

# **Environmental Guidelines: Assessment, Classification & Management of Liquid & Non-liquid Wastes**



**Department of  
Environment and  
Conservation (NSW)**

*Environmental Guidelines: Assessment, Classification & Management of Liquid and Non-liquid Wastes* is a combination of the *Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Wastes* (1997) and the product of consultation on *Draft Environmental Guidelines for Assessment, Classification and Management of Liquid Wastes* (1998). Its provisions take effect from 1 July 1999.

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# SECTION 1 INTRODUCTION

## 1.1 Background

The *Waste Minimisation and Management Act 1995* (the Waste Act) introduced a State-wide scheme for licensing waste activities. According to this scheme, the wastes that pose the greatest threat to the environment need a licence. The purpose of the licence is to ensure that appropriate controls apply to the handling, storage, treatment and disposal of the waste. There must also be a clear public record of what wastes are going where. Sometimes this is needed even where a licence is not required, so that the community can be confident that our wastes are well managed, and so that there is a way of tracing illegally dumped waste.

The Waste Minimisation and Management Regulation 1996 detailed State-wide licensing requirements, standard environment protection requirements and waste reporting obligations.

The waste licensing and offence provisions of the Waste Act have (now) been transferred into the *Protection of the Environment Operations Act 1997* (the Operations Act), which will commence on 1 July 1999. It is important to know that it is now Schedule 1 of the Operations Act that:

1. defines who is required to hold an *environment protection licence*; and
2. defines the different types of waste and other terms used in the Act relating to waste.

The Protection of the Environment Operations (Waste) Regulation 1996 (Waste Regulation), made under the Operations Act, now contains:

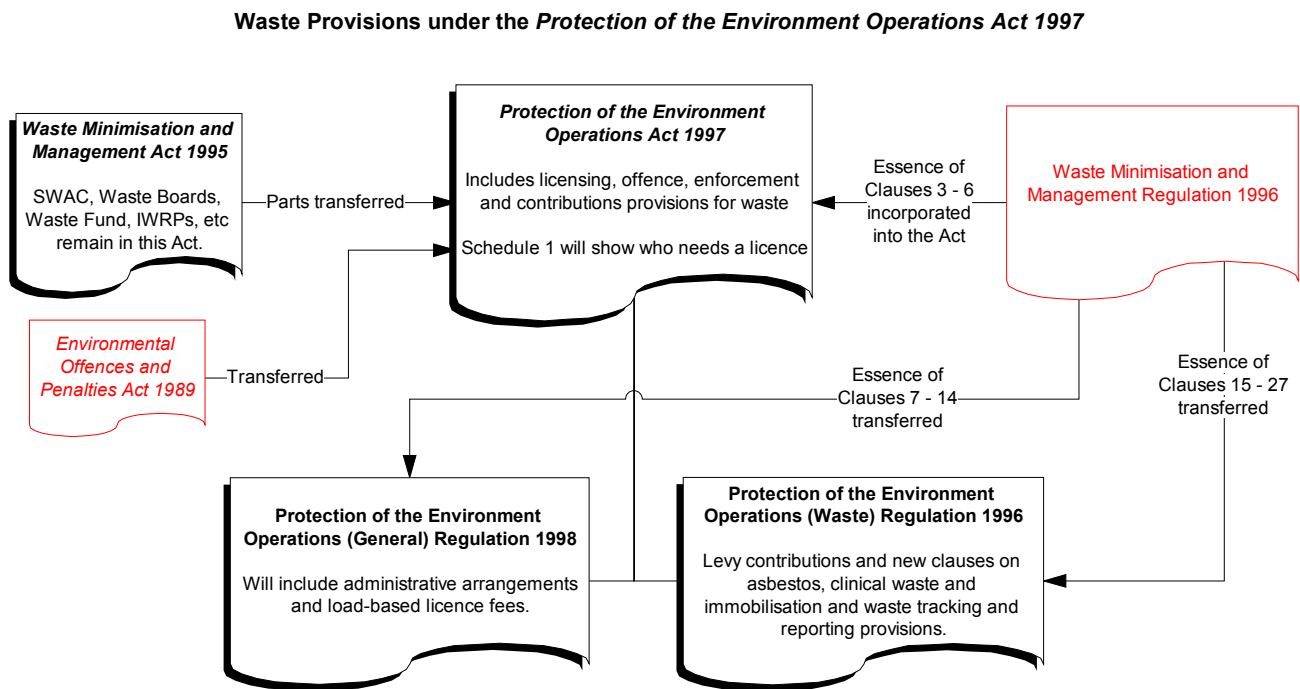
- general environmental obligations for waste activities (generators and storers), waste facilities (landfills) and waste transporters that are non-licensed
- provisions relating to the collection of waste contributions pursuant to Section 88 of the Operations Act (formerly Section 72 contributions under the Waste Act)
- special provisions relating to matters such as contaminant immobilisation approvals, the management of asbestos waste and the management of clinical waste.

The regulatory scheme set down in the Operations Act complements the provisions of the *Waste Minimisation and Management Act 1995* and associated reforms, which include:

- a target for reducing waste going to disposal by 60% by 2000
- a waste management hierarchy, within which waste avoidance is a priority, followed by reuse and recycling/reprocessing, with disposal as a last resort
- industry waste reduction plans to ensure that nominated industries make tangible and effective waste reduction commitments
- operation of the State Waste Advisory Council to advise the Minister for the Environment and the EPA on aspects of the implementation of waste reforms in NSW
- operation of Regional Waste Boards to maintain and implement comprehensive regional waste management plans
- a Waste Planning and Management Fund to support NSW waste reduction initiatives
- comprehensive plans of action for key waste streams (such as green waste and building and demolition waste)

- ongoing State-wide community education, promoting waste avoidance and reduction options
- requirements for government agencies to produce waste reduction and purchasing plans.

The relationship between the *Protection of the Environment Operations Act 1997* and its new regulations and the *Waste Minimisation and Management Act 1995* is summarised in the diagram below:



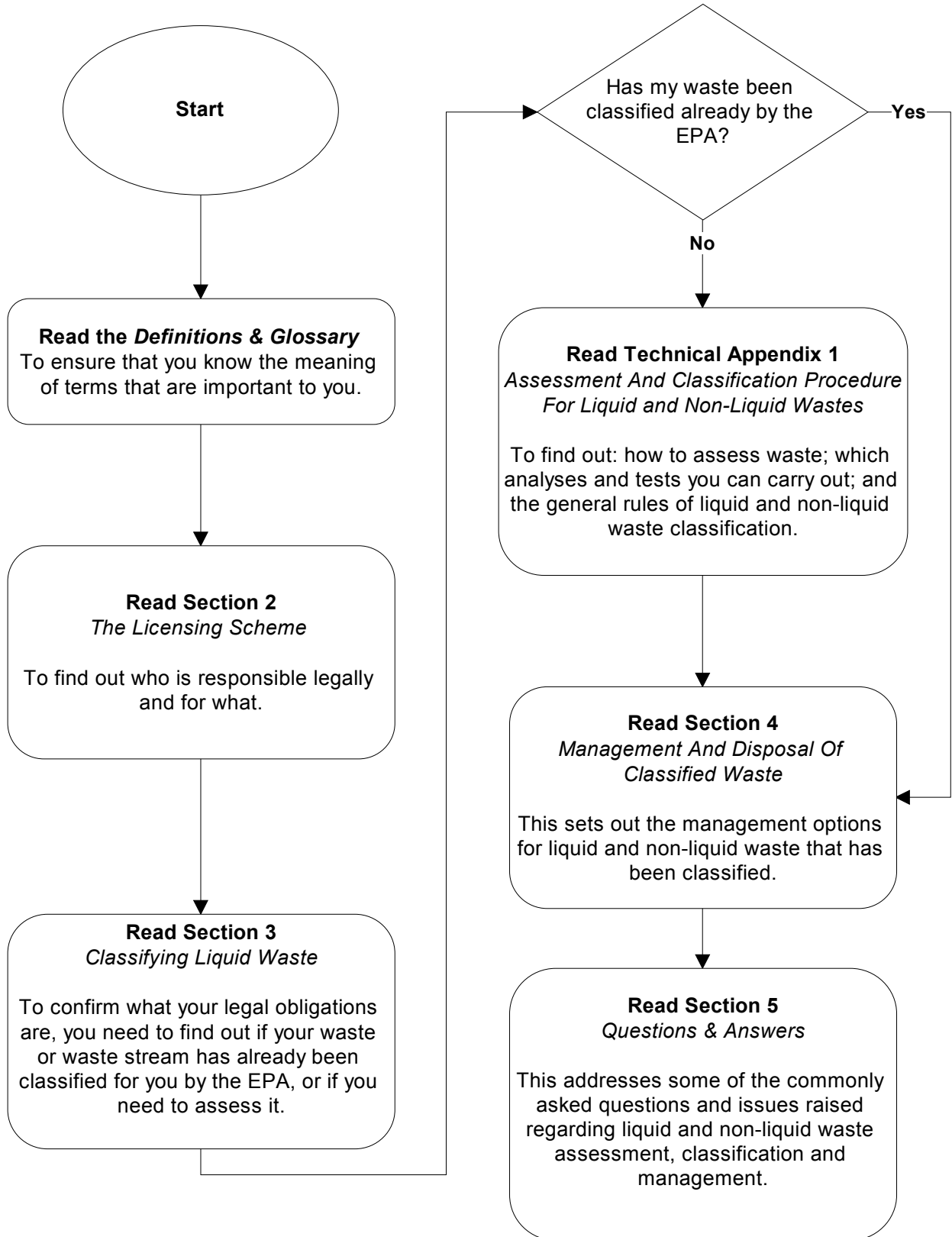
## 1.2 Structure of these guidelines

The figure opposite shows you how to use these guidelines. They are structured as follows:

### Section 2:

- Defines those people generating, storing, transporting, treating, processing, reprocessing or disposing of waste who need a licence.
- Outlines the obligations of those who need a licence.
- Sets out the general environmental obligations of those who do not need a licence.

## How do I use this document?



### **Section 3:**

- Guides those generating, storing and handling wastes in assessing these wastes to determine whether the liquid waste they are handling is regarded as hazardous, Group A, Group B, Group C or non-controlled aqueous liquid and whether the 'solid'/'non-liquid' waste they are handling is inert, solid, industrial or hazardous. This will enable them to determine whether a licence is required and what their associated environmental management obligations are.
- Outlines the two main ways of classifying liquid and non-liquid wastes.
- Outlines two different assessment processes—one for liquid waste and the other for non-liquid waste. This is supported by more detailed technical advice in Technical Appendix 1.

### **Section 4:**

- Explains the rules that are set out in the Waste Regulation for the management of liquid and non-liquid wastes once they are classified.
- Discusses good management practices for liquid and non-liquid wastes. In particular, there are rules relating to the disposal of liquid and non-liquid wastes and the constraints on sending particular sorts of wastes to particular sorts of landfills.

### **Section 5:**

- Deals with the common questions and answers about classifying and managing different wastes
- Draws out some of the implicit and explicit issues/linkages between the various aspects of waste regulation
- Discusses links between waste regulation and other aspects of environmental regulation.

### **Definitions and glossary:**

- Provides a guide to unfamiliar terms.
- Lists EPA contacts for further information.

## SECTION 2 THE LICENSING SCHEME

This section discusses the regulatory provisions made under the *Protection of the Environment Operations Act 1997* in simplified terms. Readers should also consult the actual text of these provisions, reproduced in Technical Appendix 9 of these guidelines.

### 2.1 Who needs a licence?

The need for a licence will depend on the sort of waste being handled, the volume of that waste and what is being done with it. Schedule 1 of the *Protection of the Environment Operations Act 1997* (the Operations Act) sets out the criteria for whether you need to hold an *environment protection licence*.

In general the following facilities or activities must be licensed unless they are specifically exempted (see Sections 2.1.1 to 2.1.4 for more details):

- those who **generate or store** hazardous, industrial or Group A waste (*waste activities*)
- **transporters** of hazardous, industrial, Group A, Group B or Group C waste or tyres (*waste transporters*)
- facilities that **treat, process, reprocess or dispose of** hazardous, industrial, Group A or Group B waste, or facilities that store or dispose of tyres (*waste facilities*)
- **landfill sites** (*waste facilities*)
- **mobile plants** that treat, process or reprocess industrial, hazardous or Group A wastes (*mobile waste processors*).

The waste classification scheme is outlined in section 3.

#### 2.1.1 Waste activities: generators and storers

People who generate and/or store hazardous waste, industrial waste or Group A waste require an environment protection licence.

Some activities are exempt from this requirement because they are either small in scale or easy to manage with little risk. The exemptions are:

- the generating or on-site storage of contaminated soil, recyclable oil or stabilised asbestos waste in bonded matrix
- the generating or on-site storage of hazardous waste, industrial waste or Group A waste in or at a concrete batching plant
- the generating of not more than 10 tonnes per year, or the on-site storage of less than 2 tonnes at any one time, of hazardous waste, industrial waste or Group A waste by any of the following:
  - local authorities
  - dry cleaners
  - printers
  - photographic and processing laboratories
  - pharmacies
  - hairdressers

- businesses carrying out any skin penetration procedure to which Part 3 of the Public Health Regulation 1991 applies
- veterinary surgeons
- nursing homes
- funeral parlours
- painters
- builders
- machinery and vehicle repair and servicing workshops
- panel beaters
- jewellers
- educational institutions
- hotels, clubs, restaurants and related hospitality industries
- the generating of not more than 2 tonnes per year, or the on-site storage of less than 500 kg at any one time, of hazardous waste, industrial waste or Group A waste by any of the following:
  - dental or doctors surgeries
  - hospitals, pathology laboratories or pre-term clinics
  - farming operations
  - landscaping or fire-hazard-reduction works (such as those carried out by local and public authorities)
- the generating of not more than 10 tonnes per year, or the on-site storage of less than 2 tonnes at any one time, of hazardous waste, industrial waste or Group A waste in the form of oil, paint, lacquer, varnish, resin, ink, dye, pigments, adhesives, hydrocarbons or emulsions.

### **2.1.2 Transport of waste**

You will require an environment protection licence if you transport:

- hazardous waste, industrial waste, Group A waste, Group B waste or Group C waste for fee or reward in quantities of more than 200 kg per load, or
- used, rejected or unwanted tyres (including shredded tyres and tyre pieces) in loads over 2 tonnes.

The following persons or activities are excluded from this licensing requirement:

- persons who transport waste in their capacity as employees
- any waste that is transported in connection with an emergency situation or an accident
- transporting only stabilised asbestos in bonded matrix.

### **2.1.3 Waste facilities: treatment, processing, reprocessing and landfill sites**

#### **Waste facilities**

Factors that determine whether a waste facility licence is required include: the nature of the waste received; the annual quantity of waste received; and, in the case of landfills, whether the landfill is inside or outside an area comprising the Sydney metropolitan area and the Extended Regulated Area, or located within an environmentally sensitive area.

For the purpose of determining whether a waste facility requires a licence, *virgin excavated natural material, non-hazardous bulk agricultural or crop waste that is not putrescible* and *effluent* are not regarded as 'waste'. These materials therefore do not need to be considered when you are deciding whether a waste facility licence is needed.

The following premises do *not* require a waste facility licence:

- premises where the only type of waste disposed of is coal washery rejects or slags generated on those premises
- premises where only coal washery rejects or slags are used solely for the purposes of road or railway construction
- premises where the only type of waste disposed of is biosolids generated on those premises
- premises where organic waste (and no other type of waste) is applied for agricultural or environmental rehabilitation purposes
- mines (as referred to in Schedule 1 of the POEO Act), where the only waste disposed of is tailings, waste rock or inert waste generated on the mine
- electricity generating works (as referred to in Schedule 1 of the POEO Act), where the only waste disposed of is ash generated from the works
- other premises (referred to in Schedule 1 of the POEO Act), which are used solely for the purposes of disposing of any of the following types of waste:
  - non-hazardous tailings or waste rock generated on or at any mine, or
  - non-hazardous ash generated from any electricity-generating works.

#### **Landfill sites within the Sydney metropolitan area or Extended Regulated Area**

All landfill sites in the Sydney metropolitan area, or in the local government areas of Cessnock, Gosford, Kiama, Lake Macquarie, Maitland, Newcastle, Port Stephens, Shellharbour, Shoalhaven, Wingecarribee, Wollongong and Wyong must be licensed unless they fit one of the following categories:

- landfills that receive only coal washery rejects or slags at a rate of not more than 20,000 tonnes per year, or
- landfills that are situated on residential premises, or on land used principally for farming operations, and which only dispose of waste generated on those premises, or
- landfills that receive no more than 20,000 tonnes of inert waste only, over any period of time, and only if the disposal of the waste is incidental or ancillary to the land being used for a purpose other than as a landfill site (for example, for the construction of buildings or roads or other similar types of infrastructure development).

#### **Rural landfill sites which are *not* in 'environmentally sensitive areas'**

Rural landfills (that is the ones outside the Sydney metropolitan area, or in the local government areas of Cessnock, Gosford, Kiama, Lake Macquarie, Maitland, Newcastle, Port Stephens, Shellharbour, Shoalhaven, Wingecarribee, Wollongong and Wyong) will require a licence if they receive:

- over 5000 tonnes per year of solid waste or solid waste and inert waste
- over 20,000 tonnes per year of any waste
- over 20,000 tonnes per year of coal washery rejects or slags (or both)

- any amount of hazardous waste, industrial waste, Group A waste and Group B waste for disposal except the following:
  - where the only hazardous, industrial, Group A or Group B waste that is disposed of is asbestos waste, or
  - where the landfills are operated by a local authority and where the only hazardous, industrial, Group A or Group B waste that is disposed of is asbestos waste, liquid grease-trap waste or clinical waste.

#### **Landfill sites in 'environmentally sensitive areas'**

Landfill sites in 'environmentally sensitive areas' (listed in Technical Appendix 8 of these guidelines) will also need to be licensed, except in the following cases:

- landfills that are within an environmentally sensitive area by reason only of being located within 250 metres of a residential zone or of a dwelling, school or hospital not associated with the landfill site, *and* that:
  - receive only coal washery rejects or slags at a rate of not more than 20,000 tonnes per year, or
  - were in operation as at 30 June 1997 and receive no more than 200 tonnes of waste per year
- landfills that are situated on residential premises, or on land used principally for farming operations, and that dispose of only waste generated on those premises.

#### **Used tyre treatment, processing, storage and disposal**

Facilities that treat, process or dispose of tyres require a licence if:

- they treat, process or dispose of more than 5000 tonnes per year of tyres (including shredded tyres and tyre pieces)
- they store more than 50 tonnes of tyres at any one time (including shredded tyres and tyre pieces).

#### **Waste treatment, processing, reprocessing and disposal**

Facilities that treat, process, reprocess or dispose of any amount of hazardous waste, industrial waste, Group A waste and Group B waste require an environment protection licence, with the following exceptions:

- facilities that only treat, process or reprocess sewage, or gases specified as Dangerous Goods Class 2 in the 6th edition of the *Australian Code for the Transport of Dangerous Goods by Road and Rail*, in force as at 1 January 1998, or
- facilities that only treat, process or reprocess waste that is generated on site, or
- facilities that only lawfully discharge waste into a sewer.

#### **Waste storage, transfer or recovery**

- Facilities that store or transfer any waste, or that recover (by separating or processing) any waste in quantities exceeding 30,000 tonnes per year, require an environment protection licence.
- Facilities that store any amount of hazardous waste, industrial waste or Group A waste require an environment protection licence, with some exceptions. (See Section 2.1.1 above.)

## Waste incinerators

The requirement for persons operating incinerators to hold an environment protection licence depend on the type and quantity of waste involved. The following will require a licence:

- facilities incinerating any quantity of chemical waste
- facilities incinerating any quantity of cytotoxic waste
- facilities incinerating more than 25 tonnes per year of clinical waste
- facilities incinerating more than 25 tonnes per year of quarantine waste
- facilities incinerating more than 1 tonne per hour of any other type of waste.

### 2.1.4 Mobile waste processing

Mobile waste processors who treat, process or reprocess hazardous waste, industrial waste or Group A in any quantities require an environment protection licence.

The definition of **mobile plant** in Schedule 1 Part 2 of the *Protection of the Environment Operations Act 1997* is as follows: any equipment or machinery that:

- (a) is capable of carrying on any one or more of the activities referred to in this Schedule, and
- (b) is capable of moving under its own motive power or of being transported, and
- (c) is operated at a particular site on a temporary basis only (that is, for a total period of not more than 6 months in any 12-month period at that site).

Note that a non-premises-based activity that is carried on by mobile plant will revert to being a premises-based activity for licensing purposes if the mobile plant is operated at the particular site for a total period of more than 6 months in any 12-month period.

**'Mobile waste processing'**, which is a mobile-plant scheduled activity, is defined as being 'the treatment, processing or reprocessing of hazardous waste, industrial waste or Group A waste (or any combination of those types of waste) by mobile plant and that is carried on for business or commercial purposes'.

The advantage of holding a non-premises-based licence for mobile waste processing is that persons who operate such 'mobile' equipment (that is, equipment that stays at any one site for a total period of not more than 6 months in any 12-month period) will need to hold only one licence regardless of where they operate, rather than each premises where the mobile plant operates needing to hold a licence.

## 2.2 Who is responsible for what under the licensing scheme?

Understanding and working within a licensing scheme relies on generators, transporters, treatment and disposal operators and mobile waste processors being able to clearly identify their wastes. It also relies on everyone understanding their responsibilities and accountabilities for properly identifying and managing wastes.

### **2.2.1 Generators**

The primary responsibility of the generator (and in some cases the storer) is to classify the waste properly (irrespective of whether it is going to be disposed of or reprocessed), to use a licensed transporter (where the waste to be transported is industrial waste, hazardous waste, Group A waste, Group B waste or Group C waste), and to ensure that the wastes are taken to suitable mobile waste processors or waste facilities. If the waste is hazardous waste, industrial waste or Group A waste, the generator must also obtain a consignment authorisation number from a waste facility or mobile waste processor for waste that is to be transported from the premises, complete an approved waste data form about the consigned waste, and provide copies to the transporter.

### **2.2.2 Transporters**

All transporters must be aware of what sort of waste is being carried. This is crucial so they know whether a licence is required to transport the waste, and so the waste can be transported to a suitable mobile waste processor or waste treatment, processing or reprocessing facility. If the waste is hazardous waste, industrial waste or Group A waste, the transporter must carry, with each load, duly completed waste data forms about the consigned waste, and must provide a copy of each to the waste facility or mobile waste processor to which the load is delivered.

It is an offence under Section 143 'Unlawful transporting of waste' in the Operations Act if a person transports waste to a place that cannot lawfully be used as a waste facility for that waste. Both the transporter and the owner of the waste (if not the same) may be guilty of an offence in the event of unlawful disposal. The maximum penalty is \$250,000 for a corporation or \$120,000 for an individual.

### **2.2.3 Waste treatment or reprocessing facilities**

Waste treatment, processing or reprocessing facilities must know the types and quantities of the waste they receive and the characteristics of the site where the facility is located. If a licence is needed it will specify what sorts of wastes can be received, and while the primary responsibility for assessing and classifying the wastes rests with the generator, the facility must have a system for screening and recording wastes received to ensure that it handles only those wastes it is licensed to take. If the waste is hazardous waste, industrial waste or Group A waste, operators must ensure that they receive duly completed waste data forms about each load of waste received from transporters, and verify that each has a valid consignment authorisation number issued by the waste facility.

### **2.2.4 Mobile waste processors**

Mobile waste processors are responsible for knowing the type and quantity of waste they receive, assessing and classifying any waste residues they generate, and obtaining a licence from the EPA. Licences for mobile waste processors will give details of the sorts of wastes that can be received for treatment, processing or reprocessing.

While the primary responsibility for assessing and classifying the wastes rests with the generator, the operator must have a system for screening and recording wastes received to ensure that it handles only those wastes it is licensed to take. Operators must ensure that they receive duly completed waste data forms about each load of waste received from transporters, and verify that each has a valid consignment authorisation number issued by the mobile waste processor.

## 2.3 Requirements for activities and facilities that do not have to be licensed

There are standard environment protection and reporting requirements for certain unlicensed operations; these are set out in the Protection of the Environment (Waste) Regulation 1996.

Clauses 16 and 17 of this Regulation allow for persons or bodies other than the EPA (for example, local councils and waste boards) to be 'approved' (empowered) to require information to be provided by non-licensed waste generators and/or transporters concerning the generation, storage, transporting, treatment or disposal of waste under their control.

### 2.3.1 Non-licensed hazardous, industrial or Group A waste generating or storage activities

Persons who generate hazardous waste, industrial waste or Group A waste for business or other commercial purposes and who are not required to hold a licence under the Act are specified in the regulation as a 'non-licensed waste activities'. Clause 16 of the Waste Regulation applies to any such 'non-licensed waste activity'.

These activities must comply with the following environment protection standards to ensure that they do not harm the environment:

- the waste must be stored in an environmentally safe manner
- the waste must not be stored, or come into contact with, any incompatible waste
- the EPA (or such other person or body as may be approved) must be provided with such information as it may require concerning the generation, storage, treatment or disposal of the waste, and such information must be retained for a period of at least three years from when it was provided
- if the waste is transported from the premises the waste generator must do the following (except if they use an 'authorised contractor'):
  - obtain a consignment authorisation number for the waste from the waste facility or mobile waste processor to whom the waste is to be delivered, and
  - complete, to the required extent, an approved waste data form in relation to the consigned waste, and give a copy of the form to the person transporting the waste,
  - ensure that the waste data form is completed accurately, is retained for a period of not less than three years from the time the form was completed, and is made available for inspection by an authorised officer on request
- if the waste transported from the premises is over 200 kg in quantity, the waste generator must ensure that the transporter is licensed
- if the waste is transported from the premises to an interstate location and the waste is 'controlled waste' within the meaning of the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure*, made under the *National Environment Protection Council Act 1994* of the Commonwealth on 26 June 1998, the waste generator must comply with the requirements of that Measure
- if the waste is transported from the premises, the waste generator must ensure that the waste is transported:
  - to a waste facility that is licensed under the Act, or
  - to a person carrying on mobile waste processing that is licensed under the Act, or
  - to a place that can otherwise lawfully be used as a waste facility for that waste

- if the waste is transported from the premises, the waste generator must accurately identify the waste (including identification in accordance with the relevant description set out in Technical Appendix 4 of these guidelines) and advise the transporter accordingly
- the waste generator must inform the EPA (or such other person or body as may be approved for the purposes of this clause) of any suspected breach of the Act or this Regulation in connection with the transportation of the waste from the premises.

There are some exemptions from complying with the requirements of obtaining a 'consignment authorisation number' and completing an 'approved data form', noted above. The exemptions apply in cases where:

- the waste is asbestos waste or clinical waste (excluding recognisable body parts), or
- the waste generator has entered into a written agreement with an 'authorised contractor' (see definition below) for the transportation of the waste from the premises, in which case the waste generator must do the following before the waste is transported from the premises:
  - make a record of the name, address and licence number of the authorised contractor
  - retain that record and a copy of the agreement for a period of at least three years from the date the agreement was made
  - make the record and copy of the agreement available for inspection by an authorised officer on request
  - accurately identify the waste, and advise the authorised contractor accordingly for each load
  - inform the EPA (or such other person or body as may be approved) if the waste generator does not, within 21 days of the waste being collected by the authorised contractor, receive a receipt from the authorised contractor detailing the name and address of the person to whom the waste was delivered
  - keep each receipt that is received for a period of at least three years from the date of the collection of the waste for each load
  - make all such receipts available for inspection by an authorised officer on request.

An **authorised contractor** means a person who:

- is licensed under the Act to transport waste, and
- is specifically authorised under that licence:
  - to transport waste from premises on which non-licensed waste activities are carried on, and
  - to perform the requirements of obtaining a 'consignment authorisation number' and completing an 'approved data form', noted above, on behalf of the non-licensed waste activity.

### **2.3.2 Non-licensed hazardous, industrial, Group A, Group B or Group C waste transporters**

Persons who transport industrial, hazardous, Group A, Group B or Group C wastes for fee or gain and who are not required to hold a licence under the Act are specified in the regulation as a 'non-licensed waste transporters'. Clause 17 of the Waste Regulation applies to any such 'non-licensed waste transporters'.

