing with an incident occurring in an aircraft in flight and on the ground.
- 3.2 Information must be immediately available to the Pilot in Command (PIC) for use in the response to an emergency occurring in flight when dangerous goods are being carried as cargo. As a minimum, this information should give guidance on the hazards associated with the dangerous goods on the aircraft. In practice the requirement is often met by having on board a copy of the *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481-AN/928), published by ICAO. However, it can be met by providing any other document which gives similar information concerning the dangerous goods on board. Detailed guidance may be found in Chapter 8 of this OTAC.
- 3.3 If an in-flight emergency occurs and the situation permits, the PIC is required to inform the appropriate air traffic services unit of any dangerous goods on board an aircraft. Whenever possible this information should include:
- (a) the proper shipping name and/or UN/ID number;
 - (b) the class/division, any identified subsidiary risk(s) and, for explosives, the Compatibility Group;
 - (c) the quantity and location.
- 3.4 This information is for the use of the airport authorities, primarily to warn the emergency services what to expect when they approach the aircraft after it has landed; in this respect the PIC has a duty of care not only to the passengers and other crew on board but also to those on the ground. The emergency information should, wherever practicable, include sufficient details to identify fully the dangerous goods and where they are located. If the situation does not allow for full details to be given, the PIC should decide what it would be appropriate to give in the circumstances; for instance, if a telephone number has been provided as a point of contact from where the information on the NOTOC can be obtained, this may be given in lieu of any details or, if a summary of all the dangerous goods on the aircraft has been provided, the nature of the hazard(s) on board might be conveyed adequately by giving the class, quantity and location, rather than individual UN/ID numbers.

4 Training

4.1 It is not only the crew on an aircraft who may become involved in dealing with an incident, ground staff might also do so in the course of handling dangerous goods during their preparation for transport or through coming into contact with them inadvertently. Training for all these persons should include guidance on what to do if there is an incident involving dangerous goods.

4.2 The persons who should receive training are:

- (a) those engaged in the acceptance of dangerous goods;
- (b) those engaged in the acceptance of general cargo and the ground handling, storage and loading of cargo and baggage;
- (c) flight crew and other crew members;
- (d) passenger handling staff and security staff employed by the Operator.

The operator may also decide that there are additional members of staff who may benefit from dangerous goods training.

4.3 The benefits of providing training for persons employed on cargo related and flight crew duties is clear. However, experience has shown that, as passengers cause many incidents, training is also required for persons handling passengers and their baggage (including cabin crew). The aim of training for flight and cabin crew is to ensure a correct and adequate response to any incidents occurring in the cabin during flight. Emergency procedures training for the persons identified above is appropriate even if dangerous goods are not carried as cargo.

4.4 Training should be relevant to the responsibilities of the person concerned. The essential element for everyone is what action should be taken in an emergency. Such training should include:

- (a) for ground staff:
 - i) dealing with damaged or leaking packages;
 - ii) other actions in the event of ground emergencies.
- (b) for flight crew:
 - i) action in the event of emergencies in flight, both in the cabin and in cargo compartments;
 - ii) notification to air traffic control.
- (c) for other crew members, such as loadmasters, dealing with damaged or leaking packages in flight.
- (d) for cabin crew, dealing with incidents caused by dangerous goods in the possession of passengers.

- 4.5 Training for emergencies should be to a depth sufficient to ensure that the hazards associated with dangerous goods are appreciated and that the Operator's procedures for dealing with emergencies can be applied.

5 Procedures for dealing with emergencies

- 5.1 It is a requirement that manuals contain information on actions in the event of emergencies. This should cover emergencies occurring on the ground as well as in flight. To ensure there is an accurate and efficient response to an incident, it is necessary for an Operator to have established procedures for dealing with emergencies and these should be incorporated into manuals, written instructions etc.
- 5.2 Most incidents which involve damaged or leaking packages of dangerous goods are discovered on the ground. The established procedures should ensure that all ground staff are aware of what is expected of them in the event of an incident; these procedures should aim to implement a system which will:
- (a) identify the dangerous goods involved;
 - (b) identify, from labels or documents, the hazards (e.g. toxicity, flammability) associated with the dangerous goods;
 - (c) assess the potential level of hazard to persons;
 - (d) seek to contain the situation e.g. prevent spread of contamination;
 - (e) seek assistance, if necessary;
 - (f) ensure the safe removal or disposal of the dangerous goods, if necessary.
- 5.3 In the absence of evidence to the contrary (or a suspicion that the truth is being withheld) it should be assumed that information on documents, packages etc., is accurate. There may be a greater risk in regarding the goods as unidentified than in accepting the described nature and level of hazard.
- 5.4 Procedures should be tested periodically and updated if found inadequate or inaccurate. In order for staff to be able to deal effectively with a ground incident, they should be trained in the procedures. Personal protective equipment should be available, such as gloves, goggles and face masks and, depending on the type and quantity of dangerous goods likely to be encountered, overalls and portable breathing equipment. Training should be given in the use and limitations of the equipment and it must be maintained in a fully functional state.
- 5.5 Incidents in flight may occur through dangerous goods either in cargo or carried by passengers. On a cargo aircraft, the dangerous goods may be either in inaccessible cargo compartments or on the main deck. There should be established procedures for dealing with incidents occurring in flight and these should cover all circumstances.
- 5.6 Guidance material for dealing with incidents involving dangerous goods which occur in flight has been produced by the International Civil Aviation Organization; it is contained in *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (Doc 9481-AN/928). See Chapter 8 of this OTAC.

