

# **Strategic national guidance**

**The safe management of wastes arising following a Chemical, Biological, Radiological or Nuclear (CBRN) incident.**

**Department for Environment, Food and Rural Affairs (Defra)**

**September 2008**

## CONTENTS

1. INTRODUCTION .....	3
2. GENERAL PRINCIPLES .....	3
3. THE LEGAL FRAMEWORK.....	5
4. ROLES AND RESPONSIBILITIES FOR CBRN WASTE MANAGEMENT ..	9
5. CLASSIFICATIONS OF CBRN WASTE .....	13
6. WASTE MANAGEMENT PRACTICES .....	14
7. STORAGE OF CBRN WASTE.....	14
8. TRANSPORT OF CBRN CONTAMINATED WASTE .....	17
9. WASTE MANAGEMENT PLANS.....	17
10. RELATED GUIDANCE AND FURTHER READING.....	18
11. ACRONYMS .....	18
Appendix 1 – Considerations to be taken into account in the preparation of waste management plans.....	20
Appendix 2 – Checklist for the production of waste management plans .....	27
Appendix 3 – Template waste management plan .....	30

## **1. INTRODUCTION**

This guidance is part of the series produced under CBRN Resilience Programme, led by the Home Office. Under this Programme, Defra is responsible for developing guidance on the disposal of CBRN contaminated waste.

The guidance builds on that already produced through the CBRN Programme on decontamination of the open environment, decontamination of buildings and infrastructure, and decontamination of people. Details of these and other related publications can be found in Section 10 below.

This guidance is intended to support local authorities, Government Offices and others with a role in planning for, or dealing with, the disposal of CBRN waste. Specifically, this means the Regional and Local Resilience Forums and their CBRN sub-groups. It is not intended to be prescriptive, or to hinder the work of remediation or recovery groups set up following an incident. It describes generic principles and provides a practical source of reference such that responders to an incident can further develop their own plans, taking into account local circumstances. In addition, this guidance does not cover all aspects of recovery and restoration, but focuses on the waste management aspects.

The measures described in this guidance, although focussing on deliberate release incidents, will be similar to those required to deal with accidental release of hazardous substances, or major infectious disease outbreaks. Indeed, some of this guidance draws on pre-planning, best practice, and experience drawn from such incidents including the 2007 Avian Influenza outbreak in Suffolk. For instance, government guidance in 'Defra's overview of emergency preparedness for exotic animal diseases, December 2007' sets out a preferred hierarchy of disposal options – incineration, rendering, landfill for animal carcasses and related wastes - and could be used by emergency planners to supplement this CBRN guidance in the preparation of emergency plans.

This guidance identifies some of the likely practical, legal and regulatory issues that will need to be addressed by responders. It also references other sources of advice and guidance. This guidance also clarifies organisational roles and responsibilities in respect of CBRN waste management.

## **2. GENERAL PRINCIPLES**

A CBRN incident of itself, or as a result of decontamination of affected materials, buildings or areas, will usually give rise to wastes which have to be managed. Should a CBRN incident occur, then the following actions will ensue (in order of priority):

- Immediate measures to protect human health and the environment.
- Immediate measures to investigate a possible crime.

- Remediation, clean-up and restoration of the environment.
- Return of the affected area(s) to pre-incident status.
- Management of any wastes arising.

Notwithstanding the order of priorities above, ultimate waste management should be taken into account during the first four steps in so far as it is practical to do so. Consideration of waste management at the early stages, in pre-planning if possible, can help to eliminate or reduce later problems; management of waste itself can, if not approached correctly, lead to subsequent problems of human health and environmental damage.

In this context, waste management is taken to include:

- Temporary safe storage, if necessary.
- Preliminary treatment and decontamination.
- Preparation of waste (packaging etc) for transport or removal<sup>1</sup>.
- Transport of waste.
- Ultimate disposal or other treatment.

There is no reason whereby the 'waste hierarchy', applicable to all other waste management practices in the UK, should not apply to wastes arising as a consequence of a CBRN incident, at least in principle. This hierarchy requires consideration of the following possibilities in the order given:

- Not generating waste in the first place (avoidance).
- Minimisation of waste arising.
- Re-use.
- Recycle and composting.
- Energy recovery.
- Disposal.

In the context of a CBRN incident, the first element of the hierarchy can be taken as meaning the avoidance or minimisation of secondary waste arising as a consequence of, for instance, decontamination of an affected building or area.

---

<sup>1</sup>One waste management option – the option to leave material in-situ but make safe by ploughing in, fixing or 'tie-down' – should not be overlooked. It is not inevitable that wastes resulting from an incident need to be removed from site.

In order to apply the hierarchy efficiently, waste segregation should be practiced so far as practicable during the decontamination of affected areas and subsequent waste management activities. Wastes of different types – e.g. radioactive waste and biological waste - should never be mixed if it is possible to avoid this. Mixing of wastes in this way could complicate subsequent waste management procedures, or even remove the possibility of using a particular recovery or disposal route.

Risks to the health and safety of people that may be exposed to the contaminated material need to be considered. They will include Local Authority staff, clean-up contractors, transport operators, sewerage company workers, emergency service personnel, external advisors and others. Advice from the Scientific and Technical Advice Cell (STAC) and/or the Government Senior Scientific Advisor (SSA) attending the multi-agency Strategic Co-ordinating Group (SCG)) should be sought to ensure adequate measures are in place to prevent or control exposure. In the particular case of radiological hazards, the services of an accredited Radiation Protection Advisor (RPA) must be sought.

### **3. THE LEGAL FRAMEWORK**

#### ***Biological and Chemical wastes***

Much non-radioactive wastes which could be encountered during or after a CBRN incident will come under the classification “Hazardous Waste”. Hazardous waste is essentially waste that contains hazardous properties that may render it harmful to human health or to the environment. To help determine if a waste is hazardous or not, Local Authorities and others should consult the Environment Agency and its guidance *What is Hazardous Waste*. This refers to the Hazardous Waste Regulations 2005 (HWR), and the List of Waste Regulations 2005 (LoWR), which gives a list of wastes also known as the European Waste Catalogue. This advice should be sought from the STAC or SSA (as detailed above). This will be the body working to the multi-agency Strategic Co-ordinating Group (SCG) that will provide this specialist advice drawing upon national expertise and guidance.