Requirements relating to non-licensed waste transporters in Clause 17 are:

- any vehicle used to transport waste must:
  - be kept in a clean condition, and

- be constructed and maintained so as to prevent spillage of waste
- any container used to transport waste must be safely secured on the vehicle carrying the container
- any vehicle used to transport waste must be covered when loaded so as to prevent spillage and loss of waste and the emission of odours
- incompatible wastes must not be mixed or transported together on any vehicle used to transport waste
- any hazardous waste or industrial waste transported must not be mixed with any other type of waste or with any other material
- any material segregated for recycling that is transported must not be mixed with other waste
- if any hazardous waste, industrial waste or Group A waste (not being asbestos waste or clinical waste, but including recognisable body parts) is transported, the transporter must:
  - obtain a copy of the waste data form from the occupier of the premises from which the waste is being transported (being the approved waste data form required under the occupier's licence or by the Waste Regulation and that has been completed by the occupier to the required extent)
  - ensure that a copy of the form is kept in the vehicle transporting the waste while it is being transported
  - complete the waste data form to the required extent
  - give a copy of the form to the occupier of the waste facility, or the operator of the mobile plant, to which the waste is transported
  - retain a copy of the form for a period of not less than three years from the time the form was completed
- any waste transported must be transported:
  - to a waste facility that is licensed under the Act, or
  - to a person carrying on mobile waste processing that is licensed under the Act, or
  - to a place that can otherwise lawfully be used as a waste facility for that waste
- the occupier of the waste facility—or the operator of the mobile plant—to which the waste is transported must be advised of the type of waste before it is unloaded
- the transporter must provide the EPA (or such other person or body as may be approved) with such information as they may require in relation to the transportation of waste, and such information must be retained by the transporter for a period of at least three years from the time it was provided
- the transporter must inform the EPA (or such other person or body as may be approved) of any suspected breach of the Act or this Regulation in connection with the transportation of waste by the transporter.

### **2.3.3 Non-licensed landfills**

Clause 15 of the Waste Regulation requires all occupiers of non-licensed landfills to report the following information to the EPA:

- the location of the landfill site
- the name and address of the occupier of the landfill site.

The above requirements do not apply to landfills that receive only virgin excavated natural material, or to landfills where the disposal of waste is not for business or other commercial purposes.

The EPA can also ask unlicensed landfills for other information in a specified form; the landfill is obliged to provide this information.

## SECTION 3 CLASSIFYING WASTES

### 3.1 Differentiating non-liquid and liquid wastes

All waste is classified into one of three categories: non-liquid, liquid or gaseous.

For waste to be considered *non-liquid* it must meet **all** of the following requirements:

- it has an angle of repose of greater than five degrees (5°)
- it has no free liquids when tested in accordance with the USEPA Paint Filter Liquids Test—Method 9095 (USEPA 1986)
- it liberates no free liquids when transported
- it does not become free flowing at or below 60°C or when transported
- it is spadeable.

All **other waste** that is not gaseous is considered to be *liquid waste*.

### 3.2 Classifications of non-liquid and liquid wastes in the Operations Act

The classifications of *inert waste*, *solid waste* and *industrial waste* apply only to non-liquid wastes.

The classification of *hazardous waste* can apply to both to liquid and non-liquid wastes.

The classifications of Group A, Group B and Group C waste apply only to liquid wastes. In other words:

#### Types of liquid waste:

- hazardous
- Group A
- Group B
- Group C
- non-controlled aqueous liquid

#### Types of non-liquid waste:

- hazardous
- industrial
- solid
- inert

Table 1 lists wastes that are already classified by the EPA as inert.

Table 2 lists wastes that are already classified by the EPA as solid.

Table 3 lists wastes that are already classified by the EPA as industrial.

Table 4 lists wastes that are already classified by the EPA as hazardous.

Table 5 lists Group A, Group B and Group C wastes.

Note that the non-liquid wastes listed in Tables 1, 2, 3 and 4, and the liquid wastes listed in Tables 4 and 5 (with the exception of controlled aqueous liquid wastes), do not have to be assessed according to the methods described in Technical Appendix 1.

A liquid classified in Group B or C will not be classified as Group A unless that liquid is contaminated with other waste(s). For example, liquid grease-trap wastes where, in some cases, the percentage of grease exceeds 20% of the total liquids will always be Group B. On the other hand, if the liquid grease-trap waste is contaminated with, say, chemicals, solvents or mineral oils, then it may be classified as Group A.

<b>Table 1: Non-liquid waste types that are classified in Schedule 1 Part 3 of the Operations Act as inert waste</b>
<b>Waste type or stream</b>
<p>‘Virgin excavated natural material (eg clay, gravel, sand, soil and rock) that is not mixed with any other waste and that:</p> <p>(a) has been excavated from areas that are not contaminated, as a result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphidic ores or soils, or</p> <p>(b) consists of excavated natural materials that meet such criteria as may be approved by the EPA.’</p>
<p>‘Building and demolition waste (eg bricks, concrete, paper, plastics, glass, metal and timber<sup>1</sup>), being material resulting from the demolition, erection, construction, refurbishment or alteration of buildings or from the construction, repair or alteration of infrastructure-type development such as roads, bridges, dams, tunnels, railways and airports, and which:</p> <p>(a) is not mixed with any other type of waste, and</p> <p>(b) does not contain any asbestos waste.’</p>
‘Asphalt waste (eg resulting from road construction and water proofing works).’
‘Biosolids categorised as Unrestricted Use, or as Restricted Use 1, in accordance with the criteria set out in the Biosolids Guidelines.’
‘Used, rejected or unwanted tyres (including shredded tyres or tyre pieces).’
‘Office and packaging waste (eg paper, plastics, glass, metal and timber) that is not mixed with any other type of waste.’
<p><b>Note:</b></p> <p>1. Includes treated timber such as copper chrome arsenate (CCA), high temperature creosote (HTC), pigmented emulsified creosote (PEC) and light organic solvent preservative (LSOP) treated timber.</p>

<b>Table 2: Non-liquid waste types that are classified in Schedule 1 Part 3 of the Operations Act as solid waste</b>
<b>Waste type or stream</b>
‘Municipal waste, being waste consisting of: (a) household domestic waste that is set aside for kerb side collection or delivered by the householder directly to a waste facility, or (b) other types of domestic waste (eg domestic clean-up and residential garden waste), or (c) local council generated waste (eg waste from street sweeping, litter bins and parks).’
‘Biosolids categorised as Restricted Use 2 or 3 in accordance with the criteria set out in the Biosolids Guidelines, manure and night soil.’
‘Waste contaminated with lead from residential premises or educational or child care institutions.’
‘Cleaned pesticide, biocide, herbicide or fungicide containers.’ <sup>1</sup>
‘Drained and mechanically crushed oil filters, and rags and oil absorbent materials (not containing free liquids) from automotive workshops.’
‘Disposable nappies, incontinence pads and sanitary napkins.’
‘Food waste.’
‘Vegetative waste generated from agriculture or horticulture.’
‘Non-chemical waste generated from manufacturing and services (including metal, timber, paper, ceramics, plastics, thermosets and composites).’
Note: 1. The cleaning method used should be as good as or better than the triple-rinsing method developed by AVCARE and reproduced in Technical Appendix 3.

<b>Table 3: Non-liquid waste types that are classified in Schedule 1 Part 3 of the Operations Act as industrial waste</b>
<b>Waste type or stream</b>
‘Stabilised asbestos waste in bonded matrix.’
‘Asbestos fibre and dust waste (eg waste resulting from the removal of thermal or acoustic insulating materials or from processes involving asbestos material, and dust from ventilation collection systems).’
‘Any non-liquid radioactive waste that: (a) contains a substance that emits ionising radiation spontaneously, and (b) has a specific activity ratio or a total activity ratio (as determined in accordance with the procedures set out in the Waste Guidelines [these guidelines]) that is greater than one.’

<b>Table 4: Non-liquid and liquid waste types that are classified in Schedule 1 Part 3 of the Operations Act as hazardous</b>
<b>Waste type or stream</b>
<p>'Any waste that meets the criteria for assessment as dangerous goods under the <i>Australian Code for the Transport of Dangerous Goods by Road and Rail</i>, and categorised as one of the following:</p> <ul style="list-style-type: none"> <li>(a) explosives,</li> <li>(b) gases (compressed, liquefied or dissolved under pressure),</li> <li>(c) flammable solids (excluding organic waste, and all physical forms of carbon such as activated carbon and graphite),</li> <li>(d) flammable liquids,</li> <li>(e) substances liable to spontaneous combustion (excluding organic waste, and all physical forms of carbon such as activated carbon and graphite),</li> <li>(f) substances which in contact with water emit flammable gases,</li> <li>(g) oxidising agents and organic peroxides,</li> <li>(h) toxic substances,</li> <li>(i) corrosive substances.' </li></ul>
'Pharmaceuticals and poisons (being waste generated by activities carried out for business or other commercial purposes and that consists of pharmaceutical or other chemical substances specified in the Poisons List under the <i>Poisons and Therapeutic Goods Act 1966</i> ).'
'Clinical waste.'
'Cytotoxic waste.'
'Sharps waste.'
<p>'Any radioactive waste, being waste that:</p> <ul style="list-style-type: none"> <li>(a) contains a substance that emits ionising radiation spontaneously, and</li> <li>(b) has a specific activity greater than 100 becquerels per gram, and</li> <li>(c) consists of, or contains more than the prescribed activity of any radioactive element listed in Schedule 1 to the Radiation Control Regulation 1993.'</li> </ul>
<p>'Any liquid radioactive waste, being waste that:</p> <ul style="list-style-type: none"> <li>(a) contains a substance that emits ionising radiation spontaneously, and</li> <li>(b) has a specific activity ratio or a total activity ratio (as determined in accordance with the procedures set out in the Waste Guidelines [these guidelines]) that is greater than one.'</li> </ul>
<p>'Any declared chemical waste that:</p> <ul style="list-style-type: none"> <li>(a) is the subject of a chemical control order under the <i>Environmentally Hazardous Chemicals Act 1985</i>, and</li> <li>(b) is not permitted to be disposed of to a landfill site because of such an order.'</li> </ul>
'Quarantine waste.'

<b>Table 5: Liquid waste types that are classified in Schedule 1 Part 3 of the Operations Act</b>			
<p><b>Hazardous waste:</b> Wastes (liquid) that are classified as hazardous (as reproduced in Table 4 of these guidelines).</p>	<p><b>'Group A waste:</b> (a) Non-aqueous liquid waste<sup>1</sup>. (b) Controlled aqueous liquid waste<sup>2</sup>.'</p>	<p><b>'Group B waste:</b> (a) Liquid food waste<sup>1</sup>. (b) Liquid grease-trap waste resulting from the preparation or manufacturing of food.'</p>	<p><b>'Group C waste:</b> Liquid waste from human waste storage facilities or waste treatment devices<sup>1</sup> (within the meaning of the Waste Guidelines [these guidelines]), including pump-out waste and septage.'</p>
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. For definitions of these terms see: Definitions and Glossary.</li> <li>2. See Section 3.3 below and Part 4 of Technical Appendix 1.</li> </ol>			

### 3.3 Classifying and assessing liquid wastes

#### 3.3.1 Introduction

Liquids that cannot be lawfully discharged directly into waters and cannot be or are not discharged to the sewer may be **subject to licensing under the Operations Act**.

Legislation dealing with discharges to sewer include the *Water Board (Corporatisation) Act 1994*, *Hunter Water Board (Corporatisation) Act 1990*, Section 68 of the *Local Government Act 1993* and Section 43 (4)(b) of the *Local Government (Water, Sewerage and Drainage) Regulation 1993*.

#### Summary of classification options

Once it is clear that a waste is liquid, it needs to be classified in order to establish how it is allowed to be managed under the Operations Act and whether a licence is required.

There are two possible approaches to classifying liquid wastes:

**Scenario 1:** The liquid waste is clearly listed in Schedule 1 Part 3 of the Operations Act as hazardous waste (Table 4), or in Group A, Group B or Group C (Table 5), and an immediate decision can be made about storage, treatment, reprocessing or disposal, based on the regulations.

**Scenario 2:** The liquid waste is not listed in Table 4 or Table 5 and must be assessed.

If the waste is assessed as a *controlled aqueous liquid waste*, it is classified as a Group A waste and a licence is required for waste generators, storers, transporters, mobile waste processors or waste facilities.

If the waste is assessed as a *non-controlled aqueous liquid waste*, a licence is usually not required.

Liquid wastes can range from almost true liquids to wastes that contain significant quantities of solids and only just miss out on being classified as *non-liquid* (perhaps because they contain some free liquids or fail to pass the 5° minimum angle of repose requirement). Where possible, such wastes should be separated into liquid and non-liquid fractions, and each component should be assessed, classified and managed separately according to the relevant provisions in these guidelines.

To help waste generators to classify their liquid wastes, the following five distinct groupings may be useful:

1. Water containing larger quantities of filtrable and/or non-filtrable solids.

This grouping is most likely to be *non-controlled aqueous liquids*, which are usually not subject to licensing as waste activities or waste facilities under the Operations Act. Examples are dredge spoil, mine tailings, inert power station ash slurries and other slurries, provided that none of them is contaminated with suspended or dissolved chemicals to an extent that would lead them to be assessed as *controlled aqueous liquid wastes*. (See Section 3.3.) Water separated from such liquids (after the settlement of solids) can usually be discharged into the environment, and this is often carried on according to the conditions of a licence under the Operations Act.

2. Water containing larger quantities of dissolved chemical substances.

These need to be assessed and classified according to this Section and Technical Appendix 1 unless:

- the mixture is already classified as hazardous according to Table 4, or
- the mixture satisfies the definition of non-aqueous liquid waste and is therefore classified as Group A waste, or
- the generator of the liquid waste decides (without testing) to obtain a licence and manage the waste as if it were a Group A waste.

3. Water containing larger quantities of nutrients.

- Waste water satisfying the definition of '**effluent**', which 'means:
  - (a) waste water from sewage collection or treatment plants, or
  - (b) waste water from collection or treatment systems that are ancillary to processing industries involving livestock, agriculture, wood, paper or food, being waste water that is conveyed from the place of generation by means of a pipe, canal or other conventional method used in irrigation (but not by means of a tanker or truck), or
  - (c) waste water from collection or treatment systems that are ancillary to intensive livestock, aquaculture or agricultural industries, being waste water that is released by means of a pipe, canal or other conventional method used in irrigation as part of day-to-day farming operations.'

is not considered as a 'waste' when determining whether a 'waste facility' licence is required for the irrigation (disposal to land) of these liquids. (See Section 2.1.3.)

In circumstances where the same liquids in (b) and (c) above do not satisfy the definition of effluent (because they are not directly irrigated), the information provided below should be considered.

- Other types of nutrient-rich waste water that do not satisfy the definition of effluent are likely to be Group B (for example, liquid grease-trap wastes and liquid wastes from the food industry) or Group C wastes (for example, septage and pump-out wastes). (For details see Table 5.)

#### 4. Non-aqueous liquids.

These will belong to Group A liquid wastes. (See Table 5.) Examples are oils, solvents, and solvent-containing liquids such as **uncured** solvent-based coatings and paints.

#### 5. Combinations of two or more of the above groupings.

These also need to be assessed and classified according to this Section and Technical Appendix 1 unless:

- the mixture is already classified as hazardous according to Table 4, or
- the mixture satisfies the definition of non-aqueous liquid waste and is therefore classified as Group A waste, or
- the generator of the liquid waste decides (without testing) to obtain a licence and manage the waste as if it were a Group A waste.

### 3.3.2 The liquid-waste-assessment process

In some cases the composition of a particular liquid waste may not be known, or the waste does not appear on the list of hazardous wastes (see Table 4) or Group A, Group B or Group C liquid wastes (see Table 5). In these cases, the waste generator will need to do a waste assessment to establish whether a licence is required. If a waste stream is of a fairly constant composition a one-off assessment to determine the characteristics and classification may be sufficient. If the waste stream is subject to variation (from one batch to another) an ongoing assessment program may be required.

Details about the assessment process are given in Technical Appendix 1, including:

- the steps to be taken in assessment
- sampling
- which contaminants to test for
- details of the tests to be applied.

The test used to assess the waste, the *Specific Contaminant Concentration (SCC)* test, is one that determines the concentration in mg/kg of each contaminant in the liquid-waste sample. The measure mg/kg, rather than mg/L, is used, since some liquid wastes can have significant quantities of solids present. The guidelines set different maximum levels for the concentration of individual contaminants; if these levels are exceeded for any contaminant, the waste will be assessed as *controlled aqueous liquid waste* and, therefore, classified as Group A liquid waste.

### 3.3.3 Rules for assessing and classifying liquid waste

The general rules set out below must be considered before assigning a final classification to the liquid waste:

- Liquid waste must be classified as one of the following categories: hazardous, Group A, Group B, Group C liquid waste or *non-controlled aqueous liquid waste*.

- Liquid waste classified as hazardous in Table 4 or as Group A, Group B or Group C waste in Table 5 cannot be reclassified as *non-controlled aqueous liquid waste* (using this assessment procedure), unless it has been treated to reduce or remove those characteristics that were responsible for the original classification.
- The person doing the assessment must decide which of the chemical contaminants listed in Table A1 are present in the liquid waste and assess each contaminant against the given criteria.
- If the liquid waste contains potentially toxic and/or ecotoxic contaminants not listed in Table A1, the person doing the assessment must ask the EPA to provide assessment criteria for these contaminants and assess the waste against these criteria as well.
- Even if only one out of many chemical contaminants present exceeds its respective criterion in Table A1, the liquid waste must be assessed as *controlled aqueous liquid waste* and, therefore, classified as Group A waste.
- Wastes that contain any natural or artificial substance that emits ionising radiation spontaneously must also be subjected to the classification procedure specified in Section 3.5.

See Technical Appendix 1 for a full description of the liquid-waste-assessment process.

## 3.4 Classifying and assessing non-liquid wastes

### 3.4.1 Introduction

For the generator (and in some cases the storer) of wastes there are two possible scenarios associated with identifying or classifying non-liquid wastes.

**Scenario 1:** The waste is clearly listed in Schedule 1 Part 3 of the Operations Act as inert, solid, industrial or hazardous and an immediate decision can be made about storage, treatment, reprocessing or disposal.

**Scenario 2:** The waste is not listed in Schedule 1 Part 3 of the Operations Act, and there is a need to assess it to identify its components so that the appropriate management requirements can be determined.

After waste is disposed of to land, it can undergo environmentally significant (physical, chemical or biological) changes. As a result the following potential environmental impacts need to be considered and managed:

- the release of greenhouse gases such as methane and carbon dioxide
- the release of nutrient-rich liquid (leachate), which, if allowed to contaminate ground water or surface waters, can encourage the formation of environmentally harmful algal blooms
- the release of liquids (leachates) containing chemical contaminants such as heavy metals and human-made chemicals, which, if allowed to contaminate soil, ground water or surface waters, can have undesirable effects on the health of humans, animals, plants or other living organisms.

In line with the potential environmental impacts discussed above, non-liquid waste is classified in the following order, ranging from the least harmful to the most harmful to the environment:

- *inert*—this waste type is the least likely to undergo environmentally significant transformations; therefore, it should not release significant quantities of greenhouse gases or leachates contaminated with nutrients and/or chemicals
- *solid*—this waste type can include putrescible waste and is considered to pose a higher environmental risk than inert waste, and consequently needs to be managed with greater care

- *industrial*—this waste type can contain somewhat higher (four times) levels of the contaminants than solid waste, and needs to be managed with more stringent environmental controls than solid waste
- *hazardous*—this waste type contains contaminants at levels high enough to require treatment to render them safe before disposal.

### 3.4.2 The non-liquid assessment process

In some cases the composition of a particular non-liquid waste may not be known, or the waste will not appear on the lists of inert, solid, industrial or hazardous wastes in Schedule 1 of the Operations Act. (See Tables 1, 2, 3 and 4.) In these cases the waste generator will need to do a waste assessment. If a waste stream is of a fairly constant composition, a one-off assessment to determine the characteristics and classification may be sufficient. If the waste stream is subject to variation (from one batch to another) an ongoing assessment program may be required.

The classification process for non-liquids focuses on the potential for the waste to release chemical contaminants into the environment through contact with liquids (leachates). Details about the assessment process are given in Technical Appendix 1, including:

- the steps to be taken in assessment
- sampling
- which contaminants to test for
- details of the tests to be applied.

The principal test used for assessing non-liquid waste is the *Toxicity Characteristics Leaching Procedure (TCLP)*, which estimates the potential for the waste to release chemical contaminants into a leaching liquid. This property is called the *leachable concentration* in this document. The guidelines set different maximum levels for the *leachable concentration* of each contaminant in order for waste to be classified as *inert* ( $\leq$  TCLP1), *solid* ( $\leq$  TCLP2) and *industrial* ( $\leq$  TCLP3). If the level exceeds TCLP3 the waste is classified as *hazardous*.

The standard pH for the leaching solutions used must be either  $4.93 \pm 0.05$  if the pH of the waste sample is less than 5.0, or  $2.88 \pm 0.05$  if the pH of the waste sample is greater than 5.0. In specific instances the EPA may permit the use of leachants of a pH other than those specified above. The EPA's written authorisation for using an alternative leachant must be sought in writing, with justification for the proposed variation. The testing of a non-putrescible waste type for disposal into a monofill or monocell that can be shown not to be subject to penetration by acidic leachate or ground water is an example of a situation in which such written authorisation may be granted by the EPA. (See Section 3.4.2 below.)

EPA approval may be obtained to use an alternative leachant for assessing and classifying waste for monocell or monofill disposal. To seek this approval, documentation must be provided to the EPA describing all alternative options to disposal that have been considered and the reasons for their rejection. For additional information on alternative management options for wastes such as industrial ash, dust, sludges or waste containing chemical contaminants refer to Sections 4.5 and 4.8; for contaminated soils refer to Section 5.2.

The second test used to complete the assessment of waste, the *Specific Contaminant Concentration (SCC)* test, is one that determines the *total concentration* of each contaminant in the waste sample. The guidelines set different maximum levels for the *total concentration* of each contaminant in order for waste to be classified as *inert* ( $\leq$  SCC1), *solid* ( $\leq$  SCC2) and *industrial* ( $\leq$  SCC3). If the level exceeds SCC3 the waste is classified as *hazardous*.

The use of *total concentration (SCC)* limits is a precaution against a scenario where, in the presence of a high concentration of a contaminant, the TCLP test gives a low result because of interference by certain other non-permanent factors in the waste, such as high alkalinity. There is a potential for these non-permanent factors to change with time, resulting in a much greater release rate for such contaminants. (See also the discussion of *immobilisation* below.)

The *contaminant threshold (CT)* values used in Table A3 were calculated from the corresponding *leachable concentration (TCLP)* values by multiplying them by 20. This is because for every gram (g) of waste subjected to extraction in the TCLP test, 20 millilitres (mL) of leachant are used. This means that if 20 mg/kg of a contaminant is present in the waste and is completely leached out in the test, the TCLP test result will be 1 mg/L. Thus if the *total concentration* for a contaminant is less than or equal to a particular *contaminant threshold (CT1, CT2 or CT3)* limiting value, then it is certain that if the *leachable concentration* value were to be determined for that contaminant, it can be only less than or equal to the corresponding *leachable concentration (TCLP1, TCLP2 or TCLP3)* limiting value.

**Both** the TCLP and SCC criteria must be satisfied before a waste can be classified as *inert, solid* or *industrial* unless the *immobilisation* of each contaminant exceeding the *total concentration* limit (SCC1, SCC2 or SCC3) is approved by the EPA (see section 3.4.4).

### 3.4.3 Rules for assessing and classifying non-liquid waste

Table 6 summarises the criteria used in the waste assessment process. The general rules given below must be considered before assigning a final classification to the waste:

- (a) Waste must be classified in one of the following categories in ascending order: inert, solid, industrial or hazardous waste.
- (b) Waste classified as solid, industrial or hazardous in Tables 1, 2, 3 and 4 in Section 3.2 cannot be reclassified into a lower category using this procedure, unless it has been treated to reduce or remove its hazardous characteristics.
- (c) Only waste meeting all of the criteria of *non-liquid* may be classified using this procedure.
- (d) In addition to meeting other requirements set out in this section, waste classified as inert waste using this procedure must also satisfy the criteria of *not capable of environmentally significant physical, chemical or biological transformation*. (See Definitions and Glossary.)
- (e) The person doing the assessment must decide which of the chemical contaminants listed in Tables A3 and A4 are present in the waste, and must then assess each contaminant against the given criteria.
- (f) If the waste contains potentially toxic and/or ecotoxic contaminants not listed in Tables A3 and A4, the person doing the assessment must ask the EPA to provide assessment criteria for these contaminants and then must assess the waste against these criteria as well.
- (g) The waste must be classified according to the highest category listed in (a) as a result of the assessment for all contaminants in (e) and (f); for example, if all but one of the contaminants meets the requirements for solid waste, and the final contaminant meets only the requirements of industrial waste, the waste must be classified as industrial waste.
- (h) Wastes that contain any natural or artificial substance that emits ionising radiation spontaneously must also be subjected to the classification procedure specified in Section 3.5.

<b>Table 6: Summary of criteria for chemical contaminants in waste classification</b>		
<b>Waste classification<sup>1</sup></b>	<b>Criteria<sup>2</sup> for classification (any of the alternative options given)</b>	<b>Comments</b>
<b>Inert</b>	1. <b>SCC test values</b> $\leq$ CT1.	TCLP test not required.
	2. <b>TCLP test values</b> $\leq$ TCLP1 <u>and</u> <b>SCC test values</b> $\leq$ SCC1.	
	3. <b>TCLP test values</b> $\leq$ TCLP1 <u>and</u> <b>SCC test values</b> $>$ SCC1 <u>and</u> immobilisation <sup>3</sup> is EPA-approved.	Without EPA approval of immobilisation, classify as solid, industrial or hazardous.
<b>Solid</b>	1. <b>SCC test values</b> $\leq$ CT2.	TCLP test not required.
	2. <b>TCLP1</b> $<$ <b>TCLP test values</b> $\leq$ TCLP2 <u>and</u> <b>SCC test values</b> $\leq$ SCC2.	
	3. <b>TCLP1</b> $<$ <b>TCLP test values</b> $\leq$ TCLP2 <u>and</u> <b>SCC test values</b> $>$ SCC2 <u>and</u> the immobilisation <sup>3</sup> is EPA-approved.	Without EPA approval of immobilisation, classify as industrial or hazardous.
<b>Industrial</b>	1. <b>SCC test values</b> $\leq$ CT3.	TCLP test not required.
	2. <b>TCLP2</b> $<$ <b>TCLP test values</b> $\leq$ TCLP3 <u>and</u> <b>SCC test values</b> $\leq$ SCC3.	
	3. <b>TCLP test values</b> $\leq$ TCLP3 <u>and</u> <b>SCC2</b> $<$ <b>SCC test values</b> $\leq$ SCC3.	
	4. <b>TCLP2</b> $<$ <b>TCLP test values</b> $\leq$ TCLP3 <u>and</u> <b>SCC test values</b> $>$ SCC3 <u>and</u> immobilisation <sup>3</sup> is EPA-approved.	Without EPA approval of immobilisation, classify as hazardous.
<b>Hazardous</b>	1. <b>TCLP test values</b> $>$ TCLP3.	Store or treat waste as appropriate.
	2. <b>TCLP test values</b> $\leq$ TCLP3 <u>and</u> <b>SCC test values</b> $>$ SCC3 <u>and</u> immobilisation is not EPA-approved.	Store or treat waste as appropriate.
Notes: <ol style="list-style-type: none"> <li>See also the general rules relating to waste classification (in Section 3.4.3) for other criteria that must be satisfied before the waste can be classified.</li> <li>These criteria apply to each toxic and ecotoxic contaminant present in the waste. (See Tables A3 and A4.)</li> <li>In certain cases the EPA will consider specific conditions, such as the segregation of such waste from all other types of waste in a monofill or a monocell, in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the <i>Draft Environmental Guidelines for Industrial Waste Landfilling</i> (EPA 1998a).</li> </ol>		

See Technical Appendix 1 for a full description of the non-liquid-waste-assessment process.

### 3.4.4 Immobilisation of chemical contaminants

The immobilisation of a contaminant in waste may be the result of a specific treatment process that the waste has been subjected to, or it may simply be a natural property of that type of waste. From a protection of the environment perspective, the key issue is whether this immobilisation (that is, resistance to being leached out of the waste) is likely to last in the long term.