6 Other considerations

- 6.1 There may be legal or other requirements, which are not the responsibility of the OTAA, which pertain to the action to be taken in emergencies when dangerous goods are in air transport. Some airport authorities have requirements for the action to be taken if dangerous goods are found leaking or damaged in transit sheds, warehouses or other premises.
- 6.2 For some types of radioactive materials carried under exclusive use, legislation requires the shipper to produce a contingency plan to cater for an unexpected situation. This is intended to ensure the continued safety of the consignment at all times. When such radioactive material is in air transport, the shipper will require the Operator to have instructions on what should be done if an in-flight emergency occurs or the aircraft diverts for some other reason.

7 Reporting of Dangerous Goods accidents and incidents

- 7.1 The Technical Instructions contain definitions of dangerous goods accident and dangerous goods incident. OTAR Part 13 makes no distinction between dangerous goods accident and incidents and any other type. Therefore, any such incidents or accidents should be reported in accordance with the requirements and timescales of OTAR Part 13.
- 7.2 Given the nature of dangerous goods, incidents may arise at any time, particularly if the applicable requirements have not been met. The major problem encountered by Operators is dangerous goods which are undeclared or misdeclared; these are sometimes found only when leakage, spillage or fire occurs. Therefore, there is the potential for a major incident or accident to happen. It is the experience of the regulatory authorities to date that incidents occur frequently (although many are not of any significance) and they usually result from non-compliance with all the applicable requirements.
- 7.3 Dangerous goods accidents and incidents must be reported to the OTAA; initial reports must be made within 72 hours of the accident or incident unless exceptional circumstances prevent this. Every type of dangerous goods accident or incident which meets the criteria or which involves undeclared or misdeclared dangerous goods should be reported, no matter whether such goods are contained in cargo, mail, passengers' baggage or crew baggage. An initial report may be made by any means but a written report should be made as soon as possible. The report should be comprehensive and contain all data known at the time it is compiled; if all relevant information is not available at first, the initial report should be sent stating what is known and a follow-up report sent when the full details are available. There is a legal requirement for an Operator to report dangerous goods accidents and incidents but, in practice, there is nothing to prevent a handling agent from reporting on behalf of the Operator, since it is important to ensure occurrences are reported as quickly as possible. An Operator is expected to have in place arrangements both internally and with handling agents to ensure reports of dangerous goods accidents and incidents are processed with the minimum of delay.

- 7.4 Reports made to the OTAA should include copies of relevant documents and any photographs taken should be attached. The report may be sent by any means, including e-mail; any hard copy documents, photographs, etc that cannot be e-mailed should be sent to the OTAA by fax or post.
- 7.5 If the dangerous goods accident or incident involves loss of or damage to packages of radioactive materials whilst in transport the Governor also needs to be informed.

Chapter 8 - Emergency response guidance

1 General

An emergency situation can arise at any time on an aircraft. There may be some circumstances when the emergency has been caused by dangerous goods being carried or they may become involved in it e.g. a fire in a cargo compartment may not have been caused by dangerous goods but they may be damaged by it, which could exacerbate the problem. The guidance in this Chapter is aimed at dealing with emergency situations on an aircraft in flight involving dangerous goods. It explains the purpose and use of the ICAO *Emergency Response Guidance* document; in addition it suggests what actions might be considered in response to an incident on an aircraft, what should be taken into account in making a decision on what to do, and what might be appropriate to make available to flight crew to aid them in any decisions to be taken concerning an incident on an aircraft.

2 Emergency response guidance for aircraft incidents involving dangerous goods

2.1 ICAO has produced a document entitled *Emergency Response Guidance for Aircraft Incidents Involving Dangerous Goods* (reference Doc 9481-AN/928); it is referred to throughout this Chapter and in Appendix 2 as the *Emergency Response Guidance* document. It gives guidance for developing procedures for dealing with incidents on aircraft in flight. It is not suitable material for developing procedures for dealing with ground incidents.

2.2 The *Emergency Response Guidance* document contains:

- (a) general information e.g. cargo compartment locations and classifications, what fire extinguishers can be found on aircraft and what might be included in an emergency response kit;
- (b) general considerations e.g. where dangerous goods may be found and the peculiarities pertaining to each location which might be relevant in an incident;
- (c) examples of checklists for incidents in the cabin or cargo compartments;
- (d) lists of emergency response drills with drill reference numbers, identifying the dangerous goods both alphabetically and numerically.

2.3 Many operators who carry dangerous goods have decided to implement the requirement to provide emergency information to the PIC by placing a copy of the *Emergency Response Guidance* document in the aircraft library. Even if an operator does not knowingly carry dangerous goods, an incident may well arise through dangerous goods carried by passengers. There is guidance material in the *Emergency Response Guidance* document which should form the basis of actions in emergencies no matter whether they arise in cargo compartments or the passenger cabin. This material should always be considered when

formulating actions for emergencies since it gives information for use at the time of an incident. It should also form the basis of training.