National policy generally gives effect to European policy and Directives. National policy is primarily provided in the recently revised national waste strategy “Waste Strategy 2007” (WS2007) and in Planning Policy Statements (PPS). The key elements are:

- The “waste hierarchy”, seeking to prefer waste prevention or reuse, with disposal as the lowest option.
- Preventing danger to health and harm to the environment.
- An integrated and adequate network of disposal installations, seeking to dispose of waste as close as possible to where it is produced.

- Waste Plans.
- Facility permits.

It is important to note that in the UK these responsibilities are divided between the environmental protection and the planning regimes.

The relationship of waste management with the wider sustainability issues of resource management, energy use and carbon emissions is assuming ever increasing political significance, affecting the choice of waste management options.

All stages of waste management from generation to final disposal are controlled by legislation:

- Waste production is influenced by producer responsibility legislation, economic instruments and controls on specific substances.
- The spatial planning system is intended to provide an integrated network of facilities for treatment and disposal of wastes, compliant with national and European policy principles.
- The permitting system is intended to control the environmental impacts of waste disposal facilities. The Environmental Permitting (England and Wales) Regulations (EPR 2007) (which combine the former Pollution Prevention and Control regime, and the former the Waste Management Licensing regime) are used to control the environmental impacts of waste recovery and disposal facilities<sup>2</sup>.
- The UK meets its requirements on regulating the handling and carriage of waste through the waste duty of care and waste carrier and broker registration regimes. This and hazardous waste legislation are intended to reinforce some of the other elements in the package.

The above considerations are concerned with the application of national policy. CBRN planners should be aware of this policy in setting plans and priorities, while recognising (as will the government and the regulatory authorities) that the policy will be applied flexibly in the case of a significant emergency situation such as a CBRN incident.

### ***Radioactive waste***

The accumulation (i.e. temporary storage) and disposal of radioactive waste in England and Wales is regulated by the Environment Agency under the

---

<sup>2</sup>In due course, there is a proposal to integrate the waste management permitting aspects of the RSA93 within the same permitting regime.

Radioactive Substances Act 1993 (RSA93). For the purposes of interpreting RSA93, radioactive waste is waste which consists wholly or partly of:

- A substance that contains one or more of the naturally occurring radioelement's listed in the table in Schedule 1 to RSA93, in activity concentrations greater than those specified in that table.

or

- A substance containing man-made radionuclides (i.e. radionuclides produced by nuclear fission, or neutron or ionising radiation), irrespective of the activity concentrations at which they are present.

RSA93 requires the accumulation or disposal of radioactive waste to have been approved by the Environment Agency prior to it taking place. For this reason, such approval needs to be sought from the Environment Agency as soon as it is realised that it will be required. In normal (that is, non-emergency) situations, this approval is granted by way of a statutory authorisation.

In some circumstances, full statutory authorisation under RSA93 may not be applicable. For instance, materials contaminated as a result of an uncontrolled discharge of radioactivity may not meet the strict legal definition of 'radioactive waste' as set down in RSA93. There are other issues (such as whether a private garden on which radioactivity was deposited could be deemed to be a 'premises which is used for the purposes of an undertaking') which mean that strict application of RSA 93 may not be appropriate. The Environment Agency can provide regulatory advice within the UK's emergency response arrangements for some circumstances for which the Act does not apply. More generally, the Environment Agency will provide advice on radioactive waste management which complies with the 'spirit' of RSA 93 in circumstances where the Act does not strictly apply<sup>3</sup>.

The accumulation or disposal must be undertaken in accordance with any limits or conditions attached to the authorisation (or, where a statutory authorisation is not applicable, according to instructions given by the Environment Agency) for the purpose of ensuring adequate protection of the public and the environment. In the context of RSA93, the term "disposal" includes:

- The removal or transfer<sup>4</sup> of radioactive waste from any premises.

---

<sup>3</sup>The Agency could provide such advice via the multi-agency recovery working group (chaired by the Local Authority) which is responsible for co-ordinating and controlling all aspects of clean up and recovery following an incident. It is also important to note that the Agency has powers, other than under RSA93, which may be relevant depending on the situation. In particular, Section 109 of the Environment Act 1995 provides the power to deal with causes of imminent danger of serious pollution.

<sup>4</sup> Transport of radioactive materials and waste also requires compliance with transport regulations (various).

- The disposal of gaseous and aqueous radioactive wastes by discharge to the environment.
- The destruction of radioactive waste (by incineration or other means).
- The deposit or burial of solid radioactive waste.

RSA93 does not specify the disposal routes that may be used for radioactive wastes. Identification of suitable disposal routes is the responsibility of the person intending to dispose of the waste. This person is responsible for applying to the Environment Agency for authorisation/approval to use that proposed disposal route.

In the case of a CBRN event, 'ownership' of the waste in question, and hence the person or persons responsible for applying for an Authorisation, may not be clear. In these circumstances, a person acting on behalf of the multi-agency recovery group should be nominated as responsible for preparing the application and for complying with the conditions of any authorisation granted.

Certain radioactive wastes are exempt from the authorisation requirements of RSA93. These "exempt wastes" are specified in a number of exemption orders, the most relevant of which are likely to be The Radioactive Substances (Substances of Low Activity) Exemption Order 1986 (as amended) and The Radioactive Substances (Phosphatic Substances, Rare Earths etc.) Exemption Order 1962. In the case of the Alexandre Litvinenko affair, a case-specific and time-limited Exemption Order was enacted which assisted in dealing with a particular and unforeseen issue. There could be cases where this type of Exemption Order may be relevant to a future incident involving radioactive materials. Exempt wastes may be accumulated and disposed of without prior authorisation under RSA93. The Environment Agency will advise on whether a waste disposal practice is exempt under the provisions of any relevant Exemption Orders.

However, if radioactive waste is exempt from the requirements of sections 13 or 14 of RSA93, but has one or more hazardous properties arising other than from its radioactive nature, the waste will be classified as hazardous waste under the HWR.

### ***The Ionising Radiations Regulations 1999 (IRR99)***

The legal requirements relating to work activities involving exposure to ionising radiation, including the management of radioactive waste, are set out in the Ionising Radiation Regulations 1999 (IRR99). These Regulations set out a framework for controlling the exposure of workers and the public to ionising radiation. In particular, they require employers to restrict, so far as is reasonably practicable, the exposure of employees and other persons to ionising radiation and to ensure that specified dose limits are not exceeded. IRR99 needs to be taken into account in deciding on waste management practices, where a balance usually needs to be struck between radiation

exposure to the general public and radiation exposure to workers and others involved in handling wastes.