It is critical that the immobilisation of the contaminant is sustained over time; otherwise the rate of release of the contaminant could exceed the rate at which the local environment can cope with it or safely mineralise it.

The EPA may approve the immobilisation of specified contaminant(s) contained in a particular type of waste. Approvals of the immobilisation of contaminants may be given in the following ways:

- the EPA can issue general approvals which would apply to all waste generated that has the properties specified in the approval, or
- for a specific waste as a result of an individual application received by the EPA.

In either case, an approval is subject to such conditions determined by the EPA, and remains in force until such time as it is revoked by the EPA.

Approvals of immobilisation may specify conditions relating to the subsequent storage, treatment or disposal of the waste. For example, in certain cases the EPA will consider specific conditions (such as the segregation of such waste from all other types of waste in a monofill or a monocell) in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. These conditions must not be contravened, otherwise a penalty may be imposed.

The following is the substance of the legal provisions in Clause 28 of the Waste Regulation in respect of 'Immobilisation of contaminants in waste':

- The EPA may approve the immobilisation of contaminants in waste by issuing a **general approval** or a **specific approval**. Such approvals have the effect of enabling the waste to which the approval relates to be assessed and classified in accordance with the procedures set out in Technical Appendix 1 of these guidelines.
- A general approval may be given by way of notice published in the Gazette. A specific approval may be given after an application is made to the EPA.
- An application for a specific approval must:
  - be in the approved form
  - be accompanied by such fee (if any) as the EPA may determine
  - identify the contaminants to be immobilised
  - be accompanied by such evidence as may be required by the EPA for the purposes of ascertaining whether the identified contaminants in the waste will be immobilised and will remain immobilised after disposal of the waste.
- The EPA may impose conditions to any approval, such as:
  - disposal of the waste to which the approval relates
  - notification of certain matters to the EPA
  - record-keeping requirements
  - the immobilisation of the contaminants concerned.
- In giving an approval, the EPA is required to identify a person (or class of persons) to whom the approval relates (the **responsible person**).

- A general approval may be amended or revoked by the EPA by notice published in the Gazette.
- A specific approval may be amended or revoked by the EPA by way of written notice given to the responsible person.
- If an approval is given, the responsible person must comply with the conditions to which the approval is subject; otherwise they will have committed an offence.

**For details on how to make applications for specific approvals of immobilisation, as well as how to use general approvals that are already in place, see Technical Appendix 2.**

Table A5 (on the last page of Technical Appendix 2) shows the waste types to which the EPA is already planning to grant general approval in respect of the immobilisation of specific contaminants; it also specifies the conditions relevant to each approval. If a waste is not covered by a general approval, an application for a specific approval has to be made to the EPA.

It is important to note that wherever EPA approval has been given for the immobilisation of the contaminant(s), the waste can be classified according to its TCLP test results alone. If the immobilisation of a contaminant for which TCLP limits are not specified in the guidelines is approved, the EPA will advise on the management options that are available for such materials.

### 3.5 Classification of wastes containing radioactive substances

Wastes containing any natural or artificial substance that emits ionising radiation spontaneously must be classified on the basis of both their radioactive and other characteristics, according to the stepwise procedure defined below:

1. The radioactivity of the waste must be assessed in accordance with the *Radiation Control Act 1990* and the *Radiation Control Regulation 1993*.
2. If the liquid or non-liquid waste has a specific activity greater than 100 becquerels per gram and consists of or contains more than the prescribed activity of any radioactive element listed in Schedule 1 of the *Radiation Control Regulation 1993*, whether natural or artificial, it must be classified as *hazardous waste*.
3. If the liquid or non-liquid waste has a specific activity of 100 becquerels per gram or less and/or consists of or contains equal to or less than the prescribed activity of any radioactive element listed in Schedule 1 of the *Radiation Control Regulation 1993*, whether natural or artificial, then the *total activity ratio* and the *specific activity ratio* must be calculated according to the mathematical expressions given below:

The **total activity ratio** is calculated using the expression:

$$\text{Total activity ratio} = (A1 \times 10^{-3}) + (A2 \times 10^{-4}) + (A3 \times 10^{-5}) + (A4 \times 10^{-6})$$

where A1 to A4 are the total activity of Group 1 to Group 4 radionuclides, as set out in Column 1 of Schedule 1 of the *Radiation Control Regulation 1993*.

The **specific activity ratio** is calculated using the expression:

$$\text{Specific activity ratio} = \text{SA1} + (\text{SA2} \times 10^{-1}) + (\text{SA3} \times 10^{-2}) + (\text{SA4} \times 10^{-3})$$

where SA1 to SA4 are the specific activity (of the material) of Group 1 to Group 4 radionuclides, as set out in Column 1 of Schedule 1 of the Radiation Control Regulation 1993.

*Specific activity* is defined in the *Code of Practice for the Safe Transport of Radioactive Materials, 1990*, which is referenced in clause 23 of the *Radiation Control Act 1990*. *Specific activity* of a radionuclide means the activity per unit mass of that nuclide. The specific activity of a material shall mean the activity per unit mass or volume of the material in which the radionuclides are essentially uniformly distributed.

The *total activity* of a material means the activity of the whole of the material in which the radionuclides are essentially uniformly distributed (determined using 1-kilogram representative samples of the whole material).

4. If the specific activity ratio, or total activity ratio, is greater than one, then the waste must be classified as follows:

*Liquid wastes* must be classified as *hazardous waste*.

*Non-liquid wastes* must be classified as *industrial waste* **unless** other characteristics of the waste mean that it must be classified as *hazardous waste* (for example, it may be classified as *hazardous waste* because it matches another one of the hazardous waste types or streams in Table 4, or it may contain chemical contaminants that will lead to its assessment as *hazardous waste* according to the chemical assessment procedure in Part 5 of Technical Appendix 1).

5. If the *specific activity ratio* and *total activity ratio* are equal to or less than one, then the waste must be classified as follows:

*Liquid wastes* must be classified according to their other characteristics (ignoring their low-level radioactivity), in accordance with the normal liquid-waste assessment and classification procedure specified in Section 3.

*Non-liquid wastes* must be classified according to their other characteristics (ignoring their low-level radioactivity), in accordance with the normal non-liquid-waste assessment and classification procedure specified in Section 3.

It is recommended that you read Section 4.6.4 *Managing and disposing of radioactive wastes*.

## **SECTION 4 MANAGING CLASSIFIED WASTE**

### **4.1 Transporting classified liquid wastes**

Depending on the classification of a liquid waste, the generator may need to use a licensed transporter and the waste may need to be taken to a licensed mobile waste processor or licensed waste facility.

In the case of liquid waste classified as hazardous, Group A, Group B or Group C, a licensed transporter must be used, subject to certain exceptions. (See Section 2.1.2.)

Transporters are responsible for ensuring that their transport licence allows them to carry the particular liquid waste, and for transporting the waste to an appropriately licensed facility or mobile waste processor.

If the waste is hazardous waste or Group A waste the transporter must carry, with each load, duly completed waste data forms about the consigned waste, and provide a copy of each to the waste facility or mobile waste processor to which the load is delivered.

### **4.2 Transporting classified non-liquid wastes**

Depending on the classification of a non-liquid waste, the generator may need to use a licensed transporter and the waste may be able to be taken to some disposal facilities and not others.

In the case of waste classified as industrial or hazardous and for the transportation of tyres, a licensed transporter must be used, subject to certain exceptions.

Transporters are responsible for ensuring that their transport licences allow them to carry the particular classified waste, and for transporting the waste to an appropriately licensed facility.

If the waste is hazardous waste or industrial waste, the transporter must carry (subject to some exceptions), with each load, duly completed waste data forms about the consigned waste, and provide a copy of each to the waste facility or mobile waste processor to which the load is delivered.

### **4.3 Disposing of classified liquid wastes**

Liquids are less easily contained than non-liquid wastes, so that their dissolved and suspended contaminants have a greater potential to contaminate land and waters than non-liquid wastes. This can occur by run-off to surface waters or by infiltration through soil to sub-surface waters. If liquid waste percolates through other (non-liquid) waste at the site before run-off or infiltration, it can also be further contaminated with dissolved or suspended contaminants.

For this reason it is most desirable that only non-liquid wastes should be accepted for disposal at landfills.

The majority of licensed landfills in the Sydney metropolitan area already have a condition in their licences prohibiting the receipt of liquid waste. It is intended that this condition will be gradually extended to other licensed landfills throughout NSW.

It is proposed that from 1 July 2000 the disposal of liquid wastes to non-licensed landfills be banned. It is further proposed that from 1 July 2001 the disposal of liquid wastes to licensed landfills also be banned. This ban would be introduced through changes to existing licence conditions for all licensed landfills.

Before the introduction of any ban, the EPA will consult with key stakeholders—including local government and the waste processing industry—to ensure that liquid wastes diverted from landfills can be either treated effectively by existing or new liquid waste-treatment facilities, or be able to be used beneficially.

- It is recognised that in rural NSW (that is, outside the Sydney Metropolitan Area and the Extended Regulated Area), infrastructure for the treatment of liquid wastes is not yet available in all areas. In this case, occupiers of licensed *solid waste class 1 landfills* are encouraged to notify the EPA that they are accepting liquid wastes such as septic tank pump-out wastes and grease-trap pump-out wastes, so that their licence conditions can be framed to enable this activity. These licence conditions would be of a temporary nature and valid only until 30 June 2001, in line with the proposed ban. Conditions will be granted only to those landfills at which, in the opinion of the EPA, the disposal of liquids will not create significant threats to the environment, and where alternative management options for the liquid wastes are deemed to be currently unfeasible.

Applications from rural licensed landfills will need to provide the information outlined in Part 1 of Technical Appendix 7. Landfill occupiers will also need to submit an annex to their existing Landfill Environment Management Plan (LEMP), describing how they propose to manage the receipt of such liquid wastes in a way that minimises the potential adverse environmental and/or health impacts of this activity.

Technical Appendix 7 contains two new benchmark techniques, one dealing with *aqueous liquid treatment ponds* and the other dealing with the *disposal of liquid waste to landfill*; these should help landfill occupiers to prepare the annex to their LEMPs.

If a licence is modified to permit the receipt of certain liquid-waste types, the licence will also have additional condition(s) attached to it to ensure that such waste is managed in an environmentally acceptable and sustainable manner.

Environmental or health issues arising from the receipt of liquid wastes at non-licensed landfills will be addressed through the *clean-up notices* under Part 4.2 of the Operations Act.

Note that even if liquid waste is assessed as *non-controlled aqueous liquid waste*, this does not mean that it can be discharged into the environment or that it is suitable for beneficial use. A person discharging *non-controlled aqueous liquid wastes* to land or waters who believes that in doing so he/she may pollute land or waters may consider applying for a licence issued under the *Protection of the Environment Operations Act 1997*. It is an offence to pollute waters unless the polluter holds a licence and complies with the conditions of that licence.

## 4.4 Disposing of classified non-liquid wastes

All licensed landfill facilities will be in one of the five classes or subclasses as follows:

Inert:           Class 2  
                  Class 1

Solid:           Class 2  
                  Class 1

Industrial:

Each class or subclass will have licence conditions setting out those wastes that may or may not be received, in accordance with Table 7.

Table 7: Disposal of wastes to the different classes of landfills	
Type	Wastes able to be received
Inert Waste Class 2 Landfill	Waste that is not a physically, chemically or biologically fixed, treated or processed waste that is assessed as <i>inert waste</i> following the technical assessment procedure outlined in Technical Appendix 1 of these guidelines, or that is specified as <i>inert waste</i> in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , <b>except</b> biosolids.
Inert Waste Class 1 Landfill	Waste assessed as <i>inert waste</i> following the technical assessment procedure outlined in Technical Appendix 1 of these guidelines, or that is specified as <i>inert waste</i> in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , and stabilised asbestos wastes in bonded matrix.
Solid Waste Class 2 Landfill	Waste, excluding putrescible waste, that is assessed as <i>inert waste</i> or <i>solid waste</i> following the technical assessment procedure outlined in Technical Appendix 1 of these guidelines, or that is specified as <i>inert waste</i> or <i>solid waste</i> in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , and asbestos waste (including asbestos waste in bonded matrix and asbestos fibre and dust waste resulting from the removal of thermal or acoustic insulating materials or from processes involving asbestos material, and dust from ventilation collection systems).
Solid Waste Class 1 Landfill	Waste, including putrescible waste, that is assessed as <i>inert waste</i> or <i>solid waste</i> following the technical assessment procedure outlined in Technical Appendix 1 of these guidelines, or that is specified as <i>inert waste</i> or <i>solid waste</i> in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , and asbestos waste (including asbestos waste in bonded matrix and asbestos fibre and dust waste resulting from the removal of thermal or acoustic insulating materials or from processes involving asbestos material, and dust from ventilation collection systems).
Industrial Waste Landfill	Waste that is assessed as <i>inert waste</i> , <i>solid waste</i> or <i>industrial waste</i> following the technical assessment procedure outlined in Technical Appendix 1 of these guidelines, or that is specified as <i>inert waste</i> , <i>solid waste</i> or <i>industrial waste</i> in Schedule 1 of the <i>Protection of the Environment Operations Act 1997</i> , except putrescible waste, unless specifically permitted in the licence.

The conditions of environment protection licences issued to scheduled landfill sites may permit the receipt of waste not listed in Table 7, such as specified types of liquid waste or small quantities of clinical waste at Solid Waste Class 1 Landfills operated by rural local councils.

Certain non-licensed rural landfills may also accept types of liquid waste or small quantities of clinical waste as specified in subclause (1)(b)(ii) of 'waste facilities' reproduced from Schedule 1 to the Operations Act in Technical Appendix 9 of these guidelines.

## 4.5 Treating and reprocessing classified wastes

Different waste types can require very different treatment methods to reduce the risk of environmental harm.

In particular, hazardous wastes must be treated prior to disposal.

Currently, the EPA does not have a list of approved waste treatment processes, and processes are assessed on a case by case basis.

Waste treatment processes should:

- be technically sound
- be environmentally safe
- reduce the level of contaminants or reduce the extent of the environmental hazard

- recover useful materials from the waste where possible
- not increase substantially the overall quantity of waste
- meet other EPA requirements for emissions to air and water, should they be specified
- meet other EPA requirements for the specific waste type, should they be specified.

Applications for approvals or licences for treatment technologies for scheduled chemical wastes and polychlorinated biphenyl wastes are assessed according to the following ANZECC protocols:

- National Protocol: Approval/Licensing of Trials of Technologies for the Treatment/Disposal of Schedule X Wastes.
- National Protocol: Approval/Licensing of Commercial Scale Facilities for the Treatment/Disposal of Schedule X Wastes.

## 4.6 Wastes requiring special handling and disposal conditions

### 4.6.1 Storing, handling, transporting and disposing of asbestos wastes

Clause 29 of the Waste Regulation contains new provisions for asbestos waste to replace the now revoked Asbestos Waste Chemical Control Order originally made under the *Environmentally Hazardous Chemicals Act 1985*.

**The provisions below apply to any activity that involves the transportation, collection, storage, or disposal of any type of asbestos waste, regardless of whether the activity is required to be licensed.**

**Transportation requirements** for asbestos waste are as follows:

- any type of asbestos waste must not be transported unless it is conveyed in a covered leak-proof vehicle so as to prevent any spillage or dispersal of the waste
- if asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is to be transported and the waste is not stored in a bag in accordance with the requirements for collection and storage (see below), the waste must be wetted before it is transported
- any vehicle used to transport any type of asbestos waste must be cleaned before leaving the landfill site at which the waste is disposed of, so as to ensure that all residual asbestos waste is removed from the vehicle.

**Collection and storage requirements** for asbestos waste are as follows:

- asbestos waste that is in the form of asbestos fibre and dust waste must be covered in such a manner as to prevent the emission of any dust
- asbestos waste that is in the form of asbestos fibre and dust waste must not be collected and stored except in accordance with the following procedures:
  - the waste must be collected and stored in impermeable bags
  - each bag must be made of heavy duty low-density polyethylene of at least 0.2-mm thickness, and have dimensions of no more than 1.2 m in height and 0.9 m in width
  - each bag must be sealed by a wire tie, and contain no more than 25 kg of waste
  - each bag must be marked with the words 'CAUTION ASBESTOS' in letters that are of not less than 40 mm and that comply with Australian Standard AS 1319—*Safety Signs for the Occupational Environment*

- if asbestos waste in any form is stored in a bag, the following procedures must be followed:
  - the bag must be placed in a leak-proof container that is used only for the purposes of storing asbestos waste, and
  - the container must be marked with the words ‘DANGER—ASBESTOS WASTE ONLY—AVOID CREATING DUST’ in letters that are of not less than 50 mm and that comply with Australian Standard referred to in paragraph above, and
  - the container must have a close-fitting sealed cover so as to prevent any spillage or dispersal of the waste
- asbestos waste in any form must not be stored except in accordance with the following procedures:
  - the waste must be stored in a secure area so as to prevent entry by unauthorised persons and to prevent the risk of environmental harm
  - the waste must, if it is practicable to do so, be stored separately from other types of waste
- if asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is stored otherwise than in a bag (as detailed above), the following procedures must be followed:
  - if it is practicable to do so, the waste must be wetted so as to prevent the emission of any dust
  - in wetting the asbestos waste, care must be taken to ensure that the wetting process does not cause any emission of dust or lead to any discharge of polluted water
  - the waste must be kept covered at all times

**Disposal requirements** for asbestos waste are as follows:

- asbestos waste in any form must be disposed of only at a landfill site that may lawfully receive the waste
- disposal of asbestos waste in any form must be by way of burial
- before disposal of the asbestos waste, arrangements must be made with the occupier of the landfill site for the purposes of ensuring that the asbestos waste will be covered:
  - initially to a depth of at least 0.5 m, and
  - finally to a depth of at least 1 m (in the case of stabilised asbestos waste in bonded matrix) or 3 m (in the case of asbestos fibre and dust waste) beneath the planned final land surface of the landfill site
- the asbestos waste must:
  - be disposed of in accordance with the arrangements in the paragraph above, and
  - be buried to the initial depth on the same day it is received at the landfill site
- in disposing of asbestos waste in any form at a landfill site, the waste must:
  - be unloaded in such a manner as to avoid the creation of dust, and
  - not be compacted before it is covered, and
  - not come into contact with any earthmoving equipment at any time
- The regulation prohibits the use of asbestos waste in any form as road making material.

The definition of **asbestos waste** specified by the regulation is as defined in these guidelines (see Definitions and Glossary).

#### 4.6.2 Managing and disposing of clinical waste

The following definition of clinical waste was developed by the NSW Department of Health. It replaces the two previous categories of clinical waste (*general clinical waste* and *special clinical waste*). *Clinical waste* is classified as *hazardous waste*. Sharps waste and cytotoxic waste are also classified as types of *hazardous waste* in Schedule 1, Part 3 of the Operations Act:

**'clinical waste** means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- (a) human tissue (other than hair, teeth and nails),
- (b) bulk body fluids or blood,
- (c) visibly blood-stained body fluids, materials or equipment,
- (d) laboratory specimens or cultures,
- (e) animal tissue, carcasses, or other waste, from animals used for medical research,

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.'

**'sharps waste** means any waste resulting from medical, nursing, dental, veterinary, pharmaceutical, skin penetration or other related clinical activity, and that contains instruments or devices:

- (a) that have sharp points or edges capable of cutting, piercing or penetrating the skin (e.g. needles, syringes with needles or surgical instruments), and
- (b) that are designed for such a purpose, and
- (c) that have the potential to cause injury or infection,

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.'

Other wastes that are classified separately as *hazardous waste* and that may be also be generated in a clinical setting are:

- radioactive substances
- cytotoxic wastes
- pharmaceuticals and poisons
- chemical wastes.

As a general rule, the above *hazardous wastes* should be managed separately from one another and from other wastes generated in a clinical setting that are not assessed and/or classified as *hazardous waste*. Effective source separation and segregation of the different waste streams in a clinical setting are essential for compliance with the legal requirements of the Operations Act and for protecting the health and safety of workers and the environment.

Once clinical waste has been treated by a method approved by the Director-General of the NSW Department of Health, it is no longer classified as clinical waste or as hazardous waste, and therefore it must be assessed and classified in accordance with the provisions in these guidelines.

Other waste types generated in a clinical setting that are *not* defined as *clinical waste* may be found under other classifications in Schedule 1 of the Operations Act such as:

- office and packaging waste (*inert waste*)

- non-chemical waste generated from manufacturing and services (*solid waste*)
- food waste (*solid waste*)
- disposable nappies, incontinence pads and sanitary napkins (*solid waste*).

For requirements relating to the need or otherwise for obtaining an *environment protection licence* as a waste activity (generation and/or storage of waste), see Section 2.1.1 of these guidelines.

Guidance relating to the management of *clinical waste* and other waste generated in a clinical setting may be found in the *Waste Management Guidelines for Health Care Facilities* (NSW Health 1998).

Recognising that doctors, dentists, hospitals and other generators of clinical waste located in remote parts of the NSW do not have access to facilities which treat clinical waste, provisions have been made for the landfill disposal in rural areas of very small quantities of clinical waste that does not contain recognisable body parts, sharps waste, cytotoxic waste or radioactive waste. The Protection of the Environment (Waste) Regulation 1996 has been amended to include a new Clause 30 to enable the landfill disposal of clinical waste in quantities of no more than 40 kg on each occasion in non-licensed landfills in rural areas, provided that the following conditions are met:

- the waste must be disposed of only at a waste facility that is operated by a local authority and located outside the Sydney metropolitan area or Extended Regulated Area
- the written approval of the local authority must be obtained before the waste is disposed of
- the waste to be disposed of must have been generated outside the Sydney metropolitan area or Extended Regulated Area
- the waste must not contain recognisable body parts, sharps waste, cytotoxic waste or radioactive waste
- the waste must be packaged in accordance with the requirements set out in the document called NSW Health: *Waste Management Guidelines for Health Care Facilities* issued by the Department of Health and dated August 1998
- the waste must not be disposed of in amounts that exceed 40 kg at any one time
- the waste must be buried, or be immediately contained, in a manner that prevents the waste coming into contact with any person or animal.

Any council outside the Sydney Metropolitan Area and the Extended Regulated Area will also be able to apply to the EPA to have the licence of their solid waste class 1 landfill modified in order to enable them to receive small quantities (no more than 200 kg on any one occasion) of clinical waste. The application would need to document that the council has no reasonable access to clinical waste-treatment facilities. The conditions would have similar limitations to those for unlicensed landfills, described above.

#### **4.6.3 Managing and disposing of radioactive wastes**

The principal legislation for the control of radioactive materials in NSW is the *Radiation Control Act 1990* (the Radiation Act) and Regulation (1993). The Radiation Act requires those who use or sell radioactive substances to hold a licence for all high activity sources that, when requiring disposal, correspond to the types of sources classified as Hazardous Waste in these guidelines. The Radiation Act also controls the disposal of such sources. Any person handling radioactive sources in this category requires a Radiation Act licence to do so.

The process that must be used for the classification of radioactive materials may be found in Section 3.5.

The *hazardous waste* criteria used in these guidelines have been extended downwards in activity by a factor of some 100, in the case of liquid radioactive wastes, to reflect the additional risk associated with liquid radioactive wastes. The corresponding classification for non-liquid radioactive wastes is *industrial waste*. In both cases the Radiation Act does not directly control the disposal of these low level radioactive wastes—rather, a system of licence conditions and *consent to dispose* is attached to a licence, either under the Radiation Act or the *Protection of the Environment Operations Act 1997*.

Radioactive material that has very low levels of activity (including materials with naturally occurring background levels) is recognised as being ‘below regulatory concern’. The criteria adopted in these guidelines for the levels of radioactivity that permit wastes to be classified in the inert waste, solid waste or non-controlled aqueous liquid waste categories closely relate to the international criteria used for assessing radioactive materials as being ‘below regulatory concern’. Disposal of such materials does not require formal approval, but you should seek advice in the case of liquid wastes to ensure compliance with other requirements (for example, trade waste agreements).

#### **4.6.4 Management of approved immobilised non-liquid wastes**

General and specific approvals relating to the immobilisation of contaminants in waste, and how such approvals affect the process of assessing and classifying wastes, are discussed in section 3.4.4 and Technical Appendix 2.

Such approvals may specify conditions relating to the subsequent storage, treatment or disposal of the waste, and these must not be contravened. A penalty (as specified in Clause 27 of the Waste Regulation) may be imposed for failure to comply with all of the conditions of such approvals.

Immobilised wastes containing Scheduled Chemical Wastes or polychlorinated biphenyls in concentrations of 50 mg/kg or greater cannot be disposed of to landfill.

For details of how the approvals system works, how to manage approved immobilised non-liquid wastes, and also how to make applications for approvals of immobilisation, see Technical Appendix 2.

### **4.7 Record-keeping requirements for classified wastes**

Licensed and non-licensed waste activities, waste transporters and waste facilities need to maintain records of waste movements. Licensed landfill occupiers are required to report periodically to the EPA. These requirements ensure that records of industrial, hazardous, Group A, Group B or Group C waste movements are maintained and are used to verify that these wastes have been appropriately managed. Reporting waste movements also provides data to evaluate the effectiveness of waste reduction programs, and meets national and international reporting obligations.

The reporting requirements provide a robust and auditable waste-tracking system to replace the previous hazardous-waste consent and tracking system (the five-docket system).

All of the following who hold licences will be required, via licence conditions, to record details of waste movements, and, in the case of hazardous, industrial and Group A wastes, to provide reports periodically to the EPA:

- generating and storage activities involving industrial, hazardous or Group A waste
- waste transporters carrying industrial, hazardous, Group A, Group B or Group C waste
- waste facilities receiving industrial, hazardous, Group A or Group B waste

- mobile waste processors receiving industrial, hazardous or Group A waste.

The Waste Regulation sets out record-keeping requirements for nominated non-licensed waste facilities, waste activities and transporters in clauses 15, 16 and 17.

#### **4.7.1 Non-licensed hazardous, industrial and Group A waste generating and storage activities**

Clause 16 of the regulation imposes the following record-keeping requirements on non-licensed waste activities:

- The EPA (or such other person or body as may be approved by the EPA) must be provided with such information as they may require in relation to the generation, storage, treatment or disposal of the waste. Such information must be retained by the person for a period of at least three years from the time it is provided.
- The approved waste data form required to be completed in relation to any industrial, hazardous or Group A waste (or a combination of these) transported from the premises for treatment or disposal must be kept for a period of at least three years from the time the form was completed. See section 2.3.1 for further details.

#### **4.7.2 Non-licensed transporters**

Clause 17 of the regulation imposes the following record-keeping requirements on non-licensed waste transporters:

- The EPA (or such other person or body as may be approved by the EPA) must be provided with such information as they may require in relation to the transportation of waste. Such information must be retained by the transporter for a period of at least three years from the time it is provided.
- The approved waste data form which the transporter is required to complete in relation to any industrial, hazardous or Group A waste (or a combination of these) that is transported, must be kept for a period of at least three years from the time the form was completed. See section 2.3.2 for further details.

#### **4.7.3 Reporting requirements for non-licensed landfill sites**

Clause 15 of the regulation imposes the following record-keeping requirements on non-licensed landfill sites:

- The EPA may (by notice in writing) require the occupier to provide certain information relating to the landfill site. The occupier must provide the information to the EPA within 30 days of receiving the notice.
- Within 30 days of the end of each subsequent financial year, the occupier of a landfill site must provide the EPA with such information as the EPA requires in respect of the landfill site (in the approved form).

### **4.8 Good management practices for all classes of waste**

Waste is a resource, with reuse, recycling, reprocessing and processing being strongly preferred options over disposal, as has been made clear in the establishment of the waste management hierarchy.

#### 4.8.1 Waste separation

It makes good sense to keep various components of a waste stream separate whenever practicable, both from financial and conservation points of view. For example:

- Industrial, hazardous or Group A waste (which may be a very small fraction of the total waste), when mixed with other wastes, can turn all the waste into industrial, hazardous or Group A waste—this can result in much higher management costs.
- Recyclable waste, when kept separate from other waste, can generate income (for example, metals, clean office paper and so on) rather than incur a disposal cost.
- The fewer the types of waste materials that are mixed together, the easier it is to assess and classify the waste.
- Some types of waste may have lower disposal costs than others (for example, metals, clean office paper, recyclable solvents and oils) if they are kept separate.