- 2.4 The limitations of the *Emergency Response Guidance* document should be realised; it was produced to aid decisions in flight and recognises that little equipment may be available other than standard fire extinguishers and items carried for the safety or comfort of passengers or to assist in providing cabin services. Also, it is not mandatory to use the document to try to deal with an incident e.g. the PIC may decide that it would be preferable to make the main focus of attention the need to land rather than dealing with a spillage etc.

3 Unpressurised aircraft

The wording of the *Emergency Response Guidance* document makes it apparent it was produced with pressurised aircraft in mind. Whilst some of the detailed material may not be appropriate for unpressurised aircraft, including helicopters, the basic principles and general considerations are relevant to all aircraft.

4 General considerations

Section 2 of the *Emergency Response Guidance* document contains general considerations to be taken into account when assessing the appropriate action to be taken to deal with an incident involving dangerous goods. The following paragraphs amplify some of these general considerations and suggest others.

4.1 Safety of the Aircraft and Persons on Board

- 4.1.1 The primary consideration in any incident should be to preserve the ability of the crew to fly the aircraft. The other considerations are:

- (a) to safeguard all other persons on board from the effects of any fumes or liquid from leaking packages of dangerous goods;
- (b) to protect the aircraft structure as far as possible from damage; and
- (c) to control the potential for the dangerous goods to cause any further harmful effect.

- 4.1.2 On a passenger aircraft, if it is suspected there is a problem in the cargo compartment, the normal drills for dealing with fires in cargo compartments should be carried out. If the problem is in the cabin it is essential to ensure leaking or fuming items are removed from the cabin area and placed where they cannot affect anyone. A possible place is a toilet, where the positive pressure should ensure fumes are vented overboard, but if the item is suspected of being flammable, consideration should be given as to which toilet is used so that any smoking sections are not crossed in order to reach it. On aircraft where the air is normally recirculated it may be necessary to ensure the air is vented overboard.

4.2 Dangerous Goods in Inaccessible Cargo Compartments

If the normal fire or smoke warnings are activated for an inaccessible cargo compartment, it should be ascertained if there are dangerous goods stowed in it,

by using the NOTOC. They may not have caused the fire/smoke but they may become involved. The normal drills for fire/smoke in cargo compartments should be carried out, but it should be realised that if oxidisers or organic peroxides are in the compartment, they may contribute oxygen to a fire and cause it to continue burning even after the cargo compartment fire extinguishers have been activated.

4.3 **Passengers**

Passengers may deliberately or inadvertently bring dangerous goods which they should not have into the cabin; they are often unaware that the environment on the aircraft is likely to be different to that at ground level. The first indication of a potential incident could be a passenger becoming concerned about an item in their cabin baggage which is leaking or giving off fumes (this can happen because of the reduced pressure); or a passenger seen using an item which is not permitted in the cabin.

Also, there have been incidents caused by items which passengers can legitimately take on aircraft but which developed faults during flight. If it appears that the item is not likely to cause a problem, it might be better for the passenger to be allowed to keep it; although a watch should be kept for any sign of leakage or fuming. If it seems likely that the item might cause a problem or is leaking or fuming, it should be dealt with as suggested in paragraphs 4.1 and 8.

4.4 **Identifying Dangerous Goods**

4.4.1 It is difficult to deal effectively with spillages or leakages of dangerous goods until their identity has been established but it is not always easy to do this. If the item is being carried by a passenger, they should be asked if they can identify it or give any information on the hazard from it. Given modern requirements for consumer protection, often items or their packagings carry warnings; if it is not in a language understood, ask if the passenger can translate.

4.4.2 On a cargo aircraft, identifying the dangerous goods can only be done if they are on the main deck and accessible, which does not apply to all "cargo aircraft only" items.

4.4.3 Packages of declared dangerous goods have on them their proper shipping name and UN/ID number; and the lists of dangerous goods and associated drills in the Emergency Response Guidance document are both alphabetical and numerical. Experience has shown that it is often undeclared dangerous goods which could cause an incident. If there is a chemical name on the outside of a package, it may appear in the alphabetical list in the Emergency Response Guidance document. Similarly, if a four-figure number is shown on the package without UN or ID prefixing it, it may still be such a number and appear in the numerical list.

4.4.4 Consignments of dangerous goods in air transport are accompanied increasingly by documents, such as the Material Safety Data Sheet (MSDS/SDS), giving first aid and other emergency information; an MSDS may be attached to the copy of the Dangerous Goods Transport Document which is on the aircraft. Similar information may also appear on labels on the outside of packages.

4.4.5 In the absence of evidence to the contrary or a suspicion that the truth is being withheld, it should be assumed information shown on packages, documents etc.

is accurate. There may be a greater risk in regarding the goods as unidentified than in accepting a described nature and level of hazard.

4.5 **Landing as soon as possible**

Unless it is obvious that an incident has been dealt with successfully, the decision should be taken to land as soon as possible. It should not be hoped the problem can be contained or will go away, it may suddenly develop into a situation which becomes difficult to deal with whilst in flight.

4.6 **Notifying the Pilot in Command of a Problem**

If the cabin crew are involved in an incident the Pilot in Command should be told as soon as possible about what has occurred, and be given as many details as are known. If the incident develops, the greater the warning and the more details the PIC has, the better may be the preparation to deal with the consequences.