#### **4. ROLES AND RESPONSIBILITIES FOR CBRN WASTE MANAGEMENT**

The following roles and responsibilities relate to the management (storage, disposal etc) of wastes arising from a CBRN incident. The bodies listed below have wider responsibilities, for instance, in the immediate response stage and in relation to the remediation of contaminated sites. These wider responsibilities are dealt with in related guidance.

##### ***Department of Health (DoH)***

- *Investigation* of medical evidence of biological, chemical and radiological consequences of waste management in coordination with the HPA. To lead in the establishment of the STAC that will provide public health and technical advice regarding waste disposal.
- *Liaison* with the Food Standards Agency and the environment agencies on the release from the site and disposal of contaminated material.

##### ***Environment Agency***

- Ensure compliance of recovery and disposal facilities with their permits
- *Regulation of wastes and provision of waste management advice* to all relevant participating organisations.
- *Provision of Agency* representatives who have specialist knowledge of waste management.
- *Provision of advice* to Defra Divisions on technical and regulatory aspects.
- *Provision of information* to the public and the media on waste disposal matters.
- *Management of flows* of regulated waters if appropriate, to minimise impact.
- *Checks for breaches* of an authorisation, where relevant.

##### ***Health Protection Agency (HPA)***

- *Provision of advice* on readiness to resume occupation of contaminated sites.

- *Provision of advice* on public health impacts of contamination, waste management and other measures, including provision of information to the public.
- *Provision* of Radiation Protection Advisor (RPA) services if necessary.

***Department for Transport (DfT)***

- *Investigation* of aviation, marine and rail accidents, which could include those arising from a CBRN incident.
- *Facilitation* of the safe removal of contaminated materials from incidents involving air, rail and marine transport to a site deemed suitable for disposal.

***Food Standards Agency (FSA)***

- *Provision of advice* on management (including disposal) of contaminated foodstuffs.
- *Provision of advice* on access restrictions in certain circumstances (e.g. agricultural land).

***Department for Business, Enterprise and Regulatory Reform (BERR)***

- *Provision of advice to the* Civil Contingencies Committee about appropriate off site management and co-ordination arrangements, and appoint personnel to provide technical advice and liaison for those leading local clear up efforts.
- *Provision of advice* on public information to be provided nationally and internationally about clear up efforts. Liaison with the Government Information Service.

***Department for the Environment, Food and Rural Affairs (Defra), and equivalent departments in the Devolved Administrations.***

- *Provision of advice on* waste management policy.
- *Provision* of information on waste management.
- *Provision of advice* on statutory powers available to the various parties.

***Government Decontamination Service (GDS)***

- *Facilitation* of access to the Framework of Decontamination Specialist Suppliers.
- *Provision of advice* on decontamination of the built and open environment.

- *Provision of support* to the responsible authorities involved in decontamination prior to waste disposal.

### ***Health and Safety Executive (HSE)***

- *Provision* of specialist advice in association with the STAC on the risks to workers and others from the management of wastes. More generally, enforcement of the Health and Safety at Work Act.

### ***Local Authority and waste services organisations***

Local authorities have a wide range of responsibilities that relate to waste. Their main responsibilities are to act as:

- Waste planning authorities
- Waste collection authorities
- Waste disposal authorities.

In order to meet these responsibilities, local authorities or their contractors will:

- *Arrange* for collection of waste. Waste Collection Authorities (unitary authorities or shire districts) must collect household waste, must collect commercial waste if asked to do so, and may collect industrial waste. The Waste Disposal Authorities (WDAs) (unitary authorities or shire counties) must arrange its disposal. Collection and disposal is usually undertaken by contractors. These authorities therefore have control of this municipal waste, and must have strategies to dispose of it into the future.
- These local authorities are also emergency planning authorities. The waste functions may be able to assist the emergency planning function, through advice or possibly by making arrangements with their waste contractors.
- *Collection and removal* of waste. Waste collection services have been subject to compulsory competitive tendering, and may be operated either by local authority staff or by contractors. Facilities for the management of wastes are therefore mainly, if not entirely, in private sector hands. The arrangements for treatment and disposal of CBRN wastes will therefore have to be made with the contractors, on commercial terms.
- Many waste contractors are experienced in handling hazardous wastes, and offer ancillary services such as spillage response, tank cleaning, pressure jetting and vacuum vehicles.

- Issuing planning for use and disposal of waste management facilities.

In addition, local authorities are responsible for:

- *Organising and managing* the decontamination of the affected area and restoring the environment as far as practicable to normal use.
- *Meeting* the longer term non-medical needs of survivors (e.g. social services support and financial assistance from appeal funds) and the community (e.g. anniversaries, memorials, help lines); and to facilitate the remediation and reoccupation of sites or areas affected by an emergency.
- *Arrangements* for transport and storage of debris and equipment.
- *Liaison* with appropriate agencies on decontamination and disposal methods and sites.
- *Arrangements* for decontamination of domestic or commercial property on behalf of property owners if necessary (e.g. where not insured).

#### ***Ministry of Defence (MoD)***

- *Management* of wastes arising from a radiation incident relating to defence nuclear installations or defence nuclear material in transit.
- *Making* devices safe prior to disposal.
- *Provision of advice* on safe handling of CBRN contaminated materials including secure storage and transport, radiation measurement and protection for people in some circumstances.

#### ***Department of Communities and Local Government (DCLG)***

- *Provision* of guidance on Decontamination of buildings and infrastructure exposed to CBRN substances or material and development of site clearance capability in England and Wales
- Planning Policy Guidance

#### ***The Nuclear Industry***

The nuclear sector has no direct responsibilities in the case of CBRN incidents, but is a source of information and advice on radioactive and nuclear matters. Some nuclear sites may provide interim and/or decay storage facilities for some types of waste. The national Low Level Radioactive Waste Repository, operated on contract to the Nuclear Decommissioning Authority, provides a disposal route for non-incinerable low level radioactive waste.

## 5. CLASSIFICATIONS OF CBRN WASTE

In the context of waste management, the term CBRN waste is often employed. However, this term has no legal basis. Solid CBRN waste is therefore classified by way of legislation currently in place. The main classes are:

- Radioactive waste.
- Hazardous waste.
- Non-hazardous waste.
- Inert Waste.
- Animal by-products.

. For landfill purposes, waste may be “inert”; there are very strict criteria for this. (For landfill tax purposes, a lower rate of tax is payable for “inactive” waste, which covers a similar but not identical spectrum to “inert”).