#### 4.8.2 Reuse, recycling or reprocessing of liquid and non-liquid waste

The EPA is encouraging all sections of industry to develop voluntary standards, giving criteria for the beneficial reuse of waste generated either without any treatment or with processing, reprocessing or treatment. If the standards are proven by the proponents to be environmentally sound, the EPA may consider endorsing these beneficial reuse criteria. This will enable such materials to be removed from the waste stream, and will conserve virgin natural resources.

The EPA has identified three major issues that should be carefully addressed and documented in proposals of criteria for beneficial use. These are:

- that the use of a waste should provide measurable benefits to the environment, such as the conservation of natural resources
- that cost-effective higher-order uses of the waste according to the Waste Management Hierarchy are not available
- that the single or repeated use of the waste in the manner proposed will not result in either immediate, delayed or cumulative damage to the local or overall environment.

For example, if it were proposed to apply a liquid organic waste to soil, proposals should demonstrate:

- that the application has a desired beneficial effect on the productivity of the soil it is being applied to, and that it allows for a reduction in the quantities of human-made fertilisers being used
- that there are no higher-order uses available for such waste than as a fertiliser/soil-conditioner
- that the waste does not contain contaminants (such as undesirably high concentrations of heavy metals and other chemical or biological species, which can contaminate the soil, ground water or surface water, or have negative effect(s) on human/animal health, flora or fauna) or other substances that may, for example, cause a deterioration in the physical structure of the soil, as a result of single or repeated applications.

The EPA has produced (or has in preparation) the following guidelines for the beneficial use of wastes:

- *Environmental Guidelines: Use & Disposal of Biosolids Products* (1997)
- *Draft Guidelines for the Utilisation of Treated Sewage Effluent by Irrigation* (1995)
- *Draft Environmental Guidelines: Composting and Related Facilities* (in preparation).

## SECTION 5 COMMON QUESTIONS AND ANSWERS

### 5.1 How did the EPA develop these guidelines?

These guidelines were developed by combining the *Environmental Guidelines: Assessment, Classification and Management of Non-Liquid Wastes* (EPA 1997) with the *Draft Environmental Guidelines: Assessment, Classification and Management of Liquid Wastes*. Both documents have had the benefit of feedback from community and stakeholder consultation before being finalised.

The changes made to the text relating to non-liquid wastes are primarily related to the transfer of waste provisions from the *Waste Minimisation and Management Act 1995* to the *Protection of the Environment Operations Act 1997*, and the changes in provisions associated with this move. Other changes were made to clarify the intent of the provisions in the guidelines and to correct some anomalies that became apparent as stakeholders began to use the guidelines.

### 5.2 Do these guidelines apply to the assessment of contaminated sites?

No. These guidelines are not intended to be used to assess contaminated sites. The EPA has other guidelines for that purpose.

If waste soil does not meet the criteria for beneficial reuse as specified or approved by the EPA, and the soil needs to be disposed of to landfill, these guidelines should be used to assess and classify the soil before disposal. Note, however, that from a broad policy perspective, the EPA continues to support the ANZECC hierarchy for site clean-up as set down in the *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites* (ANZECC/NHMRC, January 1992 page 5):

'The preferred order of options for site clean-up and management are:

- on-site treatment of the soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, and
- off-site treatment of excavated soil, which, depending on the residual of contamination in the treated material, is then returned to the site, removed to an approved waste disposal site or facility or used as fill for landfill.

Should it not be possible for either of these options to be implemented, then other options that should be considered include:

- removal of contaminated soil to an approved site or facility, followed where necessary by replacement with clean fill
- isolation of the soil by covering with a properly designed barrier
- choosing a less sensitive land use to minimise the need for remedial works, may include partial remediation, and
- leaving contaminated material in-situ, providing there is no immediate danger to the environment or community and the site has appropriate controls in place.'

Consult Schedule 1 of the *Protection of the Environment Operations Act 1997* to determine whether premises where contaminated soil is treated or processed on site are scheduled, and whether they require an *environment protection licence*.

### 5.3 Do these guidelines apply if I handle chemical wastes (including scheduled wastes) subject to a Chemical Control Order?

Certain chemicals and declared chemical wastes are controlled in NSW by Chemical Control Orders (CCOs) made under the *Environmentally Hazardous Chemicals Act 1985*. (See Table 8.) The Hazardous Chemicals Advisory Committee has recommended to the EPA that certain chemicals and wastes require additional or more stringent controls, which are set out in the CCOs. This is because these chemicals and wastes are considered to present a particular threat to the environment, and require special management—for example, they may persist in the environment or bioaccumulate in animals. CCOs will generally set out requirements for manufacturing, keeping, using, processing, storing, selling, transporting or disposing of these chemicals and declared chemical wastes.

The provisions of the *Environmentally Hazardous Chemicals Act 1985* and the relevant Chemical Control Orders made under it (see Table 8) are currently subject to review. Until this review is completed, these Orders apply in addition to the waste regulations.

Any person handling any substances listed in Table 8 should read the relevant CCO to determine the appropriate legal requirements. A licence under the *Environmentally Hazardous Chemicals Act* may be required.

Similarly, any person holding or needing an *Environmentally Hazardous Chemicals Act* licence for any of the wastes listed in Table 8 may also need a licence under the *Protection of the Environment Operations Act 1997*.

<b>Table 8: Chemicals or declared chemical wastes subject to Chemical Control Orders</b>	
<b>Chemical or declared chemical waste</b>	<b>Chemical Control Order</b>
Aluminium smelter wastes	Chemical Control Order in Relation to Aluminium Smelter Wastes Containing Fluoride and/or Cyanide 1986
Dioxin-contaminated wastes	Chemical Control Order in Relation to Dioxin-Contaminated Wastes 1986
Organotin wastes	Organotin Waste Materials Chemical Control Order 1989
Polychlorinated biphenyl materials and wastes <sup>1</sup>	PCB Chemical Control Order 1997
Scheduled chemical wastes <sup>2</sup>	Scheduled Chemical Wastes Chemical Control Order 1994
Notes:	
1. Guidelines for the management of polychlorinated biphenyls (PCB) and PCB wastes are under preparation.	
2. See Technical Appendix 5.	

## 5.4 To what extent is the generator responsible for the assessment and classification of waste?

The waste assessment processes documented in these guidelines will make the criteria for classifying liquid and non-liquid waste transparent, and will enable waste generators/owners State-wide to:

- assess their waste consistently
- ensure that their waste is reused, recycled, processed, reprocessed, transported, treated, stored or disposed of lawfully
- make significant improvements in their waste generation and management practices.

The generator or owner is responsible for producing documentation that conveys the correct classification of the waste to the waste transporter and the waste management facility receiving the waste.

## 5.5 How often does the generator need to test waste to demonstrate that it is assessed and classified with due diligence?

There are no specified legal requirements in relation to sampling and testing.

It may not be necessary to test the waste at all if the generator knows the process(es) that led to the production of the waste and the maximum possible levels of contaminants in the waste, and is certain that the waste can be classified without testing.

### Liquid wastes

The generator may decide after initial testing of a particular liquid waste stream that he/she wishes to treat **all** waste in that stream as being *controlled aqueous liquid wastes*. In this case no further testing will be necessary unless the controlled waste facility that receives such liquid waste requires test data.

There may be situations in which frequent testing for an initial period may show sufficient consistency in the characteristics of a liquid waste stream to give the generator confidence that all waste in that stream can be classified as *non-controlled aqueous liquid waste* and that the frequency of testing can be reduced significantly.

On the other hand, some waste streams could show such large variations in properties that every load of waste would need to be carefully sampled and tested before classification. This would apply only if the waste generator wanted to be able to manage loads that are *liquid waste not requiring a licence* differently from those that do require the use of *licensed transporters* and that must be delivered to *licensed waste facilities* or *licensed mobile waste processors*.

### Non-liquid wastes

There may be situations in which frequent testing for an initial period can show sufficient consistency in the characteristics of the waste stream to give the generator confidence to be able to reduce the frequency of testing significantly.

On the other hand, some waste streams could show such large variations in properties that every load of waste would need to be carefully sampled and tested before classification.

## Sampling

The aim of sampling is to get a sample population that truly represents the average levels of contaminants present in the waste. This document contains some guidance on sampling (see Technical Appendix 1); however, help from an expert is advisable in some cases.

## 5.6 Do transporters, mobile waste processors and waste facility operators need to assess the waste they receive?

Transporters, mobile waste processors and waste facility operators should be able to rely on the assessment and classification process of the waste generator. It is important for the waste industry to have proper commercial agreements with waste generators and to insist that written documentation concerning each load of waste is received from generators. It may be an advantage to conduct occasional random audits on waste received, in order to ensure that the waste has been classified correctly by the generator.

Documenting the movement of waste will also enable waste generators and transporters to demonstrate that the waste has been delivered to a facility that is licensed or that can otherwise lawfully receive the waste.

## 5.7 What other documents do I need to read?

### NSW Legislation

The *Protection of the Environment Operations Act 1997*, the *Protection of the Environment Operations (Waste) Regulation 1996*, the *Protection of the Environment Operations (General) Regulation 1998* and the *Waste Minimisation and Management Act 1995* are the most important documents to be familiar with when reading these guidelines.

Specific environmentally hazardous chemicals are dealt with in the *Environmentally Hazardous Chemicals Act 1985*, the *Environmentally Hazardous Chemicals Regulation 1994* and the relevant *Chemical Control Orders (CCOs)* (see Section 5.3).

Radioactive materials are dealt with in the *Radiation Control Act 1990* and the *Radiation Control Regulation 1993*.

Environmental planning issues in NSW are dealt with in the *Environmental Planning and Assessment Act 1979* and *Environmental Planning and Assessment Regulation 1994*.

### NSW EPA guidelines and documents

Landfill environmental issues are dealt with in:

- *Environmental Guidelines: Solid Waste Landfills* (1996)
- *Environmental Guidelines: Industrial Waste Landfilling* (under preparation—draft version available).

Contaminated site and soil management issues are dealt with in:

- *Contaminated Sites: Guidelines for Assessing Service Station Sites* (1994)
- *Contaminated Sites: Guidelines for the Vertical Mixing of Soil on Former Broad-acre Agricultural Land* (1995)
- *Contaminated Sites: Sampling Design Guidelines* (1995)

- *Guidelines for Consultants Reporting on Contaminated Sites* (1997)
- *Guidelines for the NSW Site Auditor Scheme* (1998)
- *Guidelines on Significant Risk of Harm from Contaminated Land and the Duty to Report* (1999)
- *Discussion Paper: Assessment of Orchard and Market Garden Contamination Sites* (1995).

Biosolids management issues are dealt with in:

- *Environmental Guidelines: Use & Disposal of Biosolids Products* (1997).

### **Commonwealth Government legislation and documents**

- *Australian Code for the Transport of Dangerous Goods by Road and Rail* (6<sup>th</sup> edition, National Road Transport Commission 1998).
- Radiation Health Series No.13, *Code of Practice for the Disposal of Radioactive Wastes by the User* (National Health and Medical Research Council, 1985)
- *National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure* made under the National Environment Protection Council Act 1994 of the Commonwealth on 26 June 1998.

## **5.8 Where can I get copies of these other documents?**

### **Printed copies**

You can get guidelines and other EPA documents by telephoning Pollution Line on 131 555 (NSW callers only) or (02) 9995 5000, or visiting the DEC website at [www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

Get copies of NSW Acts and Regulations and other publications from the Government Information Service NSW—phone 1800 463 955 (free call) or (02) 9238 0950.

Copies of Commonwealth Acts, Regulations, Codes and other documents are available from CanPrint Information Services—phone 1300 889 873.

### **Access via the Internet**

The following are useful Internet site addresses for information that you may need:

- the DEC's web page with links to other sites:  
—<http://www.environment.nsw.gov.au>
- Australasian Legal Information Institute:  
—Acts and Regulations for all States and the Commonwealth: <http://www.austlii.edu.au/>  
—NSW Acts: [http://www.austlii.edu.au/au/legis/nsw/consol\\_act/](http://www.austlii.edu.au/au/legis/nsw/consol_act/)  
—NSW Regulations: [http://www.austlii.edu.au/au/legis/nsw/consol\\_reg/](http://www.austlii.edu.au/au/legis/nsw/consol_reg/)
- Environment Australia, Environment Protection Group (formerly CEPA):  
—<http://www.erin.gov.au/index.html>
- Commonwealth *Worksafe* issues:  
—<http://www.worksafe.gov.au/~wsa1/index.htm>
- Commonwealth transport-of-dangerous-goods issues:  
—<http://www.dot.gov.au/programs/fors/dgoodsum.htm>

The advantages of gaining access to legislative documents via the Internet are:

- documents are updated very soon after Parliament makes changes to them
- you can get the information you need very quickly
- you can conduct searches on the document to locate the parts of specific interest to you
- you can print out only those parts that you require, and save resources.

## 5.9 How do I handle Hazardous Materials Incident Waste?

The NSW Fire Brigades is responsible for protecting and saving life and property that is endangered by hazardous materials incidents.

The EPA's main role in hazardous materials incidents is to provide technical advice about the properties of the materials to the NSW Fire Brigades and other agencies, as well as to advise on minimising the environmental impact of the incident. The EPA will also take evidence and consider legal action against land owners/occupiers of premises or owners of the materials causing the environmental damage.

In most instances, the EPA will direct that waste generated as a result of a Hazardous Materials Incident be disposed of by the party responsible for the waste, according to the normal EPA requirements. When necessary, the EPA may direct that the waste be stored until it can be identified and/or managed according to the requirements.

However, in the case of a Hazardous Materials Incident where there is an immediate and significant threat to the environment, Part 4.2 of the *Protection of the Environment Operations Act 1997* may apply, and further advice as to disposal procedures should be obtained from the EPA.

You should contact your local office of the EPA during business hours. (For addresses and telephone numbers see the back page of these guidelines.) For instructions relating to the management of the waste arising from the clean-up of an emergency spill, contact the Pollution Line on 131 555 (NSW callers only) or (02) 99995 5000.

## 5.10 How do I manage school laboratory waste?

The following document will contain information to help you manage chemical laboratory wastes generated in your school in an environmentally responsible manner:

*Safe use and storage of workplace chemicals in schools* (New South Wales Department of School Education 1998).

## 5.11 How do I manage excavated acid sulfate soils in landfills?

Acid sulfate soils (ASS) are the common name given to naturally occurring sediments and soils containing iron sulfides (principally iron sulfide or iron disulfide or their precursors). The exposure of the sulfide in these soils to oxygen by drainage or excavation leads to the generation of sulfuric acid.

Acid sulfate soils occur in coastal areas of NSW and pose a significant risk to the environment if they are not managed appropriately. They can cause water quality problems that kill fish and shellfish and can lead to significant infrastructure damage (such as to roads and bridges). The use of the term '*acid sulfate soils*' in these guidelines includes '*potential acid sulfate soil*' and '*actual acid sulfate soil*' as defined by ASSMAC (1998) and listed in the Definitions and Glossary section of these guidelines.

The Department of Land and Water Conservation (DLWC) has produced ASS Risk Maps to identify the probable location of ASS.

The *Acid Sulfate Soil Management Advisory Committee* (ASSMAC) has determined detailed assessment and management techniques, and this information is found in the *NSW Acid Sulfate Soil Manual* (ASS Manual). ASSMAC recommends that ASS should be **managed on-site** in accordance with an *Acid Sulfate Soil Management Plan* (ASSMP) developed in accordance with the ASS Manual. This ASS Manual is available from the Department of Urban Affairs and Planning (DUAP).

If waste ASS cannot be managed on-site, the generator may consider the use of a landfill for disposal if **no other options** are viable. Disposal at a landfill will entail the development of an Acid Sulfate Soil Management Plan, which is required under the ASS Manual by the generator of the waste ASS.

**The generator of the waste ASS must subject the soil to the chemical assessment process in Technical Appendix 1 of these guidelines to determine its correct classification.** This chemical assessment process will determine whether it contains **other** materials apart from iron sulfides that will affect its disposal. Depending on the outcome of the classification, ASS may be disposed to a Solid Waste or an Industrial Waste Landfill. ASS cannot be disposed to an Inert Waste Landfill, given that it does not satisfy the criteria of '*not capable of environmentally significant physical, chemical or biological transformations*'. (See Section 3.4.3.) In addition, ASS cannot be categorised as Virgin Excavated Natural Material (VENM) because it contains sulfidic materials (see Table 1).

Transportation of waste ASS needs to be undertaken with caution. When transporting ASS, the generator should ensure that the transport time is minimised and the load covered to avoid contact with water and the potential leaching of sulfuric acid.

If the soil has been assessed as either Industrial Waste or Hazardous Waste (see Section 2.1.2), then it must be transported by a licensed waste transporter.

The following principles should be considered and outlined by the generator in an ASSMP:

- Before sending waste ASS to a landfill, arrangements should be made with the occupier to ensure that the landfill is suitable for ASS disposal.
- The status of the waste ASS (potential or actual ASS) should be determined using the assessment techniques outlined in the ASS Manual.
- Potential and actual ASS must be treated by the generator before acceptance by a landfill occupier for disposal. Treatment should be undertaken in accordance with the neutralising techniques outlined in the ASS Manual.

Landfill occupiers should consider the following points when accepting ASS for disposal in a landfill:

- Significant amounts of waste ASS should be managed within a discrete cell (that is, a lined monocell) of a landfill. This will ensure that any potential acidic leachate generated by waste ASS that may not be fully neutralised by the above treatment can be controlled to reduce the likelihood of such leachate coming into contact with other types of waste.
- Special care should be taken to ensure that contaminated, hazardous or industrial wastes are not in the vicinity of the ASS.
- ASS must not be used as a cover material, as it may oxidise and produce highly acidic leachate.

# TECHNICAL APPENDIX 1: ASSESSMENT AND CLASSIFICATION PROCEDURES FOR LIQUID AND NON-LIQUID WASTES

## Part 1 Introduction

### Assessing and classifying liquid wastes

If aqueous liquid wastes (see Definitions and Glossary) are not classified as hazardous (see Table 4), Group B or Group C (see Table 5) wastes and are known to contain or suspected to contain chemical contaminants (such as industrial, commercial, mining or agricultural chemicals), they must be assessed chemically.

All non-aqueous liquid wastes (see Definitions and Glossary) have been classified in Schedule 1 of the Operations Act as Group A liquid waste. (See Table 5.)

There is no need to test and assess the following types of liquid wastes:

- wastes that have already been classified in Tables 4 and 5 in Section 3
- natural, recycled, reprocessed, processed or treated (waste) materials that meet EPA-specified or EPA-endorsed beneficial (re)use criteria, that are not intended for disposal and that are beneficially reused.

Table A1 lists the maximum Specific Contaminant Concentration values for chemical contaminants (the same chemicals as in Tables A3 and A4 for non-liquid wastes) for aqueous liquid wastes to be assessed as *non-controlled aqueous liquid waste*. Liquid waste must be classified as *controlled aqueous liquid waste* even if only one out of many chemical contaminants present exceeds its respective criterion in Table A1.

The majority of the above maximum values are numerically the same (but expressed as mg/kg) as the *USEPA final rule for TCLP levels* (see ref: USEPA 1990a) for these chemical contaminants. Consult the notes to Table A1 for references to the origin of most of the values in the Table. As a **rule of thumb**, many of the values would be about 100 times larger than the maximum values for such chemical contaminants in drinking water standards (assuming a dilution attenuation factor of 100 in the case of accidental spillage).

### Assessing and classifying non-liquid wastes

There is no need to do chemical assessment and subsequent classification of the following types of non-liquid wastes:

- non-liquid waste types classified in the regulations, as listed in Tables 1, 2, 3 and 4 in Section 3
- gaseous emissions, since these are regulated under the other parts of the *Protection of the Environment Operations Act 1997*
- natural, recycled, reprocessed, processed or treated (waste) materials that meet EPA-specified or EPA-endorsed beneficial (re)use criteria, that are not intended for disposal and that are beneficially reused.

Table A3 lists the *contaminant threshold* values (CT), while Table A4 lists the *leachable concentration* (TCLP) and *total concentration* values for chemical contaminants used in the assessment of non-liquid wastes as *inert, solid, industrial* or *hazardous waste*. The assessment of non-liquid wastes is more complicated than that of liquid wastes; it is described in detail in Part 5 of this appendix.

## Part 2 Frequency of testing, sampling and precision

There are no specified legal requirements in relation to sampling and testing. It may not be necessary to test the waste at all if the generator knows the process(es) that led to the production of the waste, and the maximum possible levels of contaminants in the waste, and is certain that the waste can be classified without testing.

### Frequency of testing

#### Liquid wastes

The generator may decide after initial testing of a particular liquid waste stream that he/she wishes to treat **all** waste in that stream as being *controlled aqueous liquid wastes* and, therefore, to classify it as Group A liquid waste. In this case no further testing will be necessary unless the controlled waste facility that receives the liquid waste requires test data.

There may be situations in which frequent testing for an initial period may show that the characteristics of a liquid waste stream are consistent enough to give the generator confidence to classify all waste in that stream as *non-controlled aqueous liquid waste*, and to reduce the frequency of testing significantly.

On the other hand, some waste streams may show such large variations in properties that every load of waste would need to be carefully sampled and tested before classification. This would apply only if the waste generator wanted to be able to manage loads that are *non-controlled aqueous liquid waste* differently from those that are *controlled aqueous liquid waste*. (The latter not only require the use of a *licensed transporter*, but also have to be delivered to *controlled waste facilities* or licensed mobile waste processors.)

#### Non-liquid wastes

There may be situations in which frequent testing of non-liquid wastes for an initial period may show that the characteristics of the waste are consistent enough to give the generator confidence to reduce the frequency of testing.

On the other hand, some non-liquid waste streams may show such large variations in properties that every load of waste would need to be tested before classification.

### Sampling

Sampling is done to determine the average levels of contaminants in the waste that is to be assessed. It is important to recognise that most incorrect chemical assessments of waste are due to poor or incorrect sampling.

Generalised sampling recommendations are not possible, since they depend on how consistent any tested property is throughout the batch of waste.

#### Liquid wastes

If the property is highly consistent (homogeneous liquids), sampling is relatively straightforward.

It becomes much more difficult to sample waste that either consists of many different types of waste materials, or that has contamination that is not evenly distributed throughout the batch. In such situations, keeping different waste types separate, or separating portions of liquid waste that contain high levels of contaminants from the rest, can be of great benefit.

For guidance on sampling techniques see the following Australian/New Zealand Standards:

- AS/NZS 5667.1:1998—*Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
- AS/NZS 5667.10:1998—*Part 10: Guidance on sampling of waste waters*
- AS/NZS 5667.11:1998—*Part 11: Guidance on sampling of groundwaters.*

The EPA has also provided some guidance for sampling, such as in the *Provisional Water Quality Investigations Manual: Preferred Methods for Sampling & Analysis* (1995).

In certain cases you may need to get help from an expert in sampling and testing.

### **Non-liquid wastes**

Where the property is highly consistent (homogeneous), sampling is relatively straightforward, and useful guidance can be found in the following Australian Standards:

- AS 1199–1988: *Sampling Procedures and Tables for Inspection by Attributes*
- AS 1399–1990: *Guide to AS 1199.*

The Australian Standard AS 1141: *Methods for Sampling and Testing Aggregates* is likely to be useful for sampling wastes such as aggregates, foundry sand, furnace slag or mining waste.

It becomes much more difficult to sample waste that either consists of many different types of waste materials or has contamination that is not evenly distributed throughout the batch. In such situations, keeping different waste types separate, or separating portions of waste that contain high levels of contaminants from the rest, can be of great benefit.

The EPA has provided some guidance for the sampling of soils; see *Contaminated Sites: Sampling Design Guidelines* (1995)

In certain cases you may need to get help from an expert in sampling and testing.

### **Precision in chemical analyses**

It is important that the test methods and instruments used are capable of measuring the concentration of each chemical contaminant with a sufficient degree of confidence to assure correct classification.

It is recommended that the upper limit of the combined confidence interval of sampling and analysis (at a probability of 95%) is used for comparison with the maximum values specified in Tables A1, A3 and A4. This approach should give the assessor a sufficient degree of confidence that a correct classification has been made.

## **Part 3 Which contaminants should I test for?**

Table A1 lists the chemical contaminants that are used in the assessment and classification of liquid waste, while Tables A3 and A4 list those used for the assessment and classification of non-liquid wastes. If your waste contains chemical contaminants that are not in these tables, you should contact the EPA for advice.

If you have inadequate knowledge of chemistry or waste assessment, you are likely to require some expert help, either from a laboratory that specialises in waste analysis or from a person specialising in such waste management issues, or both. The advice of an expert will probably help you avoid the need (and costs) of testing for contaminants that are unlikely to be present in your liquid or non-liquid wastes. The following headings may provide you with some useful ideas for your type of waste.

### **Waste generated from businesses where chemicals are used**

You should make an inventory of materials that you use and ensure that you have Materials Safety Data Sheets for all of these. Materials Safety Data Sheets should list the constituent chemical components and should help you to draw up a list of potential contaminants.

If you operate a process that involves chemical changes, then you need to add to the above list of chemicals the products and by-products of such processes.

### **Suspected contaminated soil**

Consult the EPA's guidelines on the assessment of contaminated sites to identify the likely contaminants. Knowledge of the type of activity previously carried out on the site can give some clues as to the nature of potential contaminants present.

### **Unused agricultural chemicals**

Take great care when handling chemicals, especially if they are known to be dangerous or if their hazards are unknown. If in doubt, enlist help from an expert. Note or estimate the date of manufacture of the chemical, then contact the supplier or manufacturer in order to narrow the range of chemical contaminants that were in use at the time of manufacture. You can also contact your peak organisation or association for help.

### **Waste of unknown origin**

This type of waste may already have been on the property at the time of purchase or have been dumped on the site (as 'orphan waste'). Take great care when handling chemicals, especially if you do not know their hazards. If in doubt, enlist help from an expert. Look for any clues present in the waste that may indicate its origin. An idea of the type of activity from which the waste arose can give some clues as to the nature of potential contaminants present. Take care in attempting to identify unknown wastes. Avoid handling open, corroding or leaking containers, or wastes not in a container.

### **Waste received from a generator**

Transporters, waste storage facilities, processors, reprocessors, recyclers, mobile waste processors and treatment facilities should be able to rely on assessments carried out by the generators or owners of the waste. If they wish to audit waste they receive from time to time, they should request information relating to the nature of the waste from its generator or owner. This should narrow down the list of chemical contaminants that need analysis.

## Part 4 Chemical assessment and classification procedures for liquid wastes

### Who can do the chemical analysis?

It is strongly recommended that you use analytical laboratories accredited by the National Association of Testing Authorities (NATA) to perform these analyses and tests.

### Methods of analysis

If the liquid waste contains a **low fraction of solids**, then analytical procedures suitable for **liquids** may be suitable.

If the liquid waste contains a **high fraction of solids**, then analytical procedures suitable for **solids** may be suitable.

In some instances, however, in order to obtain reliable analytical results for a **mixture of liquids and solids**, it may be necessary to:

- separate the aqueous phase from the solid phase
- determine the concentrations of the contaminants present in each phase, and
- calculate the average contaminant concentrations in the original waste mixture using weighted averages.

For the reference test method for determining the concentration of chemical contaminants in aqueous liquids, see *Standard Methods for the Examination of Water and Wastewater* (APHA 1995).

The reference test method for determining the concentration of chemical contaminants for solids (if any) separated from a mixture is as described in the Office of Solid Waste and Emergency Response, United States Environmental Protection Agency (USEPA) document *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846: Third Edition, 1986 and Updates I and II (revised July 1992).

### Rules for chemical assessment and classification

You must consider the general rules given below before assigning a final classification to the waste:

- Liquid waste must be classified as one of the following categories: hazardous, Group A, Group B, Group C liquid waste or *non-controlled aqueous liquid waste*.
- Liquid waste classified as hazardous in Table 4 or as Group A, Group B or Group C waste in Table 5 cannot be reclassified as *non-controlled aqueous liquid waste* (using this assessment procedure) unless it has been treated to reduce or remove those characteristics that were responsible for the original classification.
- The person doing the assessment must decide which of the chemical contaminants listed in Table A1 are present in the liquid waste and assess each contaminant against the given criteria.
- If the liquid waste contains potentially toxic and/or ecotoxic contaminants not listed in Table A1, the person doing the assessment must ask the EPA to provide assessment criteria for these contaminants and assess the waste against these criteria as well.
- Even if only one out of many chemical contaminants present exceeds its respective criterion in Table A1 the liquid waste must be assessed as *controlled aqueous liquid waste* and, therefore, classified as Group A waste.