4.7 **Information by the Pilot in Command**

If the PIC decides to land, air traffic control must be advised of the reason for doing so and given sufficient information, including details of the dangerous goods as shown on any NOTOC, to enable them to alert the airport authority. This is so the emergency services can be warned of any unexpected hazard and be prepared to deal with the aircraft when it lands. These details should be passed on even if the incident did not involve the dangerous goods, since the emergency services may need to be aware of what is on the aircraft in order to make decisions as to the appropriate action to take.

5 **Using the Emergency Response Guidance Document**

- 5.1 Flight crew should not be expected to use the *Emergency Response Guidance* document for dealing with an incident until training has been given. It contains information that is not only of use in an emergency but also intended for training and the development of procedures and incident checklists.
- 5.2 A dangerous goods incident can only be dealt with as such when the goods are accessible i.e. it occurs in the passenger cabin or an accessible cargo compartment on a passenger aircraft or the main deck of a cargo aircraft. The method of dealing with the incident may be different depending on the location and the *Emergency Response Guidance* document gives specific guidance on dealing with incidents in all these situations, plus dealing with an incident in an inaccessible cargo compartment.
- 5.3 The lists in the *Emergency Response Guidance* document have been designed for incidents occurring with dangerous goods that are accessible, since the correct identification of the goods causing the problem is essential to the correct use of the drills.
- 5.4 Whilst it may appear so, the number in the Drill Code is not always related to the Class/Division of the dangerous goods. Moreover, it may not give actual actions which can be taken but rather present a number of possible consequences and considerations.

- 5.5 In deciding what action to take in relation to a suggested Drill Code, the following may also be relevant:
- (a) a fire should be dealt with using any available equipment, but water should only be used when it can be positively established that it will not exacerbate the fire (see paragraph 6);
 - (b) if there are fumes, an attempt should be made to prevent further spillage or leakage and to reduce the spread of fumes by covering with polyethylene plastic based material;
 - (c) if the hazard may result in an explosion, the aircraft should descend to an altitude where the pressure can be reduced to a minimum value commensurate with safe operation;
 - (d) if the hazard is associated with radioactive materials, toxic or infectious substances, no attempt should be made to approach them and any passengers thought to be in danger should be moved;
 - (e) spillages of both powders and liquids should be contained to prevent spreading by surrounding with non-reactive material, such as polyethylene waste bin bags, duty-free sales bags;
 - (f) powders may be better left in situ if they do not appear to be causing progressive damage or discomfort to crew or passengers (to check for damage there should be the minimum disturbance of the spillage but the edge should be moved to see what is happening underneath);
 - (g) extreme caution should be used with liquids; they may be better left in situ, if they do not appear to be causing progressive damage or discomfort to passengers, and covered with polyethylene based material;
 - (h) for a limited period polyethylene (plastic) should not react with any dangerous goods.
- 5.6 Operators may provide information to the PIC by extracting the relevant parts from the *Emergency Response Guidance* document; this could be done by adding the Drill Code to the entry in the NOTOC and providing lists which identify the information appropriate to each number and letter.

6 Use of water as a fire-fighting agent

- 6.1 The drills assigned to dangerous goods in the *Emergency Response Guidance* document are not always comprehensive in describing all possible hazards. In particular, not all those dangerous goods are identified where the use of water as a fire-fighting agent would exacerbate the situation. In some instances it is possible to identify when water should not be used e.g. those in Division 4.3 or where "W" appears as part of the Drill Code. However, there are other dangerous goods where no such guidance is given but it is known that water should not be used. In the absence of any other guidance (e.g. on the Dangerous Goods Transport Document or other information provided about the dangerous goods on the aircraft) the use of water should be subject to the following considerations:

- (a) it should not be used unless the class or division of the dangerous goods is known and there is no specific prohibition on its use in the Drill Code;
 - (b) it should not be used on any Corrosive material (Class 8, "RCM").
- 6.2 It is known that a number of dangerous goods react with water to a degree; sometimes the reaction can be severe. Usually, where there is a severe reaction, the classification assigned to the goods is that of having either a primary hazard or subsidiary risk of being water reactive.
- 6.3 However, there are other dangerous goods which react with water but this is not immediately apparent from the classification. The following groups of dangerous goods are known to react with water and in such circumstances can produce flammable, toxic or corrosive fumes:
- (a) Substances which are in Division 4.3 (water reactive substances);
 - (b) Substances which have a Division 4.3 subsidiary risk;
 - (c) All entries in the Alphabetical and Numerical Lists of the Emergency Response Guidance document where "W" appears as a letter in the Drill Code.

7 Training

- 7.1 There are requirements that the training for flight and cabin crew include emergency procedures for dealing with incidents arising from dangerous goods. This training can be developed from any available material but the *Emergency Response Guidance* document and this OTAC contain suggested procedures and give General Considerations which might be applied when trying to contain any incident or dealing with the consequences.
- 7.2 The *Emergency Response Guidance* document and this OTAC also have suggested checklists, and guidance in the use of these should form part of training if it is intended they be included in the procedures for dealing with a dangerous goods incident. Further information about checklists is given in paragraph 8 below.