In the case of radioactive wastes, these can be in the form of solid, liquid or gas. For hazardous and non-hazardous wastes, these can be either solid or liquid. Liquid and gaseous wastes could also arise, either as a direct result of a CBRN incident or as a consequence of decontamination of an affected area or building<sup>5</sup>.

**Chemical agents:** relatively easy to detect and isolate but some are difficult to destroy; treatment can lead to generation of toxic secondary wastes.

**Biological agents:** easy to destroy but difficult to find and isolate, and it is usually difficult to be certain they are fully removed. Examples include viruses, bacteria (anthrax), fungi, other micro-organisms or toxins (e.g. ricin) derived from living organisms.

**Radiological agents:** relatively easy to detect and isolate, but very difficult to destroy. They can only be managed (containerised, access restriction, dispersed, fixed in situ etc.) in such a way that they present no hazard to human beings or the environment. There is a wide range of radionuclides, differing in their radiotoxicity and behaviour in the environment. They are usually categorised as alpha emitters (e.g. plutonium-238, polonium-210) and beta-gamma emitters (e.g. strontium-90). Some sealed sources are designed to emit neutrons.

**Nuclear detonations:** result in extensive damage from blast and the intense thermal, gamma and neutron radiation and the emission of fission products.

---

<sup>5</sup> The possibility that wastes may be mixed - that is, covered by more than one of these descriptors – should not be overlooked.

The hazards will be generally be similar to, but much more severe and widespread than, those from a radiological agent.

## **6. WASTE MANAGEMENT PRACTICES**

Decisions on the management of a particular waste arising from a CBRN incident or its subsequent recovery must be made on a case by case basis, taking into account all the circumstances and implications of a particular management option. For each of the above waste types, disposal options will depend upon a variety of factors, including:

- Waste classification (including the possibility of mixed wastes).
- Volumes and masses.
- Ease of transport
- Physical and chemical form of the waste.

Waste recovery and disposal options are generally limited to the following:

- Landfill (solids only).
- The Low Level Radioactive Waste (LLW) national facility at Drigg in West Cumbria (for LLW only).
- Incineration.
- Burial or leaving in situ (with access restrictions in the case of the latter). This is usually only applicable to some radioactive wastes and some food or animal wastes, in specifically-approved circumstances.
- Other in-situ treatments.
- Special treatment (for instance, for biologically contaminated wastes).
- Direct discharge to the environment (in the case of some liquid and gaseous wastes).

Detailed information on these options is presented in Appendix 1 - Considerations to be taken into account in the preparation of waste management plans.

## **7. STORAGE OF CBRN WASTE**

### **General considerations**

Storage of waste arising from a CBRN incident or subsequent recovery operations could be considered for two main reasons: either to allow time for disposal routes to become available (“**interim storage**”), or specifically in the

case of radioactive waste, to allow for decay of radioactivity (“**decay storage**”).

It should be noted that interim storage should only be undertaken when disposal routes are unavailable and should be part of an overall strategy for waste management, which should include a consideration of the time scales over which it is likely to be required. Waste storage is itself subject to regulatory requirements under both EPR and RSA93.

Other aspects that should be taken into consideration when deciding on whether or not to implement interim or decay storage with respect to a particular waste include the chemical and biological stability of the waste (including the potential for the formation of hazardous substances), the availability of suitable storage sites, the suitability of the storage containers to continue to provide containment throughout the storage period, the cost and resulting disruption associated with storage and, in the case of decay storage of radioactive waste, doses to workers and the public.

In order to facilitate the safe storage and ultimate disposal of any waste being accumulated, the principles of waste characterisation and segregation should be applied to storage. Facilities for the storage of waste should be designed to facilitate the (routine) inspection, retrieval and remediation of the stored waste.

Effective record keeping is important to ensure that information that may be required for the safe management of waste is recorded and preserved. Arrangements should be made for recording and preserving all information that may be required, both now and in the future, for the safe management and disposal of the waste.

In many instances, interim or decay stores will require extract ventilation systems and decontamination/hand washing facilities, all of which will give rise to secondary wastes, the disposal of which must also be planned.

For non-radioactive wastes, interim storage is likely to be subject to Environmental Permitting, rather than PPC. There are a range of exemptions from Environmental Permitting, though these are currently under review. They include various storage situations. They are subject to qualifications with regard to waste type and quantity and the conditions of storage.

### **Decay storage for radioactive wastes**

For liquid radioactive wastes, decay storage should be considered in those instances where the reduction in radioactivity that could be achieved would produce a significant reduction in the impact of its discharge to the environment. The storage of radioactive waste over a time period that will allow its radioactivity to decay to a level at which it may be subject to a particular management option may be preferable to immediate disposal.

Decay storage for solid radioactive waste should be considered in those instances where it would allow the waste to be disposed of via a disposal route more suited to lower activity waste. For example, Intermediate Level Radioactive Waste (ILW) might be allowed to decay to the point at which it was suitable for disposal at the national Low Level Radioactive Waste Repository (LLWR). Alternatively, a waste with an activity concentration that would prevent it from being incinerated soon after it was produced might be suitable for incineration following decay storage. The requisite amount of time required for decay storage and the eventual disposal route should be decided in advance of any decision to implement the decay storage option. In calculating the required decay storage period, consideration should be given to the in-growth of decay products, where relevant.

Decay storage for radioactive wastes at premises other than nuclear licensed sites will require the Environment Agency's authorisation to accumulate radioactive waste. The requirements of IRR99 will also apply to decay stores.

For radioactive waste in the LLW category, the design of facilities for the storage of LLW would be determined by the requirements of relevant legislation and regulatory regimes, and would depend upon the quantity, nature and activity of the waste and the time scales over which it will be stored. Regulation 29 of IRR99 requires radiation employers to ensure that radioactive substances are kept in a suitable receptacle in a suitable store when they are not in use. Guidance provided by the Health and Safety Commission (HSC) identifies some general characteristics that should be considered in order to comply with this requirement<sup>6</sup>. Compliance with the requirements of regulations 7 and 8 of IRR99 will also be fundamental to the design of waste storage facilities. Among other things, the requirement for a prior assessment of the risks from ionising radiation associated with the stored wastes and the use of engineering controls and design features to restrict the exposure of employees and others to the ionising radiation will have considerable bearing upon the design of storage facilities.