- Wastes that contain any natural or artificial substance that emits ionising radiation spontaneously must also be subjected to the classification procedure specified in Section 3.5.

<b>Table A1: Maximum values for chemical contaminants<sup>1</sup> for aqueous liquid wastes to be classified as <i>non-controlled aqueous liquid wastes</i></b>		
<b>Contaminant</b>	<b>Maximum specific contaminant concentration (mg/kg)</b>	<b>CAS registry number</b>
Arsenic	1.0 <sup>10</sup>	
Benzene	0.5 <sup>2</sup>	71-43-2
Benzo(a)pyrene <sup>3</sup>	0.04 <sup>4</sup>	50-32-8
Beryllium	1.0 <sup>5</sup>	
Cadmium	1.0 <sup>2</sup>	
Carbon tetrachloride	0.5 <sup>2</sup>	56-23-5
Chlorobenzene	100 <sup>2</sup>	108-90-7
Chloroform	6 <sup>2</sup>	67-66-3
Chromium (VI) <sup>7</sup>	5 <sup>2</sup>	
m-Cresol	200 <sup>2</sup>	108-39-4
o-Cresol	200 <sup>2</sup>	95-48-7
p-Cresol	200 <sup>2</sup>	106-44-5
Cresol (total)	200 <sup>2</sup>	1319-77-3
Cyanide (amenable) <sup>8</sup>	1.0 <sup>10</sup>	
Cyanide (total)	1.0 <sup>11</sup>	
2,4-D	10 <sup>2</sup>	94-75-7
1,2-Dichlorobenzene	4.3 <sup>2</sup>	95-50-1
1,4-Dichlorobenzene	7.5 <sup>2</sup>	106-46-7
1,2-Dichloroethane	0.5 <sup>2</sup>	107-06-2
1,1-Dichloroethylene	0.7 <sup>2</sup>	75-35-4
Dichloromethane	8.6 <sup>2</sup>	75-09-2
2,4-Dinitrotoluene	0.13 <sup>2</sup>	121-14-2
Ethylbenzene	30 <sup>6</sup>	100-41-4
Fluoride	20 <sup>10</sup>	
Lead	5 <sup>2</sup>	
Mercury	0.03 <sup>10</sup>	
Methyl ethyl ketone	200 <sup>2</sup>	78-93-3

**Table A1: Maximum values for chemical contaminants<sup>1</sup> for aqueous liquid wastes to be classified as *non-controlled aqueous liquid wastes***

Contaminant	Maximum specific contaminant concentration (mg/kg)	CAS registry number
Molybdenum	200 <sup>10</sup>	
Nickel	3 <sup>10</sup>	
Nitrobenzene	2 <sup>2</sup>	98-95-3
C6-C9 petroleum hydrocarbons <sup>12</sup>	32	–
C10-C36 petroleum hydrocarbons <sup>12</sup>	500	–
Phenol (non-halogenated)	15 <sup>9</sup>	108-95-2
Polychlorinated biphenyls	2	1336-36-3
Polycyclic aromatic hydrocarbons (total) <sup>14</sup>	5	–
Scheduled chemicals <sup>11</sup>	1	Refer to Appendix 5
Selenium	5	
Silver	5.0 <sup>2</sup>	
Styrene (vinyl benzene)	3 <sup>6</sup>	100-42-5
1,1,1,2 – Tetrachloroethane	10 <sup>2</sup>	630-20-6
1,1,2,2 – Tetrachloroethane	1.3 <sup>2</sup>	79-34-5
Tetrachloroethylene	0.7 <sup>2</sup>	127-18-4
Toluene	15 <sup>9</sup>	108-88-3
1,1,1-Trichloroethane	30 <sup>2</sup>	71-55-6
1,1,2-Trichloroethane	1.2 <sup>2</sup>	79-00-5
Trichloroethylene	0.5 <sup>2</sup>	79-01-6
2,4,5-Trichlorophenol	10 <sup>10</sup>	95-95-4
2,4,6-Trichlorophenol	2 <sup>2</sup>	88-06-2
Vinyl chloride	0.2 <sup>2</sup>	75-01-4
Xylenes (total)	50 <sup>13</sup>	1330-20-7

**Notes to Table A1:**

1. For organic and inorganic chemical contaminants not listed in this Table, contact the EPA for requirements. Note that aluminium, barium, boron, cobalt, chromium (0 and III oxidation states), copper, iron, manganese, vanadium and zinc have deliberately not been listed in this table and need not be tested for.
2. USEPA final rule for TCLP levels (USEPA 1990a).
3. There may be a need for the laboratory to concentrate the sample to achieve the limit value for benzo(a)pyrene with confidence.
4. Calculated from: Hazardous Waste: Identification and Listing; Proposed Rule (USEPA 1995)
5. Calculated from: DiMarco & Buckett (1996); Imray & Langley (1996).
6. Calculated from: *Australian Drinking Waters Guidelines* (NHMRC 1994).
7. This limit applies to chromium in the +6 oxidation state only.
8. Analysis for cyanide (amenable) is the established method to assess the potentially leachable cyanide. Other methods may be considered by the EPA if it can be demonstrated that these methods yield the same information.
9. Proposed level for phenol and toluene (USEPA 1990b).
10. Sydney Water Trade Waste Discharge Limit.
11. Refer to Technical Appendix 5 for a list of chemicals regulated under the Scheduled Chemical Wastes Chemical Control Order 1994.
12. Approximate range of petroleum hydrocarbon fractions: petrol C6-C9, kerosene C10-C18, diesel C12-C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6-C9, C10-C14, C15-C28, C29-C36. The results of total petroleum hydrocarbons (C10-C36) analyses are reported as a sum of the relevant three fractions.
13. Calculated from *Guidelines for Drinking-Water Quality* (World Health Organisation 1993).
14. Polycyclic aromatic hydrocarbons (total) is assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

PAH name	CAS Registry No.	PAH name	CAS Registry No.
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

## Part 5 Chemical assessment procedure for non-liquid wastes

### Who can do the chemical analysis and leaching tests?

It is strongly recommended that you use analytical laboratories accredited by the National Association of Testing Authorities (NATA) to perform these analyses and tests. If accredited laboratories are unavailable locally, contact your local EPA office for advice.

### Introduction to chemical analysis and leaching tests

The two measurable properties of chemical contaminants in samples of non-liquid waste used for subsequent waste classification are:

- the *total concentration* of any chemical contaminant in the waste (expressed as mg/kg), called *Specific Contaminant Concentration (SCC)* in these guidelines
- the *leachable concentration* of any chemical contaminant (expressed as mg/L), obtained by subjecting a sample from the waste to the *leaching test*, named the *Toxicity Characteristics Leaching Procedure (TCLP)* in these guidelines, and the subsequent chemical analysis of that leachate.

The *leachable concentration (TCLP)* for any contaminant gives an indication of whether that contaminant is likely to leach out from the non-liquid waste once it is disposed of in a landfill. This test procedure forms the basis for the assessment process. (See Table A4 in this Technical Appendix.)

The *total concentration (SCC)* of any contaminant in the waste is used for three different purposes:

- for classification without determining leachable concentration (*TCLP*) (See Table A3 in this Technical Appendix.)
- for classification **together with** leachable concentration (*TCLP*) (See Table A4 in this Technical Appendix.)
- when the *total concentration* for any contaminant is **high** (exceeding maximum values in Table A4), it is used as a *trigger* for the waste generator to examine whether that contaminant is *permanently immobilised*. (For details see Section 3.4.4 and Technical Appendix 2.)

The *concentration threshold (CT)* values were calculated from the *leachable concentration (TCLP)* values by multiplying them by 20 (for example,  $CT1 = 20 \times TCLP1$ ). (See Table A3 in this Technical Appendix.) This formula was used since if the waste sample has a *total concentration (SCC)* of 20 mg/kg of a contaminant that fully leached in the test, then the *leachable concentration (TCLP)* value would be 1 mg/L, due to the way in which the test is performed. Only when the *total concentration (SCC)* of any contaminant exceeds the *concentration threshold (CT)* value, must the *leachable concentration (TCLP)* for that contaminant also be determined in order to be able to classify the waste in that category using both criteria. (See Table A4 in this Technical Appendix.)

### Methods for chemical analysis and leaching tests

The reference test methods for determining both *total concentration [Specific Contaminant Concentration (SCC)]* and *leachable concentration [Toxicity Characteristics Leaching Procedure (TCLP)]* values are as described in the Office of Solid Waste and Emergency Response, United States Environmental Protection Agency (USEPA) document *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846*, Third Edition, 1986 and Updates I and II (revised July 1992).

It is recommended that you use the procedures described in the new series of Australian Standards for leachate preparation. This new series comprises: AS 4439–1997: *Wastes, Sediments and Contaminated Soils*; AS 4439.2–1997: *Wastes, Sediments and Contaminated Soils, Part 2: Preparation of Leachates—Zero Headspace Procedure*; and AS 4439.3–1997: *Wastes, Sediments and Contaminated Soils Part 3: Preparation of Leachates—Bottle Leaching Procedure*.

**The standard pH for the leaching solutions used must be either  $4.93 \pm 0.05$  if the pH of the waste sample is less than 5.0, or  $2.88 \pm 0.05$  if the pH of the waste sample is greater than 5.0.** To determine the pH of the waste sample, use the test method specified in Clause 7.5 (*Selection of Leaching Fluid*) of AS 4439.3–1997: *Wastes, Sediments and Contaminated Soils Part 3: Preparation of Leachates—Bottle Leaching Procedure*. In specific instances the EPA may permit the use of leachants of a pH other than those specified above, but the EPA's authorisation for using an alternative leachant must be sought in writing with justification for the proposed variation. The testing of a non-putrescible waste type for disposal into a monofill or monocell that can be shown not to be subject to penetration by acidic leachate or ground water is an example of a situation in which such written authorisation may be granted by the EPA.

There is the opportunity to secure EPA approval to use an alternative leachant for assessing and classifying waste for monocell or monofill disposal. To seek this approval documentation must be provided to the EPA describing all alternative options to disposal that have been considered and justifying the reasons for their rejection. For additional information on alternative management options for wastes such as industrial ash, dust, sludges or waste containing chemical contaminants, refer to Sections 4.5 and 4.8, while for contaminated soils refer to Section 5.2.

### **Precision of chemical analyses and leaching tests**

It is important that the test methods and instruments used are capable of measuring the concentration of each chemical contaminant with a sufficient degree of confidence to assure correct classification.

It is recommended that the upper limit of the combined confidence interval of sampling and analysis (at a probability of 95%) is used for comparison with the maximum values specified in Tables A3 and A4. This approach should give the assessor a sufficient degree of confidence that a correct classification has been made.

Practical quantitation limits (PQLs) achievable for both *total concentration (SCC)* and *leachable concentration (TCLP)* can be an important measure of the achievable accuracy of testing, and consequently of this degree of confidence. The lower the practical quantitation limit for a chemical contaminant, as compared with the actual concentration being measured, the greater is the degree of confidence in the test result. Practical quantitation limits achieved in the past in the EPA's own laboratories both for *total concentration (SCC)* and *leachable concentration (TCLP)* are listed for your information in Technical Appendix 6. In some instances, low practical quantitation limits (such as those obtained by the EPA) are not essential for a sufficient degree of confidence, but as a **rule of thumb**, practical quantitation limits should be an order of magnitude smaller than the maximum values (specified in Tables A3 and A4) with which the results are being compared.

### **Rules for chemical assessment and classification of non-liquid wastes**

This part is reproduced from Section 3.4.3.

The general rules given below must be considered before assigning a final classification to the waste:

- (a) Waste must be classified in one of the following categories in ascending order: inert, solid, industrial or hazardous waste.

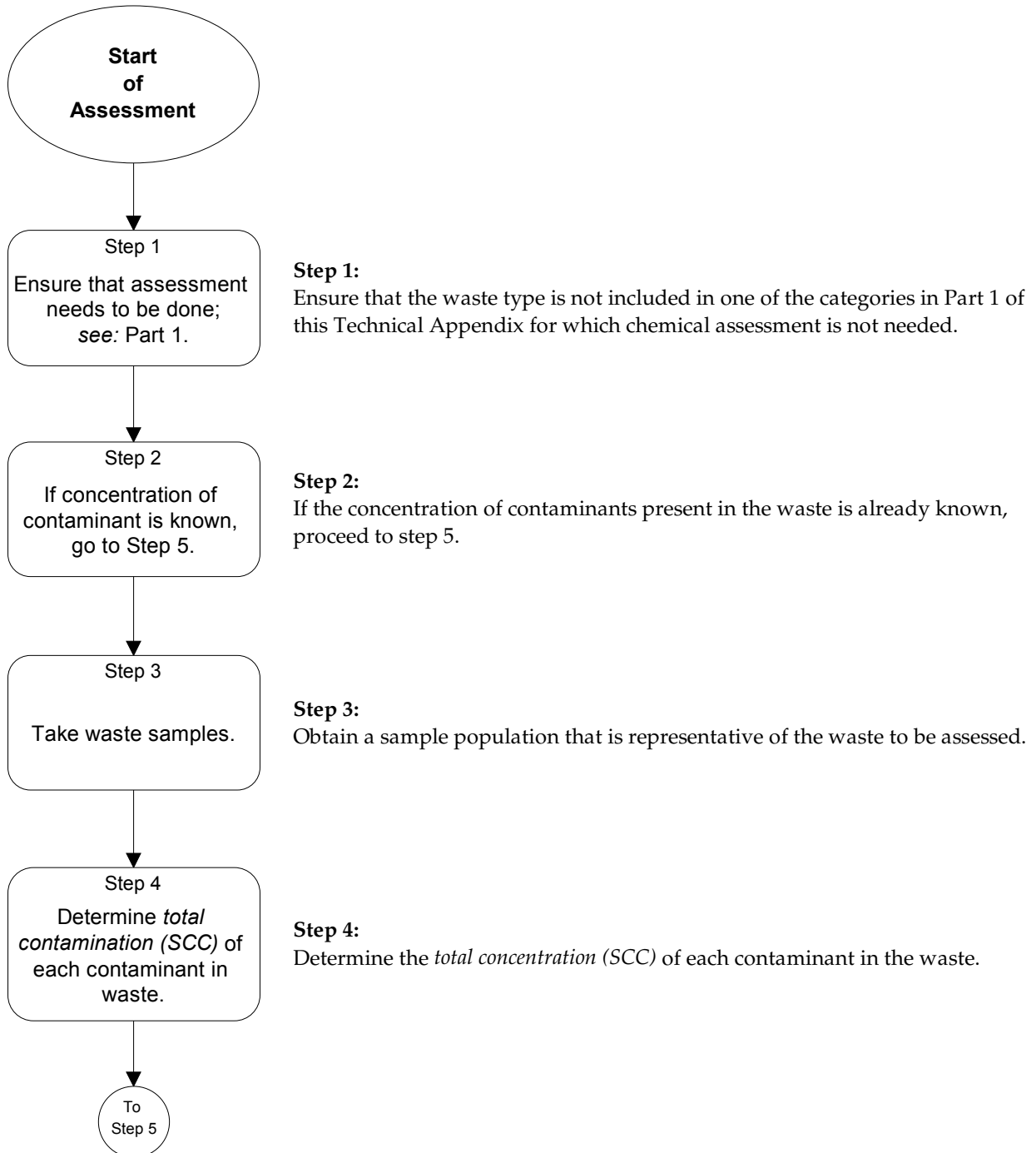
- (b) Waste classified as solid, industrial or hazardous in Tables 1, 2, 3 and 4 in Section 3.2 cannot be reclassified into a lower category using this procedure unless it has been treated to reduce or remove its hazardous characteristics.
- (c) Only waste meeting all of the criteria of *non-liquid* may be classified using this procedure.
- (d) In addition to meeting other requirements set out in this section, waste classified as inert waste using this procedure must also satisfy the criteria of *not capable of environmentally significant physical, chemical or biological transformation*. (See Definitions and Glossary.)
- (e) The person doing the assessment must decide which of the chemical contaminants listed in Tables A3 and A4 are present in the waste, and must then assess each contaminant against the given criteria.
- (f) If the waste contains potentially toxic and/or ecotoxic contaminants not listed in Tables A3 and A4, the person doing the assessment must ask the EPA to provide assessment criteria for these contaminants and then must assess the waste against these criteria as well.
- (g) The waste must be classified according to the highest category listed in (a) as a result of the assessment for all contaminants in (e) and (f); for example, if all but one of the contaminants meets the requirements for solid waste, and the final contaminant meets only the requirements of industrial waste, the waste must be classified as industrial waste.
- (h) Wastes that contain any natural or artificial substance that emits ionising radiation spontaneously must also be subjected to the classification procedure specified in Section 3.5.

## Step by step chemical assessment and classification of non-liquid wastes

### Stage 1: Sampling & Testing

**Tip:**

At this point you should have a waste that is a *non-liquid* (this process does not apply to liquids), and you should follow the process steps from Step 1 to Step 19. Other tips in this Part of the Technical Appendix will provide you with information to help you understand the procedure better.

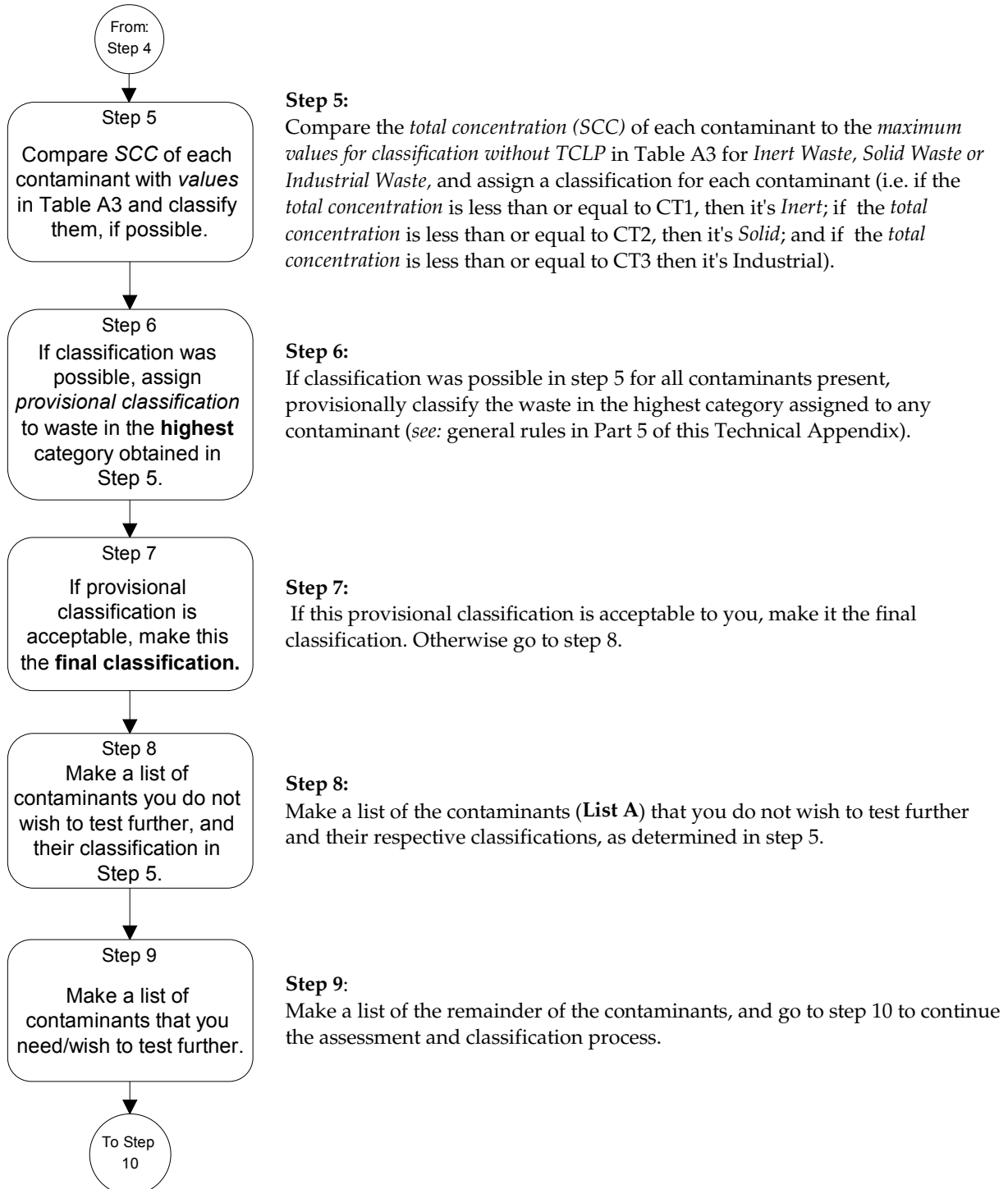


## Stage 2: Classification without using *leachable concentration* (TCLP)

**Tip:**

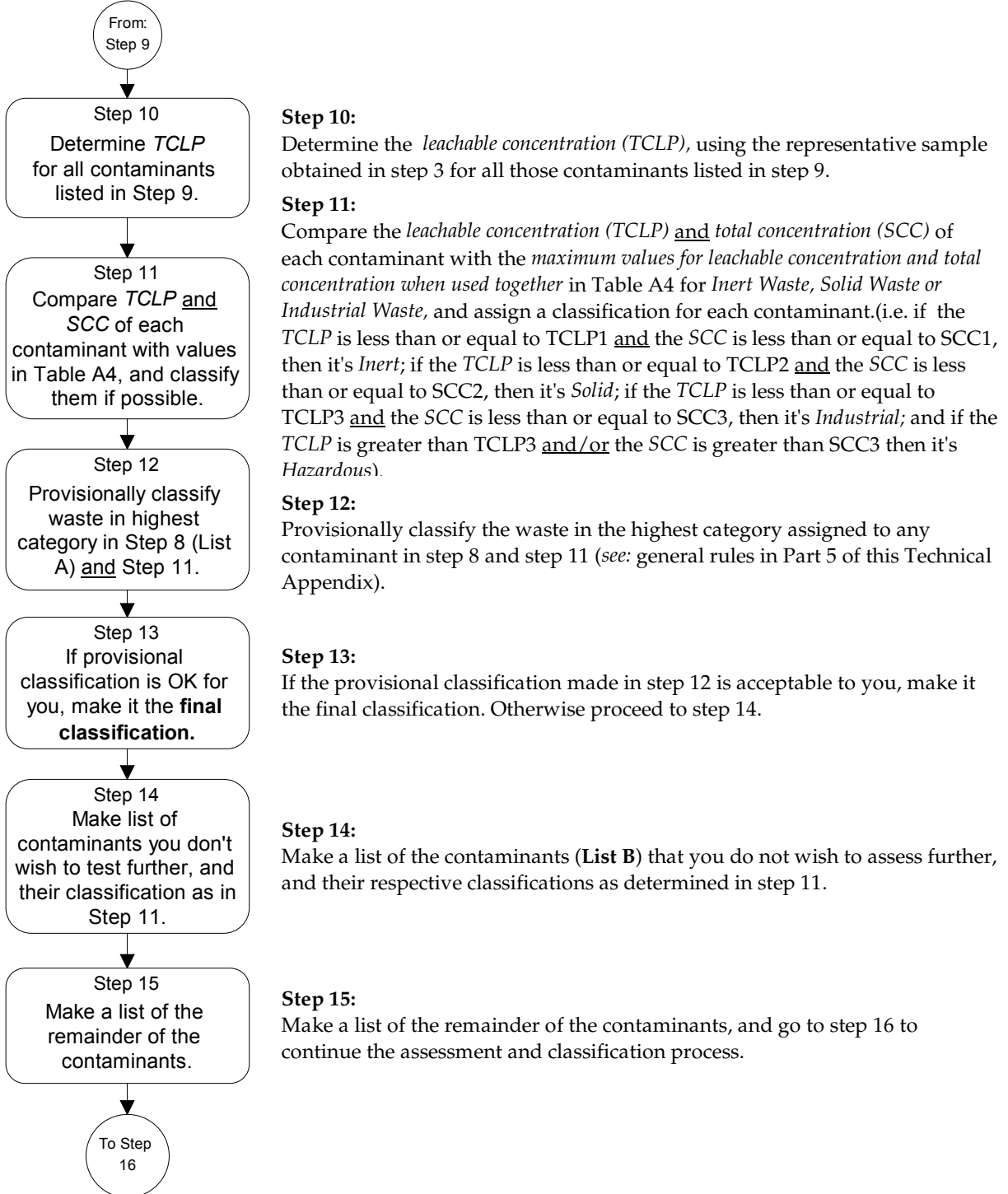
The determination of *total concentration* (SCC) is usually cheaper than the determination of *leachable concentration* (TCLP). It is possible sometimes to classify the waste without determining the TCLP, as shown below.

The lists of the assessments for individual contaminants, namely List A at Step 8, List B at Step 14 and List C at Step 17, are combined at Step 19 in order to ensure that the highest assessment value will be used to determine the final classification of the waste [see: general rules in Part 5 of this Technical Appendix].



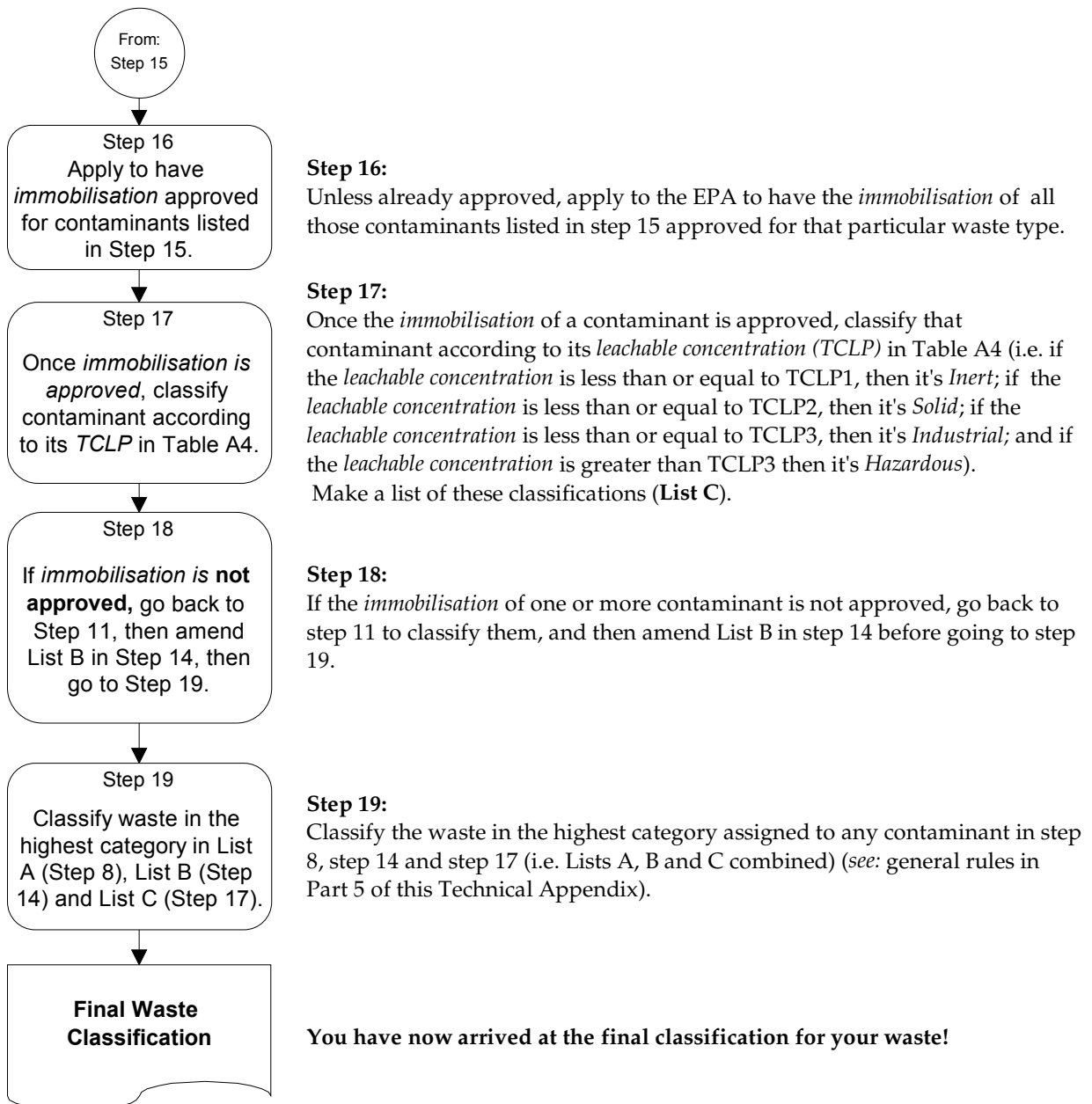
**Stage 3: Classification using *leachable concentration (TCLP)* and *total concentration (SCC)***

**Tip:**  
 The need to use *leachable concentration (TCLP)* and *total concentration (SCC)* is **either**:  
 (i) **unavoidable** if one or more contaminant in step 5 exceeded CT3, **or**  
 (ii) **optional** if any *total concentration (SCC)* value lies between the CT and the SCC maximum values for either Inert Waste or Solid Waste in Table A4 since it may enable a lower classification to be made.