8 Development of procedures and checklists

- 8.1 It is possible for an emergency to arise at any time on an aircraft involving dangerous goods. Obviously, it is only when the goods can be seen that it can be established they are the cause of the problem or are likely to become involved in it. Where a spillage or leakage has occurred or the package appears to be damaged badly, the decision needs to be taken as to whether or not to attempt to contain the effects. To do this successfully, there needs to be a plan of action to ensure no one suffers injury and no further damage is caused. Consideration needs to be given in advance as to what actions should be taken at this time and these should be developed into procedures to be incorporated into the Operations Manual. An appropriate way to summarise these procedures is as a checklist. Appendices 2 and 3 are two suggested checklists - one for use by the flight crew and one for use by cabin crew. These are very comprehensive and

could be abbreviated for actual use. They are not a repeat of the checklists which are in the *Emergency Response Guidance* document but could be considered as alternatives. Explanations and additional guidance in regard to these checklists is given in paragraphs 8.2 and 8.3 below. Further guidance can be found in the *Emergency Response Guidance* document.

8.2 Guidance Related to the Flight Crew Checklist

8.2.1 The checklist in Appendix 2 is intended to suggest actions which can be taken progressively to deal with a suspected dangerous goods incident which occurs in flight. It is intended for use both on cargo and passenger aircraft and relates mainly to actions which could be taken when the dangerous goods are accessible - either by being on the main deck of a cargo aircraft or in the passenger cabin. It is not intended to be used where there is a warning of fire/smoke in an inaccessible cargo compartment; in these circumstances the standard drills should be used.

8.2.2 In using the checklist, the following should be borne in mind:

- (a) reference to the NOTOC, in conjunction with the checklist, is essential; the NOTOC itemises what dangerous goods are on board in cargo and will aid correct identification of the item causing the problem, thus enabling the appropriate Drill Code in the *Emergency Response Guidance* document to be ascertained;
- (b) the decision to send a crew member to investigate an incident should be considered carefully, since if they are overcome by smoke, fumes, etc., the crew complement will be a person short to deal with whatever then happens;
- (c) if dangerous goods are not involved in the incident, moving them to a safe area could prevent the problem intensifying; even if they are involved it may be desirable to try to move them to prevent a sudden worsening of the problem.

8.2.3 To amplify some of the suggested actions on the checklist:

- (a) if the incident arises in the cabin of a passenger aircraft, it should be left to the cabin crew to deal with initially;
- (b) there should be good communications and co-ordination of actions between the flight crew and cabin crew, since it is essential that each is aware of what the other is planning and doing;
- (c) vapours and fumes may not be easily detectable; there should be a smoking ban if there is the possibility these have penetrated the cabin or flight deck and it should remain in force for the remainder of the flight;
- (d) water should not be used on any spillage or when fumes are present since it may spread the spillage or increase the rate of fuming; also consideration should be given to the presence of electrical components if a water extinguisher is to be used; in addition a number of dangerous goods react badly with water (see paragraph 6);

- (e) spillages, fire and fire-fighting activities may cause damage to electrical systems; consideration should be given to turning off all non-essential electrical items and retaining power only to those instruments, systems and controls necessary for the continuing safety of the aircraft. Power should not be restored until it has been ascertained that it is positively safe to do so;
- (f) after landing, if the incident was in a cargo compartment, the passengers and crew should disembark before cargo compartment doors are opened; if the incident was in the cabin, the passengers and non-essential crew should disembark before any further action is taken to remove the item or deal further with it or the effects of it;
- (g) it should be ensured that ground staff and, if necessary, the emergency services are informed of where the incident occurred and where the dangerous goods now are; if appropriate it should be ensured that the NOTOC is given to the emergency services;
- (h) it is essential that an entry be made in the maintenance log to ensure that checks are made for damage as a result of leakage, spillage etc., and that aircraft equipment (e.g. fire extinguishers etc.) are replenished or replaced, as necessary.

8.3 Guidance Related to the Cabin Crew Checklist

8.3.1 The checklist in Appendix 3 is intended to suggest actions which can be taken progressively to deal with a suspected dangerous goods incident which occurs to goods in the possession of a passenger.

8.3.2 In using the checklist the following should be borne in mind:

- (a) it may not be possible to deal in total with the incident; the aim should be to ensure that the flight can continue safely, that so far as is possible no one is discomforted and there is no damage;
- (b) if there is fire or spillage it may become worse suddenly through, e.g. contact with cabin furnishings or the air;
- (c) there are a number of dangerous goods which can react with paper or cloth and these should not be used to mop up spillages because of the possibility of a reaction; however, if the item has already been in contact with these materials they could be considered for use as a last resort.

8.3.3 To amplify some of the suggested actions on the checklist:

- (a) if dangerous goods can be identified by name or UN number, it may be possible to obtain information about them from the flight crew if a copy of the *Emergency Response Guidance* document is carried;
- (b) cabin equipment made from polyethylene or a similar plastic material can be utilised to pick up and contain any spillage, if this is needed;
- (c) oven gloves or fire-resistant gloves, if likely to be absorbent, should be covered with polyethylene bags;