Radioactive wastes with activity concentrations of greater than 4 GBq of alpha activity per tonne and/or 12 GBq of beta/gamma activity per tonne are not suitable for disposal at the national LLWR or landfill site. Such wastes are referred to as intermediate level wastes (ILW). These wastes and others not suitable for disposal at the LLWR or landfill site will need to be stored until a suitable disposal route becomes available (e.g. a national geological repository for higher level radioactive wastes). The levels of activity contained in these wastes means that they could represent a security risk. As such, arrangements will need to be made for their storage on a nuclear licensed site, where they will be subject to appropriate levels of security, provided by Civil Nuclear Constabulary (civil sites) or MoD Police (defence establishments).

---

<sup>6</sup> HSC, 2000, *Work with Ionising Radiation – Approved Code of Practice*, L121, HSE Books, 2000, Norwich

## **8. TRANSPORT OF CBRN CONTAMINATED WASTE**

Waste disposal facilities for many types of waste are unlikely to be local to an incident. For instance, permitted incinerators and hazardous waste landfills are not located in every, or indeed many, local authority areas. There is only one national facility for the disposal of LLW by burial (although many nuclear licensed sites will provide interim or decay storage facilities in the event of an emergency situation, subject to site license conditions). For this reason, CBRN planners must plan for transport requirements.

In planning the movement of contaminated waste, consideration needs to be given to the full range of transport options that might have to be procured and deployed. The following issues should be addressed:

- Use of registered waste carriers to transport waste<sup>7</sup>.
- Arrangements for procuring suitable containers and vehicles, particularly in relation to biosecurity.
- Arrangements for access, parking, fuelling and maintenance of vehicles.
- Health and safety needs of the drivers and those loading, unloading and handling waste.

Transport of dangerous goods is primarily regulated under the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2007 (known as CDG 2007). These implement a European agreement. They deal with the classification of the dangerous goods, security, suitability of the vehicle or containers, marking the vehicle, appointment of competent advisers, and training of drivers.

## **9. WASTE MANAGEMENT PLANS**

Plans can be produced in advance of a CBRN incident which covers the management of CBRN wastes. Considerations which should be taken into account in the preparation of such plans are presented in Appendix 1.

Appendix 2 comprises a checklist for the production of plans, and Appendix 3 a draft template for a plan.

---

<sup>7</sup> Waste carriers must be approached at the planning stage to secure agreement in principle; many may refuse to transport the kinds of waste covered by this guidance.

Local planners should allow for the fact that certain elements of these plans (for instance, temporary storage or treatment in-situ of CBRN wastes) may generate local interest. For this reason, it is recommended that any plans produced relating to waste management are made public such that discussions with the local population can be held prior to the plans coming into force.

## 10. RELATED GUIDANCE AND FURTHER READING

- Strategic National Guidance – The decontamination of buildings and infrastructure exposed to CBRN substances and material (written by DCLG).
- Strategic National Guidance – The decontamination of the open environment exposed to CBRN substance or material (written by Defra).
- Strategic National Guidance on CBRN incidents – Home Office.
- Radiological Handbook – Health Protection Agency publication.

## 11. ACRONYMS

BAT	Best Available Techniques
BPEO	Best Practicable Environmental Option
BPM	Best Practicable Means
DCLG	Department for Communities and Local Government
CDG	Carriage of Dangerous Goods (Regulations)
Defra	Department for the Environment, Food and Rural Affairs
DfT	Department for Transport
DoH	Department of Health
EA	Environment Agency
EPR	Environmental Permitting Regulations
GDS	Government Decontamination Service
HPA	Health Protection Agency
HSC	Health and Safety Commission
HSE	Health and Safety Executive
HO	Home Office
HWR	Hazardous Waste Regulations
ILW	Intermediate Level Radioactive Waste
IRR99	Ionising Radiations Regulations
LLW	Low Level Radioactive Waste
LLWR	Low Level Radioactive Waste Repository
LOWR	List of Waste Regulations
MoD	Ministry of Defence
PPC	Pollution Prevention and Control (regulations)
PPS	Policy Planning Statement
RPA	Radiation Protection Advisor
RSA93	Radioactive Substances Act 1993
SCC	Strategic Command Cell

STAC	Scientific and Technical Advice Cell
SSA	(Government) Senior Scientific Advisor
UKAEA	United Kingdom Atomic Energy Authority
VLLW	Very Low Level Radioactive Waste
WML	Waste Management Licensing
WS2007	Waste Strategy 2007

## **Appendix 1 – Considerations to be taken into account in the preparation of waste management plans.**

### ***The waste hierarchy***

**Waste hierarchy – re-use/recycle.** Pre-planning should include consideration of possible markets and other uses for the range of materials that may be generated. This should include identification of re-cyclers, processors and brokers, who can divert the designated material (e.g. concrete, brick, and asphalt) and the volumes they can handle. Only where re-use and recycle prove difficult (which is likely to be the case for most CBRN wastes) should a disposal option be considered.

**Waste hierarchy – minimisation.** Reducing the quantity of waste produced, by utilising the full range of methods available will help conserve raw material, keep down disposal costs, and reduce demand for landfill.

**Waste minimisation and decontamination.** Consideration should be given to decontaminating the surfaces of buildings and other structures before they are demolished. This will reduce the amount of contaminated dust that becomes airborne during the demolition work. Where decontamination is not practicable or wholly effective, consideration should be given to the application of a tie-down coating prior to demolition. Consideration should also be given to additional measures to prevent the re-suspension of contaminated dust, such as the use of water mists to damp-down dust arising from demolition work. Consideration should also be given to removing dust from the ground to prevent it becoming re-suspended.

**Hazardous waste and the waste hierarchy.** It is unlikely that hazardous wastes will be readily reused or recycled, due to their hazardous nature, unless treated to render them non-hazardous. The exceptions are oils and solvents, which can be re-processed. Some foodstuffs, when rotted, may be used for fertiliser.

**Radioactive waste and the waste hierarchy.** Although decontamination techniques have been shown to be effective in producing 'clean' products such as ferrous metals, precious metals and building aggregates, finding a market for such recycled materials has sometimes proved difficult. When considering the economic arguments for recycle, unless a market has been identified in advance at the planning stage, it is usual to ascribe a product value of zero to materials reclaimed from radioactive contamination incidents.