**Stage 4: Classification using immobilisation and leachable concentration (TCLP)**

**Tip:**  
 If the *total concentration (SCC)* of any contaminant exceeds the maximum values SCC1, SCC2 or SCC3 in Table A4, while the corresponding *leachable concentration (TCLP)* is less than or equal to TCLP1, TCLP2 or TCLP3, it is possible to apply to the EPA to have the *immobilisation* of that contaminant approved for that particular waste type.  
 Once the EPA has approved the *immobilisation* (of that contaminant for that particular waste type), the waste may be classified as outlined below. For example: approved *immobilisation* may allow a waste type with a *total concentration (SCC)* of a contaminant exceeding SCC3 but having a corresponding *leachable concentration (TCLP)* less than or equal to TCLP2 to be classified as *solid waste*. A fuller discussion of *immobilisation* may be found in Section 3.4.4 and Technical Appendix 2.



<b>Table A2: Summary of criteria for chemical contaminants in non-liquid waste classification (See also Table 6 in Section 3.4.3.)</b>		
<b>Waste classification<sup>1</sup></b>	<b>Criteria<sup>2</sup> for classification (any of the alternative options given)</b>	<b>Comments</b>
<b>Inert</b>	1. <b>SCC test values</b> ≤ CT1.	TCLP test not required.
	2. <b>TCLP test values</b> ≤ TCLP1 <u>and</u> <b>SCC test values</b> ≤ SCC1.	
	3. <b>TCLP test values</b> ≤ TCLP1 <u>and</u> <b>SCC test values</b> > SCC1 <u>and</u> immobilisation <sup>3</sup> is EPA approved.	Without EPA approval of immobilisation, classify as solid, industrial or hazardous.
<b>Solid</b>	1. <b>SCC test values</b> ≤ CT2.	TCLP test not required.
	2. <b>TCLP1 &lt; TCLP test values</b> ≤ TCLP2 <u>and</u> <b>SCC test values</b> ≤ SCC2.	
	3. <b>TCLP1 &lt; TCLP test values</b> ≤ TCLP2 <u>and</u> <b>SCC test values</b> > SCC2 <u>and</u> the immobilisation <sup>3</sup> is EPA approved.	Without EPA approval of immobilisation, classify as industrial or hazardous.
<b>Industrial</b>	1. <b>SCC test values</b> ≤ CT3.	TCLP test not required.
	2. <b>TCLP2 &lt; TCLP test values</b> ≤ TCLP3 <u>and</u> <b>SCC test values</b> ≤ SCC3.	
	3. <b>TCLP test values</b> ≤ TCLP3 <u>and</u> <b>SCC2 &lt; SCC test values</b> ≤ SCC3.	
	4. <b>TCLP2 &lt; TCLP test values</b> ≤ TCLP3 <u>and</u> <b>SCC test values</b> > SCC3 <u>and</u> immobilisation <sup>3</sup> is EPA approved.	Without EPA approval of immobilisation, classify as hazardous.
<b>Hazardous</b>	1. <b>TCLP test values</b> > TCLP3.	Store or treat waste as appropriate.
	2. <b>TCLP test values</b> ≤ TCLP3 <u>and</u> <b>SCC test values</b> > SCC3 <u>and</u> immobilisation is not EPA approved.	Store or treat waste as appropriate.
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. See also the general rules relating to waste classification (listed earlier in Part 5) for other criteria that must be satisfied before the waste can be classified.</li> <li>2. These criteria apply to each toxic and ecotoxic contaminant present in the waste (see Tables A3 and A4).</li> <li>3. In certain cases the EPA will consider specific conditions, such as the segregation of such waste from all other types of waste in a monofill or a monocell, in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. Information about the construction and operation of a monofill/monocell is available in the <i>Draft Environmental Guidelines for Industrial Waste Landfilling</i> (EPA 1998a).</li> </ol>		

Worked examples of this assessment and classification process are given later in this part of the Appendix.

**Table A3: Contaminant threshold values for waste classification of non-liquid wastes without doing the leaching test<sup>1</sup>**

Contaminant	Maximum values of <i>total concentration</i> for classification <b>without</b> TCLP.			CAS registry number
	Inert waste	Solid waste	Industrial waste	
	CT1 (mg/kg)	CT2 (mg/kg)	CT3 (mg/kg)	
Arsenic	10	100	400	
Benzene	1	10	40	71-43-2
Benzo(a)pyrene <sup>2</sup>	0.08	0.8	3.2	50-32-8
Beryllium	2	20	80	
Cadmium	2	20	80	
Carbon tetrachloride	1	10	40	56-23-5
Chlorobenzene	200	2000	8000	108-90-7
Chloroform	12	120	480	67-66-3
Chromium (VI) <sup>3</sup>	10	100	400	
m-Cresol	400	4000	16000	108-39-4
o-Cresol	400	4000	16000	95-48-7
p-Cresol	400	4000	16000	106-44-5
Cresol (total)	400	4000	16000	1319-77-3
Cyanide (amenable) <sup>4</sup>	7	70	280	
Cyanide (total)	32	320	1280	
2,4-D	20	200	800	94-75-7
1,2-Dichlorobenzene	8.6	86	34.4	95-50-1
1,4-Dichlorobenzene	15	150	600	106-46-7
1,2-Dichloroethane	1	10	40	107-06-2
1,1-Dichloroethylene	1.4	14	56	75-35-4
Dichloromethane	17.2	172	688	75-09-2
2,4-Dinitrotoluene	0.26	2.6	10.4	121-14-2
Ethylbenzene	60	600	2400	100-41-4
Fluoride	300	3000	12000	
Lead	10	100	400	
Mercury	0.4	4	16	
Methyl ethyl ketone	400	4000	16000	78-93-3
Molybdenum	10	100	400	
Nickel	4	40	160	
Nitrobenzene	4	40	160	98-95-3
C6-C9 petroleum hydrocarbons	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	–
C10-C36 petroleum hydrocarbons	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	–
Phenol (non-halogenated)	28.8	288	1152	108-95-2

**Table A3: Contaminant threshold values for waste classification of non-liquid wastes without doing the leaching test<sup>1</sup>**

Contaminant	Maximum values of <i>total concentration</i> for classification <b>without</b> TCLP.			CAS registry number
	Inert waste	Solid waste	Industrial waste	
	CT1 (mg/kg)	CT2 (mg/kg)	CT3 (mg/kg)	
Polychlorinated biphenyls <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	1336-36-3
Polycyclic aromatic hydrocarbons (total) <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	–
Scheduled chemicals <sup>5</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	N/A <sup>6</sup>	Refer to Appendix 5
Selenium	2	20	80	
Silver	10	100	400	
Styrene (vinyl benzene)	6	60	240	100-42-5
1,1,1,2-Tetrachloroethane	20	200	800	630-20-6
1,1,2,2-Tetrachloroethane	2.6	26	104	79-34-5
Tetrachloroethylene	1.4	14	56	127-18-4
Toluene	28.8	288	1152	108-88-3
1,1,1-Trichloroethane	60	600	2400	71-55-6
1,1,2-Trichloroethane	2.4	24	96	79-00-5
Trichloroethylene	1	10	40	79-01-6
2,4,5-Trichlorophenol	800	8000	32000	95-95-4
2,4,6-Trichlorophenol	4	40	160	88-06-2
Vinyl chloride	0.4	4	16	75-01-4
Xylenes (total)	100	1000	4000	1330-20-7

**Notes to Table A3:**

- For organic and inorganic chemical contaminants not listed in Table A3, contact the EPA for disposal requirements. Note that aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have deliberately not been listed in this table and need not be tested for.
- There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.
- These limits apply to chromium in the +6 oxidation state only.
- Analysis for cyanide (amenable) is the established method used to assess potentially leachable cyanide. Other methods may be considered by the EPA if it can be demonstrated that these methods yield the same information.
- Scheduled chemicals, polycyclic aromatic hydrocarbons and polychlorinated biphenyls are assessed by using SCC1, SCC2 and SCC3. No TCLP analysis is required.
- N/A means not applicable, but see Table A4 for SCC criteria.

**Table A4: Leachable concentration (TCLP) and total concentration (SCC) values for non-liquid waste classification<sup>1</sup>**

Contaminant	Maximum values for <i>leachable concentration</i> and <i>total concentration</i> when used <b>together</b> .						CAS registry number
	Inert waste		Solid waste		Industrial waste		
	Leachable concentration	Total concentration	Leachable concentration	Total concentration	Leachable concentration	Total concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	TCLP3 (mg/L)	SCC3 (mg/kg)	
Arsenic	0.5	500	5.0 <sup>2</sup>	500	20	2000	
Benzene	0.05	18	0.5 <sup>2</sup>	18	2	72	71-43-2
Benzo(a)pyrene <sup>3</sup>	0.004 <sup>3</sup>	1	0.04 <sup>4</sup>	10	0.16	23	50-32-8
Beryllium	0.1	100	1.0 <sup>5</sup>	100	4	400	
Cadmium	0.1	100	1.0 <sup>2</sup>	100	4	400	
Carbon tetrachloride	0.05	18	0.5 <sup>2</sup>	18	2	72	56-23-5
Chlorobenzene	10	3600	100 <sup>2</sup>	3600	400	14400	108-90-7
Chloroform	0.6	216	6 <sup>2</sup>	216	24	864	67-66-3
Chromium (VI) <sup>7</sup>	0.5	1900	5 <sup>2</sup>	1900	20	7600	
m-Cresol	20	7200	200 <sup>2</sup>	7200	800	28800	108-39-4
o-Cresol	20	7200	200 <sup>2</sup>	7200	800	28800	95-48-7
p-Cresol	20	7200	200 <sup>2</sup>	7200	800	28800	106-44-5
Cresol (total)	20	7200	200 <sup>2</sup>	7200	800	28800	1319-77-3
Cyanide (amenable) <sup>8,9</sup>	0.35	300	3.5 <sup>8</sup>	300	14	1200	
Cyanide (total) <sup>8</sup>	1.6	5900	16 <sup>8</sup>	5900	64	23600	
2,4-D	1	360	10 <sup>2</sup>	360	40	1440	94-75-7
1,2-Dichlorobenzene	0.43	155	4.3 <sup>2</sup>	155	17.2	620	95-50-1
1,4-Dichlorobenzene	0.75	270	7.5 <sup>2</sup>	270	30	1080	106-46-7
1,2-Dichloroethane	0.05	18	0.5 <sup>2</sup>	18	2	72	107-06-2
1,1-Dichloroethylene	0.07	25	0.7 <sup>2</sup>	25	2.8	100	75-35-4
Dichloromethane	0.86	310	8.6 <sup>2</sup>	310	34.4	1240	75-09-2
2,4-Dinitrotoluene	0.013	4.68	0.13 <sup>2</sup>	4.68	0.52	18.7	121-14-2
Ethylbenzene	3	1080	30 <sup>6</sup>	1080	120	4320	100-41-4
Fluoride	15	10000	150 <sup>6</sup>	10000	600	40000	
Lead	0.5	1500	5 <sup>2</sup>	1500	20	6000	
Mercury	0.02	50	0.2 <sup>2</sup>	50	0.8	200	
Methyl ethyl ketone	20	7200	200 <sup>2</sup>	7200	800	28800	78-93-3
Molybdenum	0.5	1000	5 <sup>6</sup>	1000	20	4000	

**Table A4: Leachable concentration (TCLP) and total concentration (SCC) values for non-liquid waste classification<sup>1</sup>**

Contaminant	Maximum values for <i>leachable concentration</i> and <i>total concentration</i> when used <b>together</b> .						CAS registry number
	Inert waste		Solid waste		Industrial waste		
	Leachable concentration	Total concentration	Leachable concentration	Total concentration	Leachable concentration	Total concentration	
	TCLP1 (mg/L)	SCC1 (mg/kg)	TCLP2 (mg/L)	SCC2 (mg/kg)	TCLP3 (mg/L)	SCC3 (mg/kg)	
Nickel	0.2	1050	2 <sup>6</sup>	1050	8	4200	
Nitrobenzene	0.2	72	2 <sup>2</sup>	72	8	288	98-95-3
C6-C9 petroleum hydrocarbons <sup>14</sup>	N/A <sup>14</sup>	650	N/A <sup>14</sup>	650	N/A <sup>14</sup>	2600	-
C10-C36 petroleum hydrocarbons <sup>14</sup>	N/A <sup>14</sup>	5000	N/A <sup>14</sup>	10000	N/A <sup>14</sup>	40000	-
Phenol (non-halogenated)	1.44	518	14.4 <sup>10</sup>	518	57.6	2073	108-95-2
Polychlorinated biphenyls <sup>11</sup>	N/A <sup>11</sup>	2	N/A <sup>11</sup>	<50	N/A <sup>11</sup>	<50	1336-36-3
Polycyclic aromatic hydrocarbons(total) <sup>11,12</sup>	N/A <sup>11</sup>	200	N/A <sup>11</sup>	200	N/A <sup>11</sup>	800	-
Scheduled chemicals <sup>11,13</sup>	N/A <sup>11</sup>	1	N/A <sup>11</sup>	<50	N/A <sup>11</sup>	<50	Refer to Appendix 5
Selenium	0.1	50	1 <sup>2</sup>	50	4	200	
Silver	0.5	180	5.0 <sup>2</sup>	180	20	720	
Styrene (vinyl benzene)	0.3	108	3 <sup>6</sup>	108	12	432	100-42-5
1,1,1,2 – Tetrachloroethane	1	360	10 <sup>2</sup>	360	40	1440	630-20-6
1,1,2,2-Tetrachloroethane	0.13	46.8	1.3 <sup>2</sup>	46.8	5.2	187.2	79-34-5
Tetrachloroethylene	0.07	25.2	0.7 <sup>2</sup>	25.2	2.8	100.8	127-18-4
Toluene	1.44	518	14.4 <sup>10</sup>	518	57.6	2073	108-88-3
1,1,1-Trichloroethane	3	1080	30 <sup>2</sup>	1080	120	4320	71-55-6
1,1,2-Trichloroethane	0.12	43.2	1.2 <sup>2</sup>	43.2	4.8	172.8	79-00-5
Trichloroethylene	0.05	18	0.5 <sup>2</sup>	18	2	72	79-01-6
2,4,5-Trichlorophenol	40	14400	400 <sup>2</sup>	14400	1600	57600	95-95-4
2,4,6-Trichlorophenol	0.2	72	2 <sup>2</sup>	72	8	288	88-06-2
Vinyl chloride	0.02	7.2	0.2 <sup>2</sup>	7.2	0.8	28.8	75-01-4
Xylenes (total)	5	1800	50 <sup>15</sup>	1800	200	7200	1330-20-7

**Notes to Table A4:**

1. For organic and inorganic chemical contaminants not listed in Table A4, contact the EPA for disposal requirements. Note that aluminium, barium, boron, chromium (0 and III oxidation states), cobalt, copper, iron, manganese, vanadium and zinc have deliberately not been listed in this table and need not be tested for.
2. USEPA final rule for TCLP levels (USEPA 1990a).
3. There may be a need for the laboratory to concentrate the sample to achieve the TCLP limit value for benzo(a)pyrene with confidence.
4. Calculated from: *Hazardous Waste: Identification and Listing; Proposed Rule* (USEPA 1995).
5. Calculated from: DiMarco & Buckett (1996); Imray & Langley (1996).
6. Calculated from: *Australian Drinking Waters Guidelines* (NHMRC 1994).
7. These limits apply to chromium in the +6 oxidation state only.
8. *Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soil; Proposed Rule* (USEPA 1993)
9. Analysis for cyanide (amenable) is the established method used to assess the potentially leachable cyanide.  
Other methods may be considered by the EPA if it can be demonstrated that these methods yield the same information.
10. Proposed level for phenol and toluene (USEPA 1990b).
11. Scheduled chemicals, polychlorinated biphenyls and polycyclic aromatic hydrocarbons are assessed by using SCC1, SCC2 and SCC3. No TCLP analysis is required.
12. Polycyclic aromatic hydrocarbons (total) is assessed as the total concentration of 16 USEPA Priority Pollutant PAHs, as follows:

PAH name	CAS Registry No.	PAH name	CAS Registry No.
Acenaphthene	83-32-9	Chrysene	218-01-9
Acenaphthylene	208-96-8	Dibenzo(a,h)anthracene	53-70-3
Anthracene	120-12-7	Fluoranthene	206-44-0
Benzo(a)anthracene	56-55-3	Fluorene	86-73-7
Benzo(a)pyrene	50-32-8	Indeno(1,2,3-cd)pyrene	193-39-5
Benzo(b)fluoranthene	205-99-2	Naphthalene	91-20-3
Benzo(ghi)perylene	191-24-2	Phenanthrene	85-01-8
Benzo(k)fluoranthene	207-08-9	Pyrene	129-00-0

13. Refer to Technical Appendix 5 for a list of chemicals regulated under the Scheduled Chemical Wastes Chemical Control Order 1994.
14. Petroleum hydrocarbons are assessed only by total concentration (SCC1, SCC2 or SCC3). Approximate range of petroleum hydrocarbon fractions: petrol C6-C9, kerosene C10-C18, diesel C12-C18, and lubricating oils above C18. Laboratory results are reported as four different fractions: C6-C9, C10-C14, C15-C28, C29-C36. The results of total petroleum hydrocarbons (C10-C36) analyses are reported as a sum of the relevant three fractions.
15. Calculated from *Guidelines for Drinking-Water Quality* (World Health Organisation 1993).

## Worked examples of non-liquid-waste assessment and classification

The examples below assume that you either know or have determined the *total concentration* of each chemical contaminant in your waste. In other words, you are at Step 5 or beyond in the flow diagram shown earlier in this part of the Appendix. The tables show the test results that you have to hand.

### Legend for all tables

N/D means not determined.

N/A means not applicable.

### Example 1

You have waste that has been tested and you have the following results:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, then
- if your waste meets all of the criteria of being *non-liquid*, and
- if your waste meets all of the criteria of not capable of environmentally significant physical, chemical and biological transformation (see Definitions and Glossary),

**then your waste can have a final classification of *inert waste*.**

### Example 2

Let us assume that nickel is also present in your waste:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	N/D	N/A	Solid

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the total concentration of nickel is greater than its CT1 maximum value of 4 but less than its CT2 maximum value of 40 in Table A3, your provisional classification can be solid.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *solid waste*.**

However, if you would like to be able to see if you may classify your waste as *inert waste*, then you need to determine the *leachable concentration* of nickel. (See Examples 3 and 4.)

### Example 3

This is the same as example 2, except that you chose to determine the leachable concentration (TCLP) for nickel and you got a value of 0.16:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.16	N/A	Inert

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is less than its TCLP1 maximum value of 0.2 and the total concentration of nickel is less than its SCC1 maximum value of 1050 in Table A4, your provisional classification can be inert.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, then
- if your waste meets all of the criteria of not capable of environmentally significant physical, chemical and biological transformation (see Definitions and Glossary), and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *inert waste*.**

#### Example 4

This is the same as example 2, except that you chose to determine the leachable concentration (TCLP) for nickel, and this time you got a value of 0.25:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *solid waste*.**

#### Example 5

This is the same as example 3, except that your waste is soil and now you also have 2325 mg/kg arsenic present, with a leachable concentration of 0.11 mg/L:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.16	N/A	Inert
Arsenic	2325	0.11	Yes	Inert

Since the total concentration of cadmium is less than its CT1 value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is less than its TCLP1 maximum value of 0.2 and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be inert.

Although the total concentration of arsenic exceeds its SCC3 maximum value in Table A4, its immobilisation is EPA-approved, and therefore you may classify it according to its leachable concentration of 0.11, which is less than its TCLP1 maximum value in Table A4, so your provisional classification is inert.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, then
- if your waste meets all of the criteria of not capable of environmentally significant physical, chemical and biological transformation (see Definitions and Glossary), and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *inert waste*.**

### Example 6

Same as example 5, except that your leachable concentration result for arsenic is 4.3 mg/L:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.16	N/A	Inert
Arsenic	2325	4.3	Yes	Solid

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is less than its TCLP1 maximum value of 0.2 and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be inert.

Although the total concentration of arsenic exceeds its SCC3 maximum value in Table A4, its immobilisation is EPA-approved, and therefore you may classify it according to its leachable concentration of 4.3, which is greater than its TCLP1 maximum value of 0.5 but less than its TCLP2 maximum value of 5.0 in Table A4, so your provisional classification is solid.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *solid waste*.**

### Example 7

Same as example 5, except that your leachable concentration result for arsenic is 6.2 mg/L:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.16	N/A	Inert
Arsenic	2325	6.2	Yes	Industrial

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is less than its TCLP1 maximum value of 0.2 and the total concentration of nickel is less than its SCC1 maximum value of 1050 in Table A4, your provisional classification can be inert.

Although the total concentration of arsenic exceeds its SCC3 maximum value in Table A4, its immobilisation is EPA-approved, and therefore you may classify it according to its leachable concentration of 6.2, which is greater than its TCLP2 maximum value of 5.0 but less than its TCLP3 maximum value of 20 in Table A4, so your provisional classification is industrial.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *industrial waste*.**

### Example 8

Same as example 5, except that your leachable concentration result for arsenic is 26.3 mg/L:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.16	N/A	Inert
Arsenic	2325	26.3	Yes	Hazardous

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is less than its TCLP1 maximum value of 0.2 and the total concentration of nickel is less than its SCC1 maximum value of 1050 in Table A4, your provisional classification can be inert.

Although the total concentration of arsenic exceeds its SCC3 maximum value in Table A4, its immobilisation is EPA-approved, and therefore you may classify it according to its leachable concentration of 26.3, which, however, is greater than its TCLP3 maximum value of 20 in Table A4, so your provisional classification is hazardous.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants,

**then your waste must have a final classification of *hazardous waste*.**

### Example 9

Same as example 4, except that you have mercury as well:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid
Mercury	5.7	N/D	N/A	Industrial

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Since the total concentration of mercury is greater than its CT2 maximum value of 4 and is less than its CT3 maximum value of 16 in Table A3, your provisional classification can be industrial.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *industrial waste*.**

However, if you would like to be able to see if you are able to classify your waste as *solid waste*, then you need to determine the *leachable concentration* of mercury. (See examples 10, 11 and 12.)

### Example 10

Same as example 9, except that you have determined the leachable concentration of mercury and got 0.17:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid
Mercury	5.7	0.17	N/A	Solid

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Since the leachable concentration of mercury is greater than its TCLP1 maximum value of 0.02 but less than its TCLP2 maximum value of 0.2, and the total concentration of mercury is less than its SCC2 maximum value of 50 in Table A4, your provisional classification can be solid.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *solid waste*.**

### Example 11

Same as example 10, except that you have determined the leachable concentration of mercury and got 0.22:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid
Mercury	5.7	0.22	N/A	Industrial

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Since the leachable concentration of mercury is greater than its TCLP2 maximum value of 0.2 but less than its TCLP3 maximum value of 0.8, and the total concentration of mercury is less than its SCC2 maximum value of 50 in Table A4, your provisional classification can be industrial.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants, and
- if your waste meets all of the criteria of being *non-liquid*,

**then your waste can have a final classification of *industrial waste*.**

### Example 12

Same as example 4, except that you have selenium, and you have determined its leachable concentration and got 5.1:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid
Selenium	146	5.1	N/A	Hazardous

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Since the leachable concentration of selenium is greater than its TCLP3 maximum value of 4 (and in spite of the fact that the total concentration of selenium is less than its SCC3 maximum value of 200 in Table A4), your provisional classification can be hazardous.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants,

**then your waste can have a final classification of *hazardous waste*.**

You must treat or store the waste.

### Example 13

Same as example 10, except that you have beryllium as well:

Chemical contaminant	Total concentration (SCC) (mg/kg)	Leachable concentration (TCLP) (mg/L)	Is immobilisation of contaminant EPA-approved? (yes/no)	Provisional classification
Cadmium	1.2	N/D	N/A	Inert
Lead	3.2	N/D	N/A	Inert
Nickel	25.3	0.25	N/A	Solid
Mercury	5.7	0.17	N/A	Solid
Beryllium	423	0.89	No	Hazardous

Since the total concentration of cadmium is less than its CT1 maximum value of 2.0 in Table A3, your provisional classification can be inert.

Since the total concentration of lead is less than its CT1 maximum value of 10 in Table A3, your provisional classification can be inert.

Since the leachable concentration of nickel is greater than its TCLP1 maximum value of 0.2 but less than its TCLP2 maximum value of 2, and the total concentration of nickel is less than its SCC2 maximum value of 1050 in Table A4, your provisional classification can be solid.

Since the leachable concentration of mercury is greater than its TCLP1 maximum value of 0.02 but less than its TCLP2 maximum value of 0.2, and the total concentration of mercury is less than its SCC2 maximum value of 50 in Table A4, your provisional classification can be solid.

The leachable concentration of beryllium is greater than its TCLP1 maximum value of 0.1 and less than its TCLP2 maximum value of 1; however, since the total concentration of beryllium is greater than its SCC3 maximum value of 400 in Table A4, and its immobilisation is not approved by the EPA, your provisional classification can be hazardous.

Now you must also apply the rules given earlier in this part of the Appendix, that is:

- you must classify the waste according to the highest classification given to any of the contaminants,

**then your waste can have a final classification of *hazardous waste*.**

You may now apply to the EPA with supporting technical documentation to have the immobilisation of beryllium approved. This can result in two possibilities:

- If the immobilisation of beryllium is approved by the EPA, then according to its leachable concentration it will be assessed as solid; therefore the waste sample may be classified as *solid waste* (since solid is the highest classification for any contaminant), as long as the waste meets the criteria of being *non-liquid*.
- If the immobilisation of beryllium is not approved by the EPA, the waste must be classified as *hazardous waste* and, therefore, must be treated or stored.

## TECHNICAL APPENDIX 2: IMMOBILISATION

### Part 1 Introduction

The immobilisation of a contaminant in waste may be the result of a specific treatment process that the waste has been subjected to, or it may simply be a natural property of that type of waste. From a protection-of-the-environment perspective the key issue is whether this immobilisation (that is, resistance to being leached out of the waste) is likely to last in the long term.

It is critical that the immobilisation of the contaminant is sustained over time, otherwise the rate of release of the contaminant could exceed the rate at which the local environment can cope with it or safely mineralise it.

The EPA may approve the immobilisation of specified contaminant(s) contained in a particular type of waste. Approvals of the immobilisation of contaminants may be given in the following ways:

- the EPA can issue general approvals which would apply to all waste generated that has the properties specified in the approval, or
- for a specific waste as a result of an individual application received by the EPA.

In either case, an approval is subject to such conditions determined by the EPA, and remains in force until such time as it is revoked by the EPA.

Approvals of immobilisation may specify conditions relating to the subsequent storage, treatment or disposal of the waste. For example, in certain cases the EPA will consider specific conditions (such as the segregation of such waste from all other types of waste in a monofill or a monocell) in order to achieve a greater margin of safety against a possible failure of the immobilisation in the future. These must not be contravened, otherwise a penalty may be imposed.