- (d) the assistance of a number of cabin crew members may be required in order to deal effectively with the problem;
- (e) if there is only one cabin crew member available, the PIC should be consulted as to whether a passenger should be asked to assist in dealing with the incident;
- (f) there should be good communications and co-ordination of actions between the cabin crew and flight crew, since it is essential that each is aware of what the other is planning and doing;
- (g) gas-tight breathing equipment should always be worn to deal with smoke, fumes or fire;
- (h) water should not be used on any spillage or when fumes are present since it may spread the spillage or increase the rate of fuming; also consideration should be given to the presence of electrical components if a water extinguisher is to be used. In addition, a number of dangerous goods react badly with water (see paragraph 6);
- (i) the spillage of a flammable liquid onto fabric may increase the release of a flammable vapour, making the possibility of a fire more likely if an ignition source, e.g. a lighted cigarette, is present;
- (j) removing a leaking container would preclude further leakage which might escalate the incident;
- (k) the residue of the leakage, both for powders and liquids, should be contained to prevent spreading by surrounding with non-reactive material, such as polyethylene waste bin bags, duty-free sales bags;
- (l) powders may be better left in situ if they do not appear to be causing progressive damage or discomfort to crew or passengers (to check for damage there should be the minimum disturbance of the spillage but the edge should be moved to see what is happening underneath);
- (m) extreme caution should be used with liquids; they may be better left in situ, if they do not appear to be causing progressive damage or discomfort to passengers, and covered with polyethylene based material;
- (n) polyethylene bags containing leaking items etc. should be placed in a toilet, if possible. On pressurised aircraft this should vent any fumes away from the passengers, but it might not be so on an unpressurised aircraft;
- (o) for a limited period polyethylene should not react with any dangerous goods;
- (p) badly contaminated cabin furnishings, carpet etc. might need to be removed. They should be stowed in a toilet or in an area well away from passengers and crew, in polyethylene bags if possible;
- (q) the use of therapeutic masks with portable oxygen bottles or the passenger dropout oxygen system, to assist passengers if smoke or fumes are present, should be considered since smoke or fumes could be inhaled through the valves or holes in the masks. Giving passengers a wet towel or

other wet cloth to hold over the nose and mouth is more effective in filtering out smoke or fumes;

- (r) regular inspections should be made of any item which has been removed to ensure it is not causing any further problem;
- (s) it should be ensured that ground staff and, if necessary, the emergency services are informed of where the incident occurred and where the dangerous goods now are;
- (t) it is essential that an entry be made in the aircraft technical log to ensure that checks are made for damage as a result of leakage, spillage etc., and that aircraft equipment (e.g. fire extinguishers etc.) are replenished or replaced, as necessary.

9 Emergency Response Kit

9.1 There is no requirement for the carriage of an emergency response kit but some operators may choose to carry one. Whilst the aim of carrying the kit is to deal with incidents arising in the passenger cabin, it might also be of use on cargo aircraft if there is an incident with dangerous goods which are accessible. The aim of such a kit is to ensure there are items available that can be used to deal with the containment and absorption of dangerous goods should there be a spillage or leakage. Typically, a kit might consist of:

- (a) supply of large, good quality polyethylene bags;
- (b) bag ties;
- (c) several pairs of long rubber gloves, which are flexible and of good quality;
- (d) small quantity of sand;
- (e) sodium bicarbonate.

9.2 It should be noted that polyethylene is reasonably resistant to all dangerous goods, at least for a short while. Sand is inert and can be used safely, except when there are products containing Hydrofluoric acid; these are identified by UN numbers UN 1786 and 1790. Sodium bicarbonate can be used safely with all acids but there may be some bubbling and carbon dioxide may be given off.

9.3 The emergency response kit suggested above is more comprehensive than that listed in the *Emergency Response Guidance* document, in that sand and sodium bicarbonate have been added to the list of items. It is felt that if a kit is to be carried the inclusion of these would greatly enhance its usefulness without adding significantly to either weight or cost and would then provide the means of suitably dealing with the containment or absorption of all dangerous goods, at least in the short term.

9.4 It will be noted that paper is not included in the kit; this is because it can react with a number of chemicals so that it disintegrates quickly or begins to smoulder. Its use is not recommended, unless there are positive indications that there will

be no reaction e.g. the container for the item is paper or fibreboard/cardboard, or it is already in contact with these.

- 9.5 Although rubber gloves are included in the kit, other personal protective equipment may be needed, such as portable breathing equipment, goggles, overalls etc.
- 9.6 If an emergency response kit is carried, instructions in its use should be included in training.

9.7 **Guidance Related to the Checklist When Using an Emergency Response Kit**

At **Appendix 6** is a suggested checklist for the actions which could be taken to deal with a spillage or leakage of dangerous goods using an emergency response kit. To amplify some of the suggested actions on the checklist:

- (a) better decisions can be taken if the item can be accurately identified and the correct emergency response ascertained; there may be a label on the container which will give the information required and this will aid prompt and effective clean-up action;
- (b) if there is no label on a container giving emergency information, there may still be a recognisable proper shipping name or UN/ID number (with or without the prefix letters) which can be checked against the alphabetical and numerical lists in the *Emergency Response Guidance* document;
- (c) if it is suspected that there might be a reaction with sand, a sample can be tested first by placing a small quantity on the edge of the spillage and waiting for 2-3 minutes; any reaction would become apparent in that time but it would not be catastrophic;
- (d) sodium bicarbonate should not be used on any dangerous goods except acids;
- (e) the aim in removing an item from the cabin is to try to ensure that further fuming or leakage will not cause discomfort to passengers or crew and will not be detrimental to the continued good order of the flight. This is done by securing the item in at least two polyethylene bags, in a position so that further leakage cannot occur, and placing the bags in a location remote from the passengers and crew;
- (f) the decision to try to remove the residue of a spillage, or leave it in situ and cover, may depend on the extent of that spillage and the effect it is having on passengers and crew. Despite passenger reaction, it might be preferable not to attempt to remove the residue but leave it covered by sand or sodium bicarbonate;
- (g) it is unlikely that all traces of spillage will be removed unless the affected cabin furnishings, carpet etc. are also removed.