**Waste minimisation and safety.** Where practicable, decontamination activities and other waste management operations likely to give rise to gaseous or liquid wastes, or airborne dusts, should be undertaken within a ventilated enclosure. The extracted air should be filtered through an appropriate mobile filtration unit, prior to its discharge to the environment. The gaseous waste should be discharged in a manner that will ensure its effective dilution and dispersion in the atmosphere – this will require consideration of the height and location of the discharge stack. In particular,

care should be taken to ensure that the discharged waste will not be entrained in adjacent buildings' air intakes.

### **Landfilling**

**Landfill – general.** Although generally discouraged by national UK policy, landfill has the advantage of being able to receive bulky wastes and wastes in large quantities and at relatively short notice. That is to say, a CBRN incident can be regarded as an emergency situation under which normal policy requirements (but not safety requirements) may have to be overridden.

**Landfill and liquids.** Liquid wastes are now banned from landfill. Additionally, liquid wastes in the LLW category may not be disposed of to the national LLW facility at Drigg in West Cumbria. Because liquid wastes are now banned from landfill, the alternatives are to treat them either at a waste industry treatment plant or a wastewater treatment works, or to incinerate them. There are issues about capacity and about the suitability of the waste types for these processes.

**Landfill and biodegradation.** Highly biodegradable wastes are also being diverted from landfill due to methane generation and emission, and, if in the control of the local authority, may count against their allowances for landfilling biodegradable municipal waste.

**Landfill and hazardous waste.** A range of hazardous wastes are still landfilled. Landfill is subject to strict engineering requirements and a range of risk assessments, including a hydrogeological risk assessment. This is based on the types of waste to be accepted, and their ability to react, dissolve and migrate. Landfill is now subject to waste acceptance criteria, numerical limit values for leaching and for total concentrations of contaminants. Many hazardous wastes are failing these criteria, for example, for metals or for total organic carbon, and hence alternatives must be found. Liquid wastes, along with explosive, oxidising, corrosive, flammable or highly flammable wastes and chemical waste are prohibited from landfill. Hazardous wastes must be pre-treated before being disposed of to landfill (many landfill operators will now offer this service alongside landfill disposal).

**Landfill and non-hazardous waste.** Non-hazardous wastes may be landfilled, and there are many more non-hazardous than hazardous landfills. Hitherto, there were no waste acceptance criteria for non-hazardous wastes (other than that they cannot be hazardous). This is no longer the case. Moreover, because policy places landfill as the last resort, new landfills are infrequent. In the municipal sphere, local authorities are set allowances for the amount of biodegradable municipal waste they can landfill, and the majority have targets for recycling and composting or waste sent to landfill. WS 2007 set out an expectation that the quantity of commercial and industrial waste being landfilled would reduce, and the landfill tax is rising to encourage alternatives. However, as with other national policy objectives, this requirement is likely to be dealt with flexibly in an extreme emergency situation such as a CBRN incident. Non-hazardous wastes must be pre-

treated before being disposed of to landfill (many landfill operators will now offer this service alongside landfill disposal).

### ***Alternatives to landfill***

**Alternative treatment of hazardous waste.** The main alternative options to landfill, available commercially for hazardous wastes, are incineration and physico-chemical treatment. Incineration is licensed for certain types of waste under EPP and RSA93 legislation for certain wastes. Incineration capacity is limited, and the ability to feed the waste to the incinerator very dependent on the physical form of the waste. Physico-chemical treatment involves processes such as acid-alkali neutralisation, phase separation, oxidation-reduction. The application of Best Available Techniques (BAT) under the EPP regime means that operators have to move from fairly crude mixing processes to more controlled, in-vessel systems. This means that many wastes have to be pre-treated to make them physically suitable prior to landfilling.

**Alternative treatment of non-hazardous waste.** For non-hazardous wastes, infrastructure is developing for recycling and recovery and for alternative treatments. Cruder facilities, for example, for crushing and screening demolition waste, and for open-windrow composting of garden waste are readily available. More sophisticated facilities for separating recyclates, in-vessel composting and other treatments are in the pipeline, but subject to delays in procurement and planning permission. Liquid non-hazardous wastes are banned from landfill and the alternatives are to treat them either at a waste industry treatment plant or a wastewater treatment works, or to incinerate them. There are issues about capacity and about the suitability of the waste types for these processes. Processes for recovery to land are also available.

**In-situ treatments.** Technologies have been developing for contaminated soil treatment, and include soil washing, thermal desorption and biological treatment. These are available on a mobile basis and, operators are starting to develop centralised treatment facilities. Contaminated soils might be amenable to soil washing – a process by which the smaller soil particles (to which the greater proportion of the contamination will be adhered) are separated from the larger particles, which make up the bulk of the soil.

### ***Radioactive waste***

**Radioactive waste – basics.** The fundamental principles behind the management of all radioactive wastes are that doses to individuals are to be kept within the relevant dose limits and that within these limits, radiation protection is optimised such that doses to individuals and to the population as a whole are kept as low as reasonably achievable, economic and social factors being taken into account. With respect to the protection of the public from disposals of radioactive waste, the Environment Agency will usually only authorise disposals that will give rise to a maximum individual dose of not more than 0.3 mSv per year. By doing so, it ensures that the public dose limit

of 1 mSv per year (which takes account of all man-made sources of exposure, including those from historic disposals) is unlikely to be exceeded.

**Radioactive waste - principles.** In relation to radioactive waste management, the Best Practicable Environmental Option (BPEO) is the radioactive waste management option, for a given practice, that provides the most benefit or the least damage to the environment as a whole in the long term as well as in the short term, taking into account operational doses and risks, and social and environmental factors. The Best Practical Means principle (BPM) should also be applied. BPM implies minimisation of wastes, so far as reasonably practicable, having regard to time, money and other resources expended<sup>8</sup>.

**Mixed wastes.** Solid wastes arising from the recovery of a CBRN/radiological incident, which contain levels of radioactivity below those specified in the relevant RSA 93 Exemption Orders may qualify as “exempt wastes” under the Radioactive Substances Act if they fulfil all of the other conditions of the Exemption Order. Exempt wastes do not require an Authorisation for their disposal and should be recovered in the same way as a conventional waste with the same physical and chemical characteristics (i.e. by reference to the above paragraphs). However, exempt wastes with certain hazardous properties other than those attributable to its radioactivity (e.g. explosive, toxic, etc. properties), may be hazardous waste within the meaning of the HWR. As such, they should be managed in accordance with the requirements of those and all other legislation that applies to hazardous waste.