Table A5 (on the last page of this Technical Appendix) shows the waste types to which the EPA is planning to grant general approval in respect of the immobilisation of specific contaminants; it also specifies the conditions relevant to each approval. General approvals will be published in the Government Gazette once the EPA has evaluated the technical and scientific documentation provided. If the waste is not currently covered by a general approval, an application for a specific approval has to be made to the EPA.

Information to be provided for a waste that is already covered by a specific approval of immobilisation is covered in Part 3.

### Part 2 Treatment of waste to achieve the immobilisation of contaminants

**Unless the application for the approval of immobilisation relies on a natural property of the waste, some form of treatment/processing will be necessary to achieve the fixing of contaminants.**

While avoidance, reuse, recycling or reprocessing of waste are preferred options for waste management, it is recognised that sometimes treatment, then disposal, is the only option. If treatment is unavoidable the EPA's preferred options for waste treatment involve the removal or destruction of the toxic or ecotoxic contaminants to achieve *total concentration* (SCC) levels of less than SCC2, and *leachable concentration* levels of less than TCLP2. If this preferred option is not

feasible, the permanent immobilisation of inorganic contaminants by the use of physical and/or chemical treatment processes is encouraged. Dilution without achieving the immobilisation of contaminants is not an acceptable waste treatment option.

### **Macroencapsulation as a treatment option**

Macroencapsulation of *hazardous waste* is the least-preferred treatment option, since it merely places a physical barrier between the chemical contaminants in the waste and the surrounding environment. For example, macroencapsulation of mercury-containing batteries in cement will significantly reduce the degree of chemical attack on the batteries by landfill leachate, *but only while the cement casing is intact and free of cracks*. On the other hand, if the batteries were finely ground up, treated with appropriate chemicals and then mixed with cement and set into a solid block, the process would be *microencapsulation*.

### **Microencapsulation as a treatment option**

When waste is microencapsulated, the availability of the immobilised chemical contaminants for release into the environment is low because of the chemical and/or physical interactions between them and the encapsulating material, so that even if the encapsulated material is finely ground up (it should be noted the normal TCLP test for microencapsulated wastes requires crushing of the solid block only to pieces no larger than 9 mm in any dimension before leaching—as specified in Technical Appendix 1, the leachable concentration test results (TCLP) for the chemical contaminants of concern would be significantly lower than those for the untreated waste.

## **Part 3 The process for approval of immobilisation**

Direct all inquiries or applications for immobilisation approvals to the Hazardous Waste Regulation Unit of the EPA.

### **In general the following steps need to be followed by applicants:**

*Step 1. Check whether there is a general approval for immobilisation*

The applicant should check if the waste type is the same as one that is already the subject of a general approval of immobilisation. Locate this information by searching relevant issues of the NSW Government Gazette (to which the EPA will be able to guide you).

If there is a general approval of immobilisation, and there are no additional chemical contaminants that require approvals of immobilisation, then the general approval may be used and there is no need to make an application to the EPA for a specific approval. The onus will be on the generator of the waste to ensure that the waste is the same as the waste type specified in the general approval and that it is handled according to conditions set in the approval.

If there is no general approval, or there are additional contaminants that require approval, then proceed to Step 2.

*Step 2. Check if there is a similar specific approval that might apply to your waste*

The applicant should check with the EPA if the waste in question or a similar waste stream has already been approved for immobilisation. Previous approvals can be considered only if the physical/chemical properties of waste and the contaminants of concern are identical.

If there is no previous approval—general or specific—then follow Step 3. If there is an existing approval go to Step 4.

*Step 3. Information to be provided by to the EPA for consideration when applying for approval of immobilisation*

When applying for the approval of the immobilisation of chemical contaminants in waste as a result of treatment, the applicant will need to demonstrate that avoidance, reuse, recycling or reprocessing of the waste is not feasible. If the application is for recognition of natural immobilisation, the above information will not be required.

For applications involving macroencapsulation, the applicant will also need to demonstrate that another treatment method including microencapsulation is not feasible for the hazardous waste. The application must include a detailed description of the process undertaken to identify other treatment options. If other options are discarded because of cost factors, an estimate of the costs must be supplied.

**The applicant should include the following information in a submission seeking specific immobilisation approval:**

- the quantity of waste requiring treatment and/or disposal
- background information of the waste (origin), including the history of the site and the source of contamination if the waste is contaminated soil
- a description of the chemical composition of the waste
- the physical/chemical nature of the untreated waste, with test results, including pH, solid/moisture content, concentrations of chemical contaminants and TCLP (or other relevant leaching test) test values.
- chemical contaminants of concern (to be approved as immobilised)
- a description of the immobilisation treatment method/process, if any, with a detailed account of the materials and methods used in the process
- scientific evidence/justification to support the immobilisation of the contaminants of concern. This should include a summary of the following as applicable:
  - the mechanism and/or chemistry of immobilisation
  - reliable evidence of the successful application of any treatment process (that is proposed to be used) for the immobilisation of the contaminant(s) in the waste, in Australia or overseas
  - copies of reputable scientific or engineering journal articles supporting the successful immobilisation of contaminants (either natural or as a result of using the proposed process).
- a treatability report, based on a trial/pilot program or a bench scale study. This treatability report should include:
  - leaching performance (based on TCLP or other acceptable relevant leaching tests) of the immobilised contaminants
  - physical/chemical properties of the waste (as is, or after treatment if it is processed):for example, pH and physical characteristics (solid/moisture content, and whether is it rigid, powdery or a paste)
  - evidence that the treated waste is likely to be stable in the long-term.

**Note:** This aspect is especially relevant to the immobilisation of waste with **high concentrations of contaminants that are bonded within the matrix solely by physical means** (for example, in some cases of microencapsulation), where, for example, it is desirable for the treated waste to attain an unconfined compressive strength in excess of 350 kPa as an indicator of long-term stability; we can conclude that unconfined compressive strength is an important factor when the leachable concentrations of contaminants determined for treated waste that has been reduced to a fine powder are at least twice as large than those obtained by testing the

'coarse' sample (less than 9 mm in any dimension), which is normally used for the TCLP testing of encapsulated waste.

- information demonstrating that they can operate any treatment process involved reproducibly, and that they can consistently achieve test results similar to those of the treatability study upon which an approval is based (Include a description of the proposed quality assurance scheme for the treatment process.)

*Step 4. Information to be provided by the applicant for types of waste already covered by a specific approval of immobilisation issued to another waste generator.*

If the waste or similar waste stream has already been subject to a specific approval issued by the EPA to another waste generator but is not covered by a general approval, the applicant should submit the following information:

- the quantity of waste to be disposed of
- background information on the waste (origin), including the history of the site and the source of contamination if the waste is contaminated soil
- the physical/chemical nature of the untreated waste, with test results, including pH, solid/moisture content, concentrations of chemical contaminants and TCLP (or other relevant leaching test) test values
- a description of the chemical composition of the waste
- chemical contaminants of concern (to be approved as immobilised)
- a treatability report based on a trial/pilot program or a bench-scale study.

### **How the EPA is likely to assess applications**

Unfortunately there is no single assessment criterion for measuring the performance of the immobilised waste. Since the chemistry of different waste types and/or of treatment processes used to fix chemical contaminants in waste can be very different, it is difficult to make hard and fast rules that will apply to the assessment of all wastes.

The EPA's primary concern is to ensure that the immobilisation of the contaminant is sustained over time, otherwise the rate of release of the contaminant could exceed the rate at which the local environment can cope with it or safely mineralise it. The thrust of the EPA's assessment of applications will be to determine if adequate information has been supplied to demonstrate that this is the situation. The EPA will consider information and test results supplied by applicants on both the physical and chemical nature of the immobilised waste while assessing the application. Depending on the waste, such test results and other information to be provided by the applicant may typically include:

- Toxicity Characteristics Leaching Procedure
- Multiple Extraction Procedure for highly alkaline waste (for example, cement/lime treated waste or waste with pH >11)
- a buffering capacity test to determine the ability of the immobilised waste to maintain a pH value when exposed to acidic or basic situations
- a test to determine whether unreacted treatment reagents are present in the chemically treated waste; if such reagents are present, then discuss whether they are toxic and/or bioavailable
- the likelihood of long-term stability, to determine the durability and or physical strength of the immobilised waste as discussed in Part 3, Step 3 above

- documentation showing that appropriate sampling and statistical procedures are used to ensure that the test results are representative of the whole of the waste being assessed/evaluated.

It is important for the applicant to demonstrate that the fixing of the contaminants works 'in principle'. It is equally important for the applicant to demonstrate that the waste stream for which the approval will apply is consistent in its characteristics from one batch to the next, irrespective of whether the waste is proposed to be treated or a natural immobilisation is involved. If the EPA requires additional information to be supplied by the applicant, the EPA will advise the applicant of this.

## **Part 4 How to assess waste once an approval of immobilisation is obtained**

**Wherever EPA approval has been given for the immobilisation of one or more of the contaminants that it contains, the waste can be classified according to the *leachable concentration (TCLP) test results alone for the specifically nominated contaminants in the approval.*** In other words, the *total concentration (SCC)* of the contaminants specifically nominated in the approval may be ignored in the assessment of the waste. However, any contaminants not specifically nominated in the approval must still be assessed using both SCC and TCLP. (See Technical Appendix 1.) If the immobilisation of a contaminant for which TCLP limits are not specified in the guidelines is approved, the EPA will advise on the management options that are available for such materials.

Worked examples 5, 6, 7, 8 and 13 contained in Part 5 of Technical Appendix 1 demonstrate how approvals of immobilisation are used in the assessment and classification procedures for non-liquid wastes.

## **Part 5 How to interpret landfill disposal restrictions in approvals**

If there are no disposal restrictions specified, then the waste may be disposed of according to the final classification of the waste.

If there is a disposal restriction which states that the 'waste cannot be co-disposed with putrescible wastes', then the waste cannot be disposed of in *solid waste class 1 landfill* (municipal putrescible landfill) cells or other landfill cells in which putrescible wastes are disposed of.

In some circumstances, due to an overriding concern to apply the 'precautionary principle', some wastes will be required to be managed not in accordance with their classification, but in a way that ensures that their disposal is to landfills that have appropriate leachate-management systems. Such wastes may be disposed of only to an industrial waste landfill or to a licensed solid waste landfill with a currently operating leachate-management system. For example, treated industrial sludges containing high concentrations of metal oxides/hydroxides would need to be disposed of in landfills that have effective leachate-management systems.

The disposal restriction in an immobilisation approval for wastes of this type would state that the waste must be disposed of to landfills licensed to receive that particular class of waste and that have currently operating leachate-management systems.

The following points concerning disposal restrictions should also be noted:

- There may be cases where a waste is assessed as *inert waste* but an immobilisation approval requires a waste to only go to 'solid waste landfills or industrial waste landfills which have currently operating leachate-management systems and which are licensed to receive that particular class of waste'. This means that such waste cannot be disposed of to an inert waste landfill, but must go to solid waste landfills or industrial waste landfills which have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction.
- There may be cases where a waste is assessed as *solid waste* but an immobilisation approval requires a waste to only go to 'solid waste landfills or industrial waste landfills which have currently operating leachate-management systems and which are licensed to receive that particular class of waste'. This means that such waste must go to solid waste landfills or industrial waste landfills that have licence conditions to receive waste subject to immobilisation approvals with this type of disposal restriction.
- Where the final classification of the waste, as determined in accordance with Technical Appendix 1, is *industrial waste*, then the waste may go only to landfills licensed to receive industrial waste. It should be noted that such landfills will always be required to have effective leachate-management systems.
- The onus is on the generator/owner of the waste to ensure that the point of disposal meets the disposal conditions in the immobilisation approval. This can be achieved in practice by inspecting that part of the landfill's licence that specifies the types of waste which it is permitted to receive and ensuring that it has a condition that enables it to receive waste subject to immobilisation approvals with the particular disposal restriction described above.
- If the final classification of any waste as determined in accordance with Technical Appendix 1 is *hazardous waste*, then the waste may not be disposed of to landfill and must be (further) treated to be able to be classified as *inert*, *solid* or *industrial waste*; failing that, it must be stored until a suitable treatment option becomes available.
- Other restrictions (if any) will be expected to be self-explanatory.
- **Whenever approval for macroencapsulation of a particular waste has been given, the appropriately encapsulated waste may be disposed of without TCLP testing to a landfill or cell at a landfill that is permitted by licence conditions to receive *industrial waste*.**
- Immobilised wastes containing scheduled chemicals (see Technical Appendix 5) or polychlorinated biphenyls in concentrations of 50 mg/kg or greater cannot be disposed of to landfill.

<b>Table A5: Waste types for which a general approval of immobilisation will apply<sup>1</sup></b>			
<b>Waste type</b>	<b>Immobilised contaminant(s)<sup>2</sup></b>	<b>Specification of nature of immobilisation or treatment process</b>	<b>Special conditions relating to approval<sup>3</sup></b>
CCA-treated timber	Arsenic and chromium	Natural	Must be disposed of to solid waste landfills or industrial waste landfills that have currently operating leachate management systems <sup>4</sup> and that are licensed to receive that particular class <sup>2</sup> of waste.
Creosote-treated timber	Creosote	Natural	Must be disposed of to solid waste landfills or industrial waste landfills that have currently operating leachate management systems <sup>4</sup> and that are licensed to receive that particular class <sup>2</sup> of waste.
Cattle-dip-contaminated soil	Arsenic	Natural	Must not be co-disposed with putrescible waste (monocell or monofill recommended).
Activated carbon	Contaminants in Table A4 (of Technical Appendix 1) <b>except:</b> chemicals or declared chemical wastes subject to Chemical Control Orders; and C <sub>6</sub> -C <sub>9</sub> petroleum hydrocarbons.	Natural	Powdery materials must be bagged or drummed or otherwise contained (such as in closed cartridges) to avoid dust generation during handling.
<p>Notes:</p> <ol style="list-style-type: none"> <li>1. General approvals relating to these waste types are expected to be gazetted by 1 July 1999, and others may be published from time to time in the Government Gazette. <b>It is important that the actual gazetted approvals are examined (when available) since they may contain requirements that are not specified in this table.</b></li> <li>2. This means that <i>total</i> concentration (SCC1, SCC2 or SCC3) limits in Table A4 of Technical Appendix 1 do not apply to the contaminants listed in this table (in the same row as the waste type), and therefore these particular contaminants may be assessed according to their <i>leachable concentration</i> (TCLP) only. For contaminants not listed here, the normal assessment process applies.</li> <li>3. See Part 5 of this Technical Appendix 'How to interpret landfill disposal restrictions in approvals'.</li> <li>4. This can be verified by inspecting that part of the landfill's licence that specifies the types of waste which it is permitted to receive and ensuring that it has a condition which enables it to receive waste subject to immobilisation approvals with this type of disposal restriction.</li> </ol>			

## TECHNICAL APPENDIX 3: TRIPLE-RINSING PROCEDURE FOR CLEANING CONTAINERS

(**Note:** It is acceptable to use other rinsing treatments, such as pressure rinsing or integrated rinsing, if the results achieved are equal to or better than those from the triple-rinse procedure.)

The information provided below has been adapted from the National Association for Crop Protection and Animal Health (AVCARE) publication *Effective Rinsing of Farm Chemical Containers*.

### Effective rinsing of farm chemical containers

#### Rinsing is a good management practice

Proper rinsing and cleaning are the first steps in the safe disposal of empty chemical containers.

Rinsing must be done immediately after emptying the container, as residues on the walls are more difficult to remove when dry.

Under current regulations in most States, containers that have not been properly rinsed can be classified as hazardous waste.

Recycling schemes are now operating for properly rinsed metal containers and some 20 L plastic drums.

For information on procedures for draining and cleaning oil-based, ultra low-volume (ULV) and low-volume (LV) insecticide spray containers, contact AVCARE or the Project Manager.

#### Rinsing makes good economic sense

The following table shows the loss, at two costs per litre for the product, from 150 mL and 300 mL of chemical left behind in containers not thoroughly cleaned (300 mL represents 1.5% of a 20-litre drum).

Amount of residue	Loss at \$20.00/litre	Loss at \$30.00/litre
150 mL	\$3.00	\$4.00
300 mL	\$6.00	\$9.00

#### Triple-rinsing (a three-stage rinsing process)

1. Empty the contents into the spray tank and allow the container to drain for an extra 30 seconds after the flow reduces to drops.
2. Fill the container with clean water to between 20% and 25% of its capacity and replace the cap securely.
3. Shake, rotate, roll or invert the container vigorously for at least 30 seconds, so that the rinse reaches all inside surfaces.

4. Add the rinsate from the container into the spray tank. Let it drain for an extra 30 seconds after the flow reduces to drops.
5. Repeat until the container has been rinsed three times.

For animal dips, add the rinsate to the dip or medicated water.

For animal drenches, dispose of the rinsate in a disposal pit specifically set up for this purpose, clear of waterways, vegetation and roots.

### **Follow these procedures after rinsing the container**

1. Check the container thread and outside of the container and, if contaminated, rinse with a hose into the spray tank. Rinse the cap separately in a bucket of water and pour this into the spray tank.
2. Do not puncture plastic 20 L containers included in recycling/reuse programs, and replace the caps on these containers.
3. Puncture all other containers. (This is specifically required for containers to be disposed of to landfill.) To ensure that it is fully drained, puncture from the inside, for example using a crowbar through the container opening. Let them dry completely and store in a dry place awaiting disposal.

### **Standards for container disposal**

Inspection of containers is necessary to ensure that containers can be safely recycled or disposed of at authorised landfills. There must be no product residue on the inside or the outside of the container.

Visible residues can be powder, flake, coloured/dark fluid or clear liquid.

The container must have been triple-rinsed or pressure-rinsed.

Evidence of rinsing includes: puncture holes from pressure-rinsing tools, cuts or puncture holes after rinsing, and a statement by the farmer or applicator that the container has been rinsed (but this must be backed up by other evidence of rinsing).

The presence of free product in the container is evidence that rinsing has not been carried out.

The cap and the threads of the container opening must be free of residues.

The container should carry labels to provide inspectors with positive identification of the material being handled.

If a container is rejected, the farmer or applicator should rinse the container back at the farm and use the rinsate to make up an application of the same chemical according to label recommendations.

### **Where to seek advice**

National Association for Crop Protection and Animal Health (AVCARE)

Locked Bag 916

Canberra City ACT 2601

Phone: (02) 6230 6399

Fax: (02) 6230 6355

Website: [www.avcare.org.au](http://www.avcare.org.au)

Program Manager—Agsafe Container Management Program

***drumMUSTER***

GPO Box 816

Canberra City ACT 2601

Phone: (02) 6230 6712

Fax: (02) 6230 6713

Email: [drummuster@agsafe.aust.com](mailto:drummuster@agsafe.aust.com)

## TECHNICAL APPENDIX 4: DESCRIPTIONS OF WASTE FOR REPORTING PURPOSES

To enable the reporting of waste to the EPA, by both licensed and unlicensed generators, storers (waste activities), waste transporters, waste facilities or mobile plants (including storing, processing, reprocessing, recycling, treatment and disposal of waste), the waste categories shown in Table A6 are those used in List 1, Schedule A of the *National Environment Protection (Movement of Controlled Wastes between States and Territories) Measure* made under the *National Environment Protection Council Act 1994* of the Commonwealth on 26 June 1998. The alphanumeric (letter and number) waste codes corresponding to the waste category is adequate for the purposes of reporting.

Acidic solutions or acids in solid form	B100
Animal effluent and residues (abattoir effluent, poultry and fish processing wastes)	K100
Antimony; antimony compounds	D170
Arsenic; arsenic compounds	D130
Asbestos	N220
Barium compounds (excluding barium sulfate)	D290
Basic solutions or bases in solid form	C100
Beryllium; beryllium compounds	D160
Boron compounds	D310
Cadmium; cadmium compounds	D150
Ceramic-based fibres with physico-chemical characteristics similar to those of asbestos	N230
Chlorates	D350
Chromium compounds (hexavalent and trivalent)	D140
Clinical and related wastes	R100
Cobalt compounds	D200
Containers which are contaminated with residues of substances referred to in this list	N100
Copper compounds	D190
Cyanides (inorganic)	A130
Cyanides (organic)	M210
Encapsulated, chemically-fixed, solidified or polymerised wastes	N160

Ethers	G100
Filter cake	N190
Fire debris and fire wash waters	N140
Fly ash	N150
Grease-trap waste	K110
Halogenated organic solvents	G150
Highly odorous organic chemicals (including mercaptans and acrylates)	M260
Inorganic fluorine compounds, excluding calcium fluoride	D110
Inorganic sulfides	D330
Isocyanate compounds	M220
Lead; lead compounds	D220
Mercury; mercury compounds	D120
Metal carbonyls	D100
Nickel compounds	D210
Non-toxic salts	D300
Organic phosphorus compounds	H110
Organic solvents, excluding halogenated solvents	G110
Organohalogen compounds—other than substances referred to in this list	M160
Perchlorates	D340
Phenols, phenol compounds including chlorophenols	M150
Phosphorus compounds, excluding mineral phosphates	D360
Polychlorinated dibenzo-furan (any congener)	M170
Polychlorinated dibenzo-p-dioxin (any congener)	M180
Residues from industrial waste treatment/disposal operations	T190
Selenium; selenium compounds	D240
Sewage sludge and residues, including night soil and septic tank sludge	K130
Soils contaminated with a controlled waste	N120
Surface active agents (surfactants), containing principally organic constituents and possibly contain metals and inorganic materials	M250
Tannery wastes (including leather dust, ash, sludges and flours)	K140
Tellurium; tellurium compounds	D250
Thallium; thallium compounds	D180
Triethylamine catalysts for setting foundry sands	M230

Tyres	T140
Vanadium compounds	D270
Waste chemical substances arising from research and development or teaching activities, including those which are not identified and/or are new, and whose effects on human health and/or the environment are not known	T100
Waste containing peroxides other than hydrogen peroxide	E100
Waste from heat treatment and tempering operations containing cyanides	A110
Waste from manufacture, formulation and use of wood-preserving chemicals	H170
Waste from the production, formulation and use of biocides and phytopharmaceuticals	H100
Waste from the production, formulation and use of inks, dyes, pigments, paints, lacquers and varnish	F100
Waste from the production, formulation and use of organic solvents	G160
Waste from the production, formulation and use of photographic chemicals and processing materials	T120
Waste from the production, formulation and use of resins, latex, plasticisers, glues and adhesives	F110
Waste from the production and preparation of pharmaceutical products	R140
Waste mineral oils unfit for their original intended use	J100
Waste oil/water, hydrocarbons/water mixtures or emulsions	J120
Waste pharmaceuticals, drugs and medicines	R120
Waste resulting from surface treatment of metals and plastics	A100
Waste tarry residues arising from refining, distillation, and any pyrolytic treatment	J160
Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs), polychlorinated naphthalenes (PCNs), polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)	M100
Wool scouring wastes	K190
Zinc compounds	D230

## TECHNICAL APPENDIX 5: SCHEDULED CHEMICAL WASTES

Table A7 lists the chemicals controlled by the Scheduled Chemical Wastes Chemical Control Order 1994, under the *Environmentally Hazardous Chemicals Act 1985*.

Wastes are considered to be scheduled chemical wastes if they contain one or more of the constituents in the following list, where the total concentration of those constituents is more than one milligram per kilogram.

<b>Table A7: Scheduled chemical wastes</b>					
<b>Chemical</b>	<b>CAS registry No.</b>	<b>Chemical</b>	<b>CAS registry No.</b>	<b>Chemical</b>	<b>CAS registry No.</b>
Aldrin	309-00-2	DDD	72-54-8	Hexachlorophene	70-30-4
Benzene, hexachloro	118-74-1	DDE	72-55-9	Isodrin	465-73-6
Benzene, pentachloronitro	82-68-8	DDT	50-29-3	Pentachlorobenzene	608-93-5
Alpha-BHC	319-84-6	Dieldrin	60-57-1	Pentachlorophenol	87-86-5
Beta-BHC	319-85-7	Endrin	72-20-8	1,2,4,5-tetrachlorobenzene	95-94-3
Gamma-BHC Lindane	58-89-9	Endrin aldehyde	7421-93-4	2,3,4,6-tetrachlorophenol	58-90-2
Delta-BHC	319-86-8	Heptachlor	76-44-8	1,2,4-trichlorobenzene	120-82-1
Chlordane	57-74-9	Heptachlor epoxide	1024-57-3	2,4,5-Trichlorophenoxy-acetic acid, salts and esters	93-76-5

## TECHNICAL APPENDIX 6: PRACTICAL QUANTITATION LIMITS

The practical quantitation limits (PQLs) listed in Table A8 are typical for solid wastes and TCLP leachates, and conform with United States Environmental Protection Agency and American Public Health Association methods. The PQLs that are attainable in any particular case depend on the capabilities of the analytical instrumentation employed, the instrumental stability, the complexity of the contaminant matrix and the specific analytical technique(s) employed.

The lower the PQL for an analyte as compared with the actual concentration being measured, the greater is the precision to which its concentration can be estimated. Assuming that there is good homogeneity in the sample, the greater the precision of the determination, the smaller the variability of the results; hence the closer the estimated mean value for an analyte may lie to a particular limit while still maintaining a high degree of confidence that the actual value does not exceed the specified limit.

<b>Table A8: Practical quantitation limits</b>		
<b>Chemical contaminant</b>	<b>Practical quantitation limits</b>	
	<b>for SCC (mg/kg)</b>	<b>for TCLP (mg/L)</b>
Arsenic	50	0.5
Benzene	1	0.005
Benzo(a)pyrene	1	0.01
Beryllium	10	0.1
Cadmium	10	0.1
Carbon tetrachloride	1	0.005
Chlorobenzene	1	0.005
Chloroform	1	0.005
Chromium (VI)	20	0.2
o-Cresol	1	0.01
m-Cresol	1	0.01
p-Cresol	1	0.01
Cresol (total)	1	0.01
Cyanide (amenable)	0.5	0.05
Cyanide (total)	0.5	0.05
2,4-D	0.4	0.02
1,4-Dichlorobenzene	1	0.005
1,2-Dichlorobenzene	1	0.005
1,2-Dichloroethane	1	0.005

<b>Table A8: Practical quantitation limits</b>		
<b>Chemical contaminant</b>	<b>Practical quantitation limits</b>	
	<b>for SCC (mg/kg)</b>	<b>for TCLP (mg/L)</b>
1,1-Dichloroethylene	1	0.005
Dichloromethane	1	0.005
2,4-Dinitrotoluene	1	0.01
Ethylbenzene	1	0.005
Fluoride	10	0.5
Lead	50	0.5
Mercury	0.2	0.002
Methyl ethyl ketone	1	0.005
Molybdenum	20	0.2
Nickel	20	0.2
Nitrobenzene	1	0.01
C6–C9 petroleum hydrocarbons	1	–
C10–C36 petroleum hydrocarbons	1	–
Phenol (non-halogenated)	1	0.01
Polycyclic aromatic hydrocarbons (total)	1	–
Selenium	50	0.5
Silver	20	0.5
Styrene (vinyl benzene)	1	0.005
1,1,1,2- Tetrachloroethane	1	0.005
1,1,2,2-Tetrachloroethane	1	0.005
Tetrachloroethylene	1	0.005
Toluene	1	0.005
1,1,1-Trichloroethane	1	0.005
1,1,2-Trichloroethane	1	0.005
Trichloroethylene	1	0.005
2,4,6-Trichlorophenol	1	0.01
2,4,5-Trichlorophenol	1	0.01
Vinyl chloride	1	0.005
Xylenes (total)	1	0.005

# TECHNICAL APPENDIX 7: BENCHMARK TECHNIQUES

## Part 1 Introduction

This technical appendix describes two benchmark techniques that deal with the following issues:

- aqueous liquid treatment ponds
- disposal of liquid wastes to landfill.

These new benchmark techniques must be read in conjunction with the *Environmental Guidelines: Solid Waste Landfills* (Landfill Guidelines) released by the EPA in May 1996.

It should be noted that certain liquid wastes may be suitable for beneficial use (see Section 4.8.2) with or without some form of pretreatment, in which case beneficial use may be preferable to the treatment or disposal methods described below.

### Aqueous liquid treatment ponds

Aqueous liquid treatment ponds may be used for the following purposes:

- to settle out suspended solids contained in aqueous liquids and then to decant the clarified water and discharge it into the environment in accordance with a licence issued under the *Protection of the Environment Operations Act 1997*, leaving a waste that satisfies the requirements of *being non-liquid* and that may then be:
  - sent for reuse, recycling, processing, reprocessing or further treatment, or
  - disposed of to a landfill that is licensed to accept it or that may otherwise lawfully receive it,  
or
  - left in the pond if the facility's licence conditions permit it or if the facility may otherwise lawfully do so.