10 Raising of a Dangerous Goods incident report

When there has been a problem on an aircraft involving dangerous goods, it may be a dangerous goods incident which is reportable to the OTAA.

APPENDIX 1 Contact Details of Relevant Organisations**ICAO (International Civil Aviation Organization)**

999 University Street
Montréal, Quebec
Canada H3C 5H7
Tel: +1 (514) 954-8219
Fax: +1 (514) 954-6077
E-mail: icaohq@icao.int
www.icao.int

IATA (International Air Transport Association)

Customer Service Representative
International Air Transport Association
800 Place Victoria
PO Box 113
Montreal, Quebec
Canada
H42 1M1
Tel no: + 1 (514) 874 0202
Fax no: + 1 (514) 874 0412

IAEA (International Atomic Energy Agency)

P.O. Box 100
Wagramer Strasse 5
A-1400 Vienna, Austria
Tel: (+431) 2600-0
Fax: (+431) 2600-7
www.iaea.org

HSE (UK Health & Safety Executive)

HSE Infoline
Caerphilly Business Park
Caerphilly,
CF83 3GG
Tel: +44 (0) 845 345 0055
hse.infoline@natbrit.com

APPENDIX 2

Suggested Checklist for Flight Crew in dealing with an in-flight emergency involving Dangerous Goods

Initial Actions

- Follow appropriate aircraft emergency procedures for fire/smoke removal
- No smoking sign on
- If smoke/fumes detectable
 - don goggles and oxygen masks, with oxygen at 100%
 - set air conditioning to maximum flow, no recirculation
- If incident in passenger cabin
 - detail cabin crew to take initial action, using cabin crew checklist
 - establish co-ordinated action between cabin and flight crew
- If fire/smoke in inaccessible hold, check for dangerous goods using NOTOC
- Identify item, if possible by
 - consulting NOTOC, making visual check, asking passenger
- If goods not accessible, consider likely involvement in incident
- If identified, check for name or number in *Emergency Response Guidance*
- If listed in *Emergency Response Guidance*, determine drill code
- Use drill code to decide on suitable action

Subsequent Actions

- **If item on fire or producing visible smoke**
 - break open package, if necessary and safe to do, for effectiveness of fire-fighting agent
 - use fire extinguisher **(but do not use water unless this is known to be safe)**
 - check fire is out, but be prepared for re-ignition
- **If item is leaking** (*if using Emergency Response Kit – see appropriate Checklist*)
 - avoid contact; always use personal protective equipment – e.g. gloves, goggles,

overalls

- stop leak, if possible by plugging hold and/or inverting package
- if possible, place package in polyethylene bag and close securely
- place package in safe location, e.g. a toilet, or isolate from other cargo; and restrain
- remove or contain leakage (**but see Notes**)

- **If risk of explosion**

- maximum altitude – 10,000 ft or MEA, whichever is the higher
- reduce cabin pressure differential to 1 psi maximum

Further Considerations

- Landing as soon as possible
- Turning off non-essential electrical power
- Use NOTOC to notify ATC of dangerous goods on board in cargo

After Landing

- Disembark passengers and crew
 - for hold incident – before opening any cargo hold doors
 - for cabin incident – so affected area not traversed
- Inform ground personnel/emergency services of nature of item and where stowed
- Make appropriate entry in maintenance log

NOTES:

- 1) *For a limited period polyethylene (plastic) should not react with any dangerous goods.*
- 2) *Powders may be better left in situ if not causing damage; if removal needed they can be picked up using safety cards of stiffened polyethylene/plastic based material.*
- 3) *Use extreme caution with unknown liquids; they may be better left in situ and covered with polyethylene/plastic based material. Do not use paper or cloth to mop up spillage unless certain there will be no reaction.*
- 4) *There may be visible or invisible fumes. If there is smoke, SMOKE warnings may be triggered.*

- 5) *If contamination within the air conditioning system AVIONICS SMOKE, MIN EQT BAY SMOKE or BAT SMOKE warnings may be triggered simultaneously. Apply AIR COND SMOKE procedure only if visible smoke or strong fumes present.*
- 6) *Ensure crew communication established. Avoid use of interphone position to minimise interference from oxygen mask breathing noise.*
- 7) *It is recommended to set the EMERGENCY pressure selector to overpressure position.*
- 8) *It is recommended to switch CAB FANS to OFF, to prevent recirculation of contaminated cabin air.*

APPENDIX 3

Suggested Checklist for Cabin Crew in dealing with an in-flight emergency involving Dangerous Goods

Initial Actions

- Notify PIC
- Ask passenger to identify or potential hazard
- If identified by name or number, ask flight crew if they have information on item
- If smoke/fumes detectable don goggles and oxygen mask, with oxygen at 100%
- Collect items of possible use
 - polyethylene bags – e.g. waste bin bags, bags for duty-free sales
 - rubber gloves, oven gloves or fire resistant gloves
 - airsickness bags (opened out or turned inside out)
 - plasticised passenger in-flight safety cards