**Radioactive waste – low volumes of Very Low Level Radioactive Waste (VLLW).** Wastes that contain levels of radioactivity in excess of the levels specified in Exemption Orders may only be disposed of under Authorisation by the Environment Agency. Radioactive wastes that are just above these Exemption Order levels may be suitable for disposal as very low level waste (VLLW). There are two sub-categories of VLLW: low volume VLLW and high volume VLLW. Small quantities of radioactive waste may be authorised for disposal along with conventional wastes, provided that no single item contains more than 40 kBq of activity and that the total activity disposed of with each 0.1 m<sup>3</sup> of conventional waste does not exceed 400 kBq. This is referred to as “low volume VLLW” disposal. The levels of activity in radioactive waste which is suitable for disposal as low volume VLLW do not require any special precautions to be taken when disposing of the waste, beyond those used during the management of the conventional waste with which it is to be disposed of. As such, the authorisation does not specify how the waste should be managed following its removal from the premises on which it arose. The use of this route for the disposal of radioactive wastes arising from CBRN incidents and their recovery is likely to be limited, since the volumes of less active radioactive waste requiring disposal are likely to be relatively high.

---

<sup>8</sup> Statutory Guidance to the Environment Agency, expected in 2008, may replace the BPEO and BPM concepts with that of Best Available Techniques (BAT).

**Radioactive waste – high volumes of Very Low Level Radioactive Waste (VLLW).** Higher volumes of radioactive waste may be authorised for disposal to a specified hazardous or non-hazardous landfill (but not an inert landfill), provided that the total activity concentration of the waste does not exceed 4 MBq per tonne. Unlike small volume VLLW disposals, conditions will be attached to the authorisation, limiting the total volume of waste that could be disposed of to the landfill and imposing certain other restrictions on the way in which the final disposal is to be made. The purpose of the former condition would be to limit the total activity of waste disposed of to that particular landfill. It is likely that this disposal route would be of much greater use following a CBRN incident than the low volume VLLW disposal route. In particular, it is likely to provide a suitable disposal route for contaminated building rubble and large volumes of contaminated soil etc.

**Radioactive waste and controlled burial.** In some circumstances, the Environment Agency will also authorise the disposal of radioactive waste with activity concentrations of greater than 4 MBq per tonne, by “controlled burial” at a specified landfill. However, to be able to authorise the disposal, the Environment Agency would need to be satisfied (through a *site-specific* risk assessment undertaken by the CBRN incident planners) that the disposal would not result in any member of the public receiving a dose of greater than 0.02 mSv per year, either during the operation of the landfill or following its closure. Whilst the controlled burial option would provide CBRN incident recovery planners with a greater degree of flexibility as to the activity of the waste that may be disposed of to a conventional landfill, the production of the site specific risk assessment for the particular landfill would involve additional resources. CBRN incident planners may wish to undertake site-specific risk assessments for the landfills within their regions in advance, so that the information on which would be most suitable for certain types of radioactive waste could be worked into recovery plans.

**Radioactive waste – incineration.** The Environment Agency will authorise the incineration of radioactive waste where it provides benefits such as volume reduction, destruction of pathogens, chemical stabilisation, etc. In particular, incineration is likely to be the most appropriate option for managing radioactively contaminated clinical wastes arising from CBRN incidents and their subsequent recovery. Subject to Authorisation, radioactive waste may be incinerated in mobile incinerators (where available), at private incinerators (such as hospital incinerators and those in operation on some nuclear licensed sites) or at merchant incinerators. The activity of radioactive waste that may be authorised for incineration depends upon the efficacy of the incinerator’s abatement system.

**Radioactive waste – Low Level Radioactive Waste (LLW).** Radioactive wastes with activity concentrations of not more than 4 GBq of alpha activity per tonne and/or 12 GBq of beta/gamma activity per tonne may also be disposed of (under authorisation) at the national low level waste repository (LLWR) near Drigg in Cumbria. The site operator will not accept wastes for disposal at the LLWR that may be disposed of by other routes such as controlled burial or disposal as VLLW or exempt waste.

## **Liquid waste**

**Liquid wastes - general.** In many instances it will not be practicable to avoid the generation of liquid wastes during a CBRN incident and its subsequent recovery. Examples of liquid wastes arising from CBRN incidents and their subsequent recovery that cannot be avoided may include fire water run-off or surface water run-off or decontamination. Where practicable, attempts should be made to contain these, taking into consideration hazards to the emergency services and the general public. The same approach as described above should then be taken to managing this waste.

**Liquid waste - treatment.** Consideration should next be given to potential treatment technologies that would reduce the levels of contaminants in the liquid waste. Such technologies might include mobile ion exchange or reverse osmosis units (where available) for radioactive wastes. Chemical treatment for chemical and biological wastes is also well-developed. Consideration should be given to the nature of the secondary wastes that will arise from the application of the treatment technology and the routes by which they might be disposed of. These techniques are well developed for liquid radioactive waste streams; less so for other types of liquid waste.

**Liquid waste - solidification.** In the case of liquid radioactive wastes, consideration should be given to solidification of liquid wastes (e.g. through cementation) followed by disposal as solid waste. Where practicable, preference should be given to the solidification of a liquid waste over its disposal by discharge to the environment. This is particularly the case for small quantities of relatively highly contaminated liquid waste. Solidification of chemical and biological liquid wastes is less likely to be an option.

**Non-radioactive liquid waste – disposal.** The availability of options for the disposal of liquid waste by discharge to the environment will depend upon the location of the CBRN incident. However, options for the disposal of such waste might include discharge to the public sewer, discharge to a local river or discharge to the sea. Where possible, liquid waste should be discharged in a manner that will optimise its dilution and dispersion in the receiving water and the rate of discharge should be determined on a case by case basis. However, it is recognised that this may not always be possible and the following rules of thumb are provided for minimising impacts of disposals of aqueous radioactive waste to the public sewer. The disposal of liquid waste direct to the ground should be avoided, unless a prior assessment suggests that its impact on local groundwater will be negligible.

**Liquid radioactive waste – disposal.** Unless a site specific assessment indicates otherwise, discharges of aqueous waste to the public sewer should be limited to 100 MBq per day. This limit may be raised to 200 MBq in a single day, provided that the maximum activity discharged during a rolling week in which such a discharge was made does not exceed 500 MBq. These conditions may be varied on advice from the Environment Agency in an

emergency situation; for instance, the case of disposal to a storm water drain (that is, not direct to a sewer) will need special case-specific advice.

### ***Gaseous wastes***

**Gaseous wastes.** Gaseous wastes may arise from CBRN incidents themselves or recovery operations undertaken subsequent to an incident. Wherever practicable, gaseous wastes should be avoided and where that is not possible, attempts should be made to contain them so that they may be abated and discharged in a controlled manner.

### ***Secondary wastes***

**Secondary waste - general.** Many decontamination techniques will give rise to secondary wastes that may be gaseous or liquid in nature and consideration should be given to the benefits derived from decontamination in relation to the secondary hazards arising from the discharge of these wastes to the environment. Consideration should be given to how all secondary wastes arising from decontamination activities will be disposed of. Where practicable to do so, the production of liquid and gaseous wastes should be avoided unless there is a clear net benefit arising from the operation that would give rise to it.

**Secondary wastes – disposal routes.** In all instances when a decision is being made on whether to decontaminate a waste, consideration should be given to disposal routes for the secondary wastes arising from the decontamination (and to ensuring that they do not generate more waste than previously existed or redistribute the contamination further), the hazards for those undertaking the work, the costs and disruption of doing so and the benefits of reducing the contamination levels of the original waste.

**Secondary liquid waste.** In those instances where circumstances allow a decision to be made as to whether a liquid waste should be generated (e.g. when considering the use of water based decontamination activities), consideration should be given to the volume and activity of the waste arising, the available means of treating the aqueous waste to reduce its pollutant content, the availability of disposal routes and the impact of the waste's disposal on the public and the environment. Consideration should also be given to the secondary wastes arising from the treatment of the aqueous waste, how these will be disposed of and the impacts of their disposal. These factors should then be weighed up against the benefits of undertaking the operation that will produce the aqueous waste (in this case the decontamination of another waste). Where practicable, aqueous waste that is generated following such a decision should be captured and contained so that it might be treated and monitored prior to disposal. In circumstances where surface cleaning (building, streets, trees etc.) is required, early consideration needs to be made for permission to allow the resultant contaminated liquid waste being disposed of via the sewerage system.

## **Appendix 2 – Checklist for the production of waste management plans**

This guidance is written in relation to the advance planning of the disposal of CBRN waste. Some of these same steps would apply to dealing with the waste at the time of an incident, but many require detailed advance planning.

### **1. Waste management plans should require the establishment the likely nature and quantities of waste at the first notification of an incident.**

As much information as possible should be collected. In particular:

- Is the waste hazardous; what hazards does it display; what are the constituents that cause the hazard?
- Is it radioactive waste? If so, what is the waste classification?
- What is the main bulk of the waste? This will affect the disposal options for dealing with it. For example, is it soil, vegetation or railway carriages?
- What is the physical form of the waste? For example, liquid, slurry, sludge, powder, solid.
- For hazardous wastes, what is the EWC code (from the List of Wastes Regulations)?
- How much is there? This will affect the ability of facilities to receive it.

More information may be needed in relation to specific disposal sites or options. For example, for landfill, “Basic characterisation” of the waste has to be undertaken as a requirement of the landfill directive. Radiological characterisation may be necessary in order to determine which, if any, local landfill can accept the waste.

The legislation which may be invoked for the waste needs to be established. This legislation can include the Environmental Permitting Regulations, and the Radioactive Substances Act.

### **2. Waste management plans should incorporate, as a matter of course, how the waste hierarchy should be complied with and include a requirement for waste segregation where possible. Consideration of ‘duty of care’ should be included.**

- How will escape of the waste be prevented, in storage and transport?
- Who will carry the waste – are they “authorised” for this purpose?
- What information will be provided to carriers, to enable them to properly manage any risks posed by the waste? Is the waste hazardous waste, such that consignment notes are required?

### **3. Waste management plans should detail what temporary storage facilities are available.**

- Are sites available? Where are they and what is their capacity? What restrictions apply to each temporary storage facility?
- Are the necessary permits or exemptions in place?
- Can their terms be complied with?
- If not, will the “emergency” defence be used?
- Will it be possible to take reasonable steps to prevent pollution or harm?
- Will hazardous waste registration be necessary? This must be done as soon as possible, even if not possible when the waste is produced.

### **4. Waste plans should detail the options are available for disposing of the waste.**

- What facilities are available? A list of locations (landfill, incineration, specialist treatment facilities) should be drawn up in the form of a matrix or table indicating the type of facility, wastes which can be accepted, and any contractual or capacity information available.
- For non-hazardous waste, there are likely to be more facilities, and there are more likely to be options for reusing or recycling the waste. For hazardous wastes, facilities may only be available on a regional or national level.
- Do the facilities have the necessary permits for the waste?
- The Environment Agency should be able to advise, at least on possibilities. More detailed enquiries may then be necessary.
- Have commercial terms been agreed with the operator? Is the facility definitely available? Is there a written contract or agreement? What charges will be payable? Are there any special health and safety considerations the operator should be made aware of?
- Is funding available and sufficient?

### **5. Are the options listed in Appendix 1 sufficient? If not, can other options/sites be identified and established as a viable waste route?**

- At the planning stage, if insufficient facilities are available, could additional facilities be made available?

- In the short term, it may be possible to amend permits.
- In the longer term, it may be possible to plan the provision of additional facilities, involving the planning authority and possibly the WDA.

## **6. Waste management plans should detail how the waste is to be transported**

This applies both to getting it to temporary storage, and to any subsequent transport.

- Potential waste carriers should be identified and listed.
- Is an authorised person involved, eg a registered carrier?
- Is a hazardous waste consignment note necessary?
- Do The Carriage Regulations apply? If so, ensure that the carrier can comply.

## **Appendix 3 – Template waste management plan**

### **Headings**

- 1.1 Geographical area covered
- 1.2 Responsible personnel and duties
- 1.3 Contact details for personnel
- 1.4 Local waste management facilities (storage, treatment, disposal)
- 1.5 Local transport undertakings
- 1.6 Contracts with waste management and waste management undertakings
- 1.7 Communications - public warning and information about waste storage and transport.
- 2. Action list

### **Activity**

### **Responsibility of?**

- 2.1 Establish nature and quantities of waste arising
- 2.2 Health and safety issues for workers and the general public.
- 2.3 Identify possibilities for re-use/recycle
- 2.4 Identify appropriate storage or treatment facility
- 2.5 Identify appropriate disposal option and disposal destination
- 2.6 Notify and receive advice from relevant regulators
- 2.7 Apply for any necessary permits
- 2.8 Site management (for accumulation, storage, treatment and transport)
- 2.9. Public information needs identified
- 2.10 Post-incident review