Such a process may apply to dredging operations, stone-cutting slurries, cement-containing effluents and other suitable aqueous liquid wastes. After the settling process, the decanted water should preferably be of good enough quality for it to be lawfully discharged into the environment as mentioned above—otherwise it must be treated further before being discharged.

- to contain the aqueous liquid securely until the water evaporates naturally, leaving a waste that satisfies the requirements of *being non-liquid* and that may be:
  - sent for reuse, recycling, processing, reprocessing or further treatment, or
  - disposed of to a landfill that is licensed to accept it or that may otherwise lawfully receive it,  
or
  - left in the pond if the facility's licence conditions permit it or if the facility may otherwise lawfully do so.

The management of septic tank effluent is an example of a case in which such a treatment process may apply in certain rural areas, provided that a more suitable treatment facility for the effluent is not available locally.

## Disposal of liquid waste to landfill

As already mentioned in Section 4.3.1, the disposal of liquid waste to land can lead to negative environmental impacts due to the presence of contaminants. Being in the liquid form and, therefore, less easily contained than non-liquid wastes, dissolved and suspended contaminants in liquid wastes have a greater potential to contaminate land and waters than non-liquid wastes. This can occur by run-off to surface waters or by infiltration through soil to subsurface waters. Should liquid waste percolate through other (non-liquid) waste at the site before run-off or infiltration, it is likely that it will be contaminated further with dissolved or suspended contaminants.

For this reason, the *Environmental Guidelines: Solid Waste Landfills* released by the EPA in May 1996 signalled that, in general, only non-liquid wastes—'wastes that meet the requirements of being physically solid (non-liquid)'—should be accepted for disposal at landfills.

- In rural NSW (that is, outside the Sydney Metropolitan Area and the Extended Regulated Area), where infrastructure is not yet available for the treatment of liquid wastes, occupiers of licensed *solid waste class 1 landfills* may apply to the EPA to have their licences modified so that they can accept liquid wastes such as septage and grease-trap pump-out wastes.

In these applications, landfill occupiers should outline the reasons for the request, and should submit an annex to their existing Landfill Environment Management Plans (LEMPs), describing how they propose to manage the receipt of such liquid wastes in a way that minimises potential negative environmental and/or health impacts, and ensuring that they provide the information specified below. The two new benchmark techniques below (to be read in conjunction with the Landfill Guidelines) should help occupiers prepare the above-mentioned annex to the LEMP.

Information in relation to the following matters must be provided in the annex to the existing LEMP with each application for licence conditions enabling licensed landfills to receive liquid wastes:

1. the location of the landfill site
2. the name and address of the occupier of the landfill site
3. the licence number
4. the average annual rainfall and evaporation rate in the region where the landfill site is located
5. the quantity per year of non-liquid municipal waste disposed of at the landfill site
6. the type(s) of liquid waste proposed to be disposed at the landfill site, the quantities involved and the period for which this special licence condition is sought
7. the source (including a description of the geographical area where the waste(s) is (are) generated) of the liquid waste(s) proposed to be disposed of
8. the name(s), and address(es) of the liquid waste treatment plants and/or collection points that are capable of accepting the liquid waste(s)
9. documentation explaining why liquid waste treatment plants and/or collection points that are capable of accepting the liquid waste(s) refuse to accept them, or why sending these wastes to them is not practicable
10. distance to the nearest ground water, and the classification of that ground water according to the Department of Land and Water Conservation's groundwater vulnerability criteria, and the use(s) (if any) of that ground water
11. distance(s) to surface water(s), and the uses (if any) for the surface water(s), residence(s) and other environmentally sensitive sites (as listed in Table A9 of Technical Appendix 8 in these guidelines)

- 12.a description of how the receipt of liquid wastes will be managed by the landfill occupier, including how the occupier will ensure that:
- only the types and quantities of liquid wastes specified in the licence will be disposed of at the landfill
  - other users of the landfill cannot come into contact with the liquid waste(s)
  - the details of the amount and type of waste disposed, the time and date of discharge, the transporter of the waste and the discharge location within the site will be recorded
  - pollution of ground and/or surface waters, and lowering of the local amenity and health risks to landfill users (as well as the local community) will be avoided.

## **Part 2 Benchmark techniques**

### **40. Aqueous liquid treatment ponds**

#### **Primary environmental goal**

2.1.1 Preventing pollution of water by leachate

#### **Related environmental goals**

2.1.2 Detecting water pollution

2.1.3 Remediating water pollution

2.2.1 Preventing landfill gas emissions

2.3.1 Assuring quality of design, construction and operation

2.3.2 Assuring quality of incoming waste

2.3.3 Recording of wastes received

2.4.1 Preventing unauthorised entry

2.4.2 Preventing degradation of local amenity

Liquid treatment ponds should be designed and installed in accordance with the quality requirements specified in an approved Construction Quality Assurance Program.

This benchmark technique does not apply to the treatment of stormwater, which should be handled as specified in the Stormwater Manual.

The benchmark technique for liquid waste treatment ponds has a liner system that forms a barrier between groundwater, soil and substrata and the liquid. Characteristics of a suitable liner include:

- a recompacted clay or modified soil liner at least 90 cm thick, with an in-situ coefficient of permeability of less than  $10^{-9} \text{ ms}^{-1}$ . Successive layers should be of compatible material, and each underlying layer should be scoured to prevent excessive permeability due to laminations. The sides should generally have a slope not exceeding a gradient of one vertical to three horizontal, in order to allow suitable compaction of the barrier and to facilitate subsequent testing.
- If the pond is located in an area of poor hydrological conditions, or otherwise, that has a significant potential threat to surface or ground waters, the clay or modified soil liner should be overlaid with a flexible membrane liner (FML) with a minimum coefficient of permeability of  $10^{-14} \text{ ms}^{-1}$ . The FML should have material properties that ensure it can maintain this permeability while the pond is in use. The FML should have a minimum thickness of 1.5 mm, and be laid according to procedures in an approved construction quality assurance program. All joins and repairs should be fully tested to ensure that the liner integrity is not breached, and the FML

should be protected by an overlay of soil with low abrasive properties or synthetic non-woven geotextile of sufficient depth to protect it against load-induced damage.

- Where the natural geology of the site is proposed to be used as the barrier system, an extensive hydrogeological investigation should be conducted by a competent entity to prove the efficacy of the barrier. This assessment should include, but not be limited to, the following:
  - the extent of the material
  - the permeability of the material to water
  - the integrity of the material, and presence of any imperfections that may compromise its effectiveness (such as root holes, cracks, or gravel layers)
  - any possible reactions between the material and the liquids treated.
- The pond should be bunded in a manner that prevents the run-on of surface water into the pond.
- The capacity of the pond should be such that it can accept rainfall from a 1-in-25-year one-day duration storm event without overflowing.

Observe the following when treating liquids specified in the facility's licence:

- For discrete deliveries by road transport, the occupier of the facility or his/her authorised representative should be present at the site to:
  - check before discharge that the liquid is of a type suitable for treatment
  - directly supervise the discharge of liquids
  - ensure that any spillage of liquid waste at the site is cleaned up as soon as practicable
  - ensure that other users of the facility, if any, cannot come into contact with the liquid waste
  - record the details of the amount and type of liquid discharged, the time and date of discharge, the discharge location within the site, and the transporter of the waste.

If, however, the liquid discharge is a continuous process, the occupier should propose alternative arrangements for satisfying the above conditions.

- The discharge of odorous liquid wastes, such as septic tank effluent (which, if untreated, is also likely to contain high concentrations of pathogenic organisms) and grease-trap wastes, should not result in the degradation of the amenity of nearby residents or in health risks to workers, other users of the landfill or nearby residents. It may be necessary for the occupier to use active measures designed to aerate liquid wastes containing high levels of organic nutrients in order to make sure that odour emissions from the treatment pond are reduced as far as is practicable.

## **41. Disposal of liquid waste to landfill**

### **Primary environmental goal**

2.1.1 Preventing pollution of water by leachate

### **Related environmental goals**

2.1.2 Detecting water pollution

2.1.3 Remediating water pollution

2.2.1 Preventing landfill gas emissions

2.3.1 Assuring quality of design, construction and operation

2.3.2 Assuring quality of incoming waste

### 2.3.3 Recording of wastes received

#### 2.4.1 Preventing unauthorised entry

#### 2.4.2 Preventing degradation of local amenity

The disposed liquid waste should be securely contained within the landfill over the period of time that it is in a liquid form and therefore poses a potential for environmental degradation. For this reason, *solid waste class 1 landfills* that wish to receive certain aqueous liquid wastes should generally have effective leachate barrier and leachate-collection systems.

If such landfills also recirculate leachate into the completed parts of the landfill, it may be quite feasible to inject certain liquid wastes received into the completed parts of the landfill as well, as long as the capacity of the waste in the landfill to absorb liquids is not exceeded. The injection may be achieved either by using the existing leachate-recirculating system or by constructing a separate liquid-injection system. It should be demonstrated that the capacity of the leachate-collection system is not exceeded by the additional quantity of liquids present.

If the direct injection described above is not feasible, liquid waste may be discharged directly on to non-liquid waste in a bunded secure area. The discharge of liquid wastes should take place only when the absorptive capacity of the non-liquid waste in the secure area is (and is expected to continue to be) sufficient to prevent ponding, run-off, infiltration into ground, or the pollution of waters, which is an offence unless the polluter holds and complies with the conditions of a licence under the *Protection of the Environment Operations Act 1997*.

Observe the following when disposing of liquid wastes specified in the facility's licence:

- The occupier of the facility or their authorised representative should be present at the site to:
  - check before discharge that the liquid waste is of a type suitable for disposal
  - directly supervise the discharge and disposal of liquid wastes until all the liquid waste has been absorbed and no ponding or runoff of liquid waste is evident
  - ensure that any spillage of liquid waste at the site is cleaned up as soon as practicable
  - ensure that other users of the landfill cannot come into contact with the liquid waste
  - record the details of the amount and type of waste disposed, the time and date of discharge, the transporter of the waste, and the discharge location within the site.
- The discharge of odorous liquid wastes, such as septic tank effluent (which if untreated is also likely to contain high concentrations of pathogenic organisms) and grease-trap wastes, should not result in the degradation of the amenity of nearby residents or in health risks to workers, other users of the landfill or nearby residents.
- All records of liquid waste disposals must be kept for a period of three years and be made available to an authorised officer of the EPA upon request.

## TECHNICAL APPENDIX 8: TABLE OF ENVIRONMENTALLY SENSITIVE AREAS

Table A9 replaces Table 1 in the *Environmental Guidelines: Solid Waste Landfills* (EPA 1996). It describes landfill sites located in environmentally sensitive areas as referred to in Schedule 1 of the *Protection of the Environment Operations Act 1997*.

<b>Table A9: Environmentally sensitive areas (areas which are considered inappropriate for landfilling)</b>
<b>Part A: Vulnerable areas</b>
<p>A landfill site in or within 250 m of an area of significant environmental or conservation value, as identified under relevant legislation, including:</p> <ul style="list-style-type: none"> <li>• areas reserved or dedicated in the <i>National Parks and Wildlife Act 1974</i> (NP&amp;W Act), such as: <ul style="list-style-type: none"> <li>—national parks</li> <li>—nature reserves</li> <li>—historic sites</li> <li>—areas covered by a conservation agreement</li> <li>—other areas protected under this Act</li> </ul> </li> <li>• world heritage areas</li> <li>• wilderness areas identified or declared under the <i>Wilderness Act 1987</i></li> <li>• items included on the register of national estate</li> <li>• marine reserves, aquatic reserves, marine national parks or nature reserves.</li> </ul>
<p>A landfill site within an identified sensitive location within a drinking water catchment, being:</p> <ul style="list-style-type: none"> <li>• any site declared by an order under section 81 of the <i>Sydney Water Act 1994</i> to be a 'special area'</li> <li>• lands within 3 km from the top water level of the following storages: <ul style="list-style-type: none"> <li>—Wingecarribee Reservoir</li> <li>—Fitzroy Falls Reservoir</li> <li>—Tallowa Dam</li> </ul> </li> <li>• any lands nominated as 'special areas' (or similar wording) by local water supply authorities (e.g. councils).</li> </ul>
<p>A landfill site within:</p> <ul style="list-style-type: none"> <li>• areas zoned under an environmental planning instrument for environmental protection purposes, e.g. high conservation, scenic, scientific, cultural or heritage value</li> <li>• areas mapped or identified for special protection under an environmental planning instrument, e.g.: <ul style="list-style-type: none"> <li>—SEPP 14: Coastal Wetlands</li> <li>—SEPP 26: Littoral Rainforests</li> <li>—areas mapped as wetlands under REP 20: Hawkesbury-Nepean River</li> <li>—areas identified as core koala habitat under SEPP 44: Koala Habitat Protection, or</li> <li>—areas similarly protected.</li> </ul> </li> </ul>
<p>A landfill site located:</p> <ul style="list-style-type: none"> <li>• in or within 40 metres from a permanent or intermittent waterbody</li> <li>• in an area overlying an aquifer which contains ground water which has high or very high vulnerability to pollution.</li> </ul>
<p>A landfill site within a karst region (either protected under the NP&amp;W Act or not), or with substrata which are prone to slippage.</p>
<p>A landfill site within a floodway that may be subject to washout and/or inundation during a major flood event. A major flood event is considered to be a 1:100 year event.</p>

<p><b>Part B: Residential areas</b></p>
<p>A landfill site within 250 metres of:</p> <ul style="list-style-type: none"> <li>• a residential zone</li> <li>• a dwelling, school or hospital not associated with the facility.</li> </ul>
<p><b>Notes:</b></p> <p><b>1. Vulnerability of ground water to pollution</b></p> <p>The Department of Land and Water Conservation (DLWC) should be consulted to determine if the area has been assessed as having high or very high vulnerability to groundwater pollution. For areas of the state that the DLWC has not assessed, the vulnerability of the ground water at a site should be assessed using the USEPA DRASTIC model (USEPA 1987) and advice from the DLWC.</p> <p><b>2. Definitions</b></p> <p><b>Dwelling</b> means a room or suite of rooms occupied or used or so constructed or adapted as to be capable of being occupied or used as a separate domicile.</p> <p><b>Residential zone</b> means land identified in an environmental planning instrument as being predominantly for residential use, including urban, village or living area zones, but excluding rural residential zones.</p> <p><b>Waterbody</b> means:</p> <p>(a) a <b>natural waterbody</b>, including:</p> <ul style="list-style-type: none"> <li>(i) a lake or lagoon either naturally formed or artificially modified; or</li> <li>(ii) a river or stream, whether perennial or intermittent, flowing in a natural channel with an established bed or in a natural channel artificially modifying the course of the stream; or</li> <li>(iii) tidal waters including any bay, estuary or inlet; or</li> </ul> <p>(b) an <b>artificial waterbody</b>, including any constructed waterway, canal, inlet, bay, channel, dam, pond or lake, but not including a dry detention basin or other construction that is only intended to hold water intermittently or an artificial waterbody associated with the facility; or</p> <p>(c) a <b>natural wetlands</b> including marshes, mangroves, backwaters, billabongs, swamps, sedgeland, wet meadows or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with fresh, brackish or salt water, and where the inundation determines the type and productivity of the soils and the plant and animal communities, or</p> <p>(d) an <b>artificial wetlands</b> including marshes, swamps, wet meadows, sedgeland or wet heathlands that form a shallow waterbody (up to 2 metres in depth) when inundated cyclically, intermittently or permanently with water, and are constructed and vegetated with wetland plant communities, but does not include an artificial wetlands associated with the landfill site.</p> <p><b>3. How distances are measured for the purposes of this Table</b></p> <p><b>Landfill site:</b> In order to determine the boundary of a landfill site, the area of the landfill site is taken to be:</p> <p>(a) in relation to a landfill site which is the subject of a development consent:</p> <ul style="list-style-type: none"> <li>(i) the whole of the land to which the development consent applies, or</li> <li>(ii) if the development consent identifies part only of the land as the actual site of the landfill site, the part of the land so identified, or</li> </ul> <p>(b) in relation to a landfill site which is not the subject of a development consent:</p> <ul style="list-style-type: none"> <li>(i) all areas of the site which have been used, are being used or will be used to dispose of waste to land, and</li> <li>(ii) all areas of the site which are used for ancillary activities, including but not limited to the handling or storage of waste, recovered materials, operational materials, site equipment or leachate.</li> </ul> <p><b>Environmentally sensitive areas:</b> The distance from an environmentally sensitive area is to be measured as the shortest distance between the boundary of the area and the boundary of the landfill site.</p> <p><b>Waterbody:</b> The distance from a waterbody is to be measured as the shortest distance between:</p> <p>(a) the top of the high bank, if present; or</p> <p>(b) if no high bank is present, then:</p> <ul style="list-style-type: none"> <li>(i) the mean high water mark in tidal waters; or</li> <li>(ii) the mean water level in non-tidal waters; or</li> <li>(iii) in the case of a wetlands, the edge of vegetation communities dominated by wetland species, and the boundary of the landfill site.</li> </ul>

## TECHNICAL APPENDIX 9: WASTE REGULATORY PROVISIONS

This Appendix reproduces the actual text of those regulatory provisions that are discussed in 'plain English' in these guidelines.

The following provisions may be found in the *Protection of the Environment Operations Act 1997*.

### Schedule 1, Part 1

#### Waste activities

(1) **Hazardous, industrial or Group A waste generation or storage**, being any activity that:

- (a) is carried on for business or other commercial purposes, and
- (b) involves the generating or storage of any one or more of the following types of waste:
  - (i) hazardous waste,
  - (ii) industrial waste,
  - (iii) Group A waste.

(2) The following activities are not waste activities for the purposes of this item:

- (a) the generating or on site storage of contaminated soil, recyclable oil or stabilised asbestos waste in bonded matrix,
- (b) the generating or on site storage of hazardous waste, industrial waste or Group A waste in or at a concrete batching plant,
- (c) the generating of not more than 10 tonnes per year, or the on site storage of less than 2 tonnes at any one time, of hazardous waste, industrial waste or Group A waste by any of the following:
  - local authorities,
  - dry cleaners,
  - printers,
  - photographic and processing laboratories,
  - pharmacies,
  - hairdressers,
  - businesses carrying out any skin penetration procedure to which Part 3 of the *Public Health Regulation 1991* applies,
  - veterinary surgeons,
  - nursing homes,
  - funeral parlours,
  - painters,
  - builders,
  - machinery and vehicle repair and servicing workshops,
  - panel beaters,
  - jewellers,

- educational institutions,
- hotels, clubs, restaurants and related hospitality industries,
- (d) the generating of not more than 2 tonnes per year, or the on site storage of less than 500 kilograms at any one time, of hazardous waste, industrial waste or Group A waste by any of the following:
  - dental or doctors' surgeries,
  - hospitals, pathology laboratories or pre-term clinics,
  - farming operations,
  - landscaping or fire hazard reduction works (such as those carried out by local and public authorities),
- (e) the generating of not more than 10 tonnes per year, or the on site storage of less than 2 tonnes at any one time, of hazardous waste, industrial waste or Group A waste in the form of oil, paint, lacquer, varnish, resin, ink, dye, pigments, adhesives, hydrocarbons or emulsions.

### Waste facilities

- (1) A waste facility that is of any one or more of the following classes:
- (a) **hazardous, industrial, Group A or Group B waste processing facilities**, being waste facilities that treat, process or reprocess hazardous waste, industrial waste, Group A waste or Group B waste (or any combination of those types of waste), **except those**:
    - (i) that only treat, process or reprocess sewage, or gases specified as Dangerous Goods Class 2 in the 6th edition of the *Australian Code for the Transport of Dangerous Goods by Road and Rail*, in force as at 1 January 1998, or
    - (ii) that only treat, process or reprocess waste that is generated on site,
  - (b) **hazardous, industrial, Group A or Group B waste disposal facilities**, being waste facilities that dispose of hazardous waste, industrial waste, Group A waste or Group B waste (or any combination of those types of waste), **except those**:
    - (i) that only lawfully discharge waste into a sewer, or
    - (ii) that are located outside the Sydney metropolitan area or the extended regulated area and:
      - (A) where the only hazardous, industrial, Group A or Group B waste that is disposed of is asbestos waste, or
      - (B) are operated by a local authority and where the only hazardous, industrial, Group A or Group B waste that is disposed of is asbestos waste, liquid grease trap waste or clinical waste,
  - (c) **used tyre processing or disposal facilities**, being waste facilities that:
    - (i) treat, process or dispose of more than 5,000 tonnes per year of used, rejected or unwanted tyres (including shredded tyres and tyre pieces), or
    - (ii) store such tyres at any one time in quantities of more than 50 tonnes,
  - (d) **waste storage, transfer, separating or processing facilities**, being waste facilities that store or transfer, or recover by way of separating or processing, more than 30,000 tonnes of waste per year,
  - (e) **waste incineration facilities**, being waste facilities that treat or process:
    - (i) any quantity of chemical waste, or

- (ii) any quantity of cytotoxic waste, or
- (iii) more than 25 tonnes per year of clinical waste, or
- (iv) more than 25 tonnes per year of quarantine waste, or
- (v) more than 1 tonne per hour of any other type of waste,

(f) **landfill sites within the Sydney metropolitan or extended regulated areas**, being landfill sites that are located in the Sydney metropolitan area or the extended regulated area, **except those:**

- (i) that receive only coal washery rejects or slags at a rate of not more than 20,000 tonnes per year, or
- (ii) that are situated on residential premises, or on land used principally for farming operations, and only if the disposal of waste is carried out on site, or
- (iii) that receive no more than 20,000 tonnes of inert waste only over any period of time, and only if the disposal of the waste is incidental or ancillary to the land being used for a purpose other than as a landfill site (eg the construction of buildings or roads or other similar types of infrastructure development),

(g) **landfill sites in environmentally sensitive areas**, being landfill sites that are located in an environmentally sensitive area described in Technical Appendix 8 of the Waste Guidelines , **except those:**

- (i) that are within an environmentally sensitive area by reason only of being located within 250 metres of a residential zone or of a dwelling, school or hospital not associated with the landfill site, and:
  - (A) receive only coal washery rejects or slags at a rate of not more than 20,000 tonnes per year, or
  - (B) were in operation as at 30 June 1997 and receive no more than 200 tonnes of waste per year, or
- (ii) that are situated on residential premises, or on land used principally for farming operations, and only if the disposal of waste is carried out on site,

(h) **solid waste landfill sites**, being landfill sites that receive over 5,000 tonnes per year of solid waste or solid waste and inert waste,

(i) **coal washery rejects or slags landfill sites**, being landfill sites that receive over 20,000 tonnes per year of coal washery rejects or slags (or both),

(j) **large-scale landfill sites**, being landfill sites that receive over 20,000 tonnes per year of any waste.

(2) For the purposes of this item, the following are taken not to be waste:

- (a) virgin excavated natural material,
- (b) non-hazardous bulk agricultural or crop waste that is not putrescible,
- (c) effluent.

(3) The following premises are not waste facilities for the purposes of this item:

- (a) premises where coal washery rejects or slags (and no other type of waste) is disposed of on site,
- (b) premises where only coal washery rejects or slags are used solely for the purposes of road or railway construction,

- (c) premises where biosolids (and no other type of waste) are disposed of on site,
- (d) premises on which organic waste (and no other type of waste) is applied for agricultural or environmental rehabilitation purposes,
- (e) mines referred to in this Part where the only waste disposed of is tailings, waste rock or inert waste generated on the mine,
- (f) electricity generating works referred to in this Part where the only waste disposed of is ash generated from the works,
- (g) other premises referred to in this Part that are used solely for the purposes of disposing of any of the following types of waste:
  - (i) non-hazardous tailings or waste rock generated on or at any mine,
  - (ii) non-hazardous ash generated from any electricity generating works.

## **Schedule 1, Part 2**

**Mobile plant scheduled activities**—being the carrying on of any activity referred to in Part 1 of this Schedule (other than the activities described as waste activities or waste facilities) by mobile plant.

**Mobile waste processing**—being the treatment, processing or reprocessing of hazardous waste, industrial waste or Group A waste (or any combination of those types of waste) by mobile plant and that is carried on for business or commercial purposes.

**Transporting of waste**—being the activities of persons who transport any one or more of the following types of waste for fee or reward (including occupiers of waste facilities, and persons who carry on waste activities, that are licensed under this Act and who transport any such waste to or from those facilities):

- (a) **transport of hazardous waste, industrial waste, Group A waste, Group B waste or Group C waste** (or of any combination of those types of waste) in loads exceeding 200 kilograms, except if it consists only of stabilised asbestos waste in bonded matrix,
- (b) **transport of used, rejected or unwanted tyres** (including shredded tyres and tyre pieces) in loads over 2 tonnes.

For the purposes of this item, the following are excluded:

- (a) persons who transport waste in their capacity as employees,
- (b) any waste that is transported in connection with an emergency situation or an accident.

## **Schedule 1, Part 3, Division 1**

**mobile plant** means any equipment or machinery that:

- (a) is capable of carrying on any one or more of the activities referred to in this Schedule, and
- (b) is capable of moving under its own motive power or of being transported, and
- (c) is operated at a particular site on a temporary basis only (ie for a total period of not more than 6 months in any 12-month period at that site).

**Note.** A non-premises-based activity that is carried on by mobile plant will revert to being a premises-based activity under Part 1 of this Schedule if the mobile plant is operated at the particular site for a total period of more than 6 months in any 12-month period.

## Schedule 1, Part 3, Division 2

Selected definitions are reproduced in the Definitions & Glossary section, which follows this Appendix.

The following provisions may be found in the **Protection of the Environment Operations (Waste) Regulation 1996**:

### 16 Requirements relating to non-licensed waste activities

(1) In this clause:

**authorised contractor** means a person who:

- (a) is licensed under the Act to transport waste, and
- (b) is specifically authorised under that licence:
  - (i) to transport waste from premises on which non-licensed waste activities are carried on, and
  - (ii) to perform the requirements set out in subclause (2) (d) on behalf of the person carrying on the non-licensed waste activity concerned.

**non-licensed waste activity** means an activity, carried on for business or other commercial purposes, that involves the generating or storage of any one or more of the following types of waste but is not licensed under the Act:

- (a) hazardous waste,
- (b) industrial waste,
- (c) Group A waste.

(2) A person who carries on a non-licensed waste activity must comply with the following requirements:

- (a) the waste must be stored in an environmentally safe manner,
- (b) the waste must not be stored, or come into contact with, any incompatible waste,
- (c) the EPA (or such other person or body as may be approved for the purposes of this clause) must be provided with such information as the EPA (or the other person or body) may require from time to time in relation to the generation, storage, treatment or disposal of the waste, and such information must be retained by the person for a period of at least 3 years from when it was provided,
- (d) if the waste is transported from the premises on which the non-licensed waste activity is carried on, the person must (except as provided by subclause (3)):
  - (i) obtain a consignment authorisation number for the waste from the person to whom the waste is to be delivered, and
  - (ii) complete, to the required extent, an approved waste data form in relation to the consigned waste and give a copy of the form to the person transporting the waste,
- (e) the person must, if the person is required to comply with paragraph (d), ensure that the waste data form:
  - (i) is completed accurately, and
  - (ii) is retained for a period of not less than 3 years from the time the form was completed, and

- (iii) is made available for inspection by an authorised officer on request,
- (f) if the waste is transported from the premises and it is of such an amount as to require the person transporting it to be licensed, the person must ensure that the person transporting the waste is licensed,
- (g) if the waste is transported from the premises to an interstate location and the waste is controlled waste within the meaning of the *National Environment Protection (Movement of Controlled Waste between States and Territories) Measure* made under the *National Environment Protection Council Act 1994* of the Commonwealth on 26 June 1998-the person must comply with the requirements of that Measure,
- (h) if the waste is transported from the premises, the person must ensure that the waste is transported:
  - (i) to a waste facility that is licensed under the Act, or
  - (ii) to a person carrying on mobile waste processing that is licensed under the Act, or
  - (iii) to a place that can otherwise lawfully be used as a waste facility for that waste,
- (i) if the waste is transported from the premises, the person must accurately identify the waste (including identification in accordance with the relevant description set out in Technical Appendix 