Subsequent Actions

- Seek assistance
 - from another cabin crew member, or
 - with agreement of PIC, from a passenger
- Don gloves; have available other personal protective equipment – e.g. goggles, overalls
- **If item on fire or producing visible smoke**
 - use standard procedure
 - break open package, if necessary and safe to do, for effectiveness of fire-fighting agent
 - use fire extinguisher **(but do not use water unless this is known to be safe)**
 - check fire is out, but be prepared for re-ignition
- **If item is leaking** (*if using Emergency Response Kit – see appropriate Checklist*)
 - avoid contact; always use personal protective equipment – e.g. gloves, goggles,

overalls

- stop leak, if possible by plugging hold and/or inverting item
- if possible, place item in polyethylene bag and close securely
- place item in safe location, e.g. a toilet, or isolate from passengers; and restrain
- remove or contain leakage (**but see Notes**)
- cover affected area with polyethylene bag(s), airsickness bag(s), safety cards
- regularly inspect item for further signs of leakage

Further Considerations

- Keep PIC informed
- Move passengers away from affected area
- Give first aid to affected passengers
- If smoke/fumes likely to incapacitate passengers - distribute wet towels or cloths (**but do not deploy drop-out oxygen system**)

After Landing

- Disembark passengers
 - so affected area not traversed
 - so no need to pass close to where item is stowed
- Inform ground personnel/emergency services of nature of item and where stowed
- Make appropriate entry in maintenance log

NOTES:

- 1) *For a limited period polyethylene (plastic) should not react with any dangerous goods.*
- 2) *Powders may be better left in situ if not causing damage; if removal needed they can be picked up using safety cards of stiffened polyethylene/plastic based material.*
- 3) *Use extreme caution with unknown liquids; they may be better left in situ and covered with polyethylene/plastic based material. Do not use paper or cloth to mop up spillage unless certain there will be no reaction.*

APPENDIX 4 Suggested Checklist for dealing with an in-flight emergency involving Dangerous Goods, using an Emergency Response Kit

(Note – the kit is only intended to be of use in dealing with spillages and leakages)

Initial Actions

- Check kit contains
 - large and small polyethylene bags
 - bag ties
 - several pairs of flexible rubber gloves
 - sand **(but do not use on anything identified as containing Hydrofluoric acid)**
 - sodium bicarbonate **(can be used with all acids)**
- Collect other items of possible use
 - oven gloves or fire resistant gloves
 - airsickness bags (opened out or turned inside out)
 - plasticised passenger in-flight safety cards
 - personal protective equipment – e.g. PBE, goggles, overalls

Actions to Remove Item from Vicinity of Passengers and Crew

- Don rubber gloves or put hands in polyethylene bags; or use other gloves and protect in same way as hands
- Stop leak if possible by plugging hole and/or inverting item
- Prepare polyethylene bag of sufficient size by opening out to fullest extent
- Place item in bag with closure or point of leakage uppermost
- Tie bag tightly and securely around item, but allow for pressure equalisation
- Remove gloves, etc., taking care to avoid skin contact with any contamination
- Place bag containing item, gloves etc., into another bag; tie this tightly and securely as before
- Take bag away from passengers and crew; avoid smoking section
- Stow bag in safe location, e.g. a toilet, or isolate from passengers; and restrain

- If sand available and usable, contain spillage by covering/surrounding with sand
- For acids, cover spillage with sodium bicarbonate, to neutralise
- Use safety cards or stiffened polyethylene bags to pick up powders or contaminated sand/sodium bicarbonate; place in polyethylene bag and secure
- Place in another bag all used items and bag containing contaminated sand/sodium bicarbonate
- Secure this bag and stow as before
- Cover any residue of spillage with polyethylene bag(s), airsickness bag(s), safety cards
- If furnishings (e.g. seat covers) contaminated, remove if possible, place in polyethylene bag; secure and stow as before; or cover with polyethylene bag(s), airsickness bag(s), safety cards
- If carpet contaminated, cover with polyethylene bag(s), airsickness bag(s), safety cards; or remove if possible, place in polyethylene bag, secure, stow away from passengers and crew

Subsequent Actions

- **Keep PIC informed**
- Regularly inspect bag containing item for further signs of leakage or reaction
- Ensure no one touches or interferes with any of the bags
- Move passengers away from affected area; give first aid to affected passengers
- If smoke/fumes likely to incapacitate passengers- distribute wet towels or cloths **(but do not deploy drop-out oxygen system)**
- After landing – as on Cabin Crew Checklist

NOTES:

- 1) *For a limited period polyethylene (plastic) should not react with any dangerous goods.*
- 2) *Powders may be better left in situ if not causing annoyance to passengers or damage. Use extreme caution with unknown liquids; if spread on carpet or furnishings they may be better left in situ and covered.*
- 3) *Do not use water. Do not use paper or cloth to mop up spillage unless certain there will be no reaction.*
- 4) *Sand is inert with all substances other than those containing Hydrofluoric acid (UN nos. 1786 and 1790).*
- 5) *Use of sodium bicarbonate on acids is safe but there may be bubbling and evolution of carbon dioxide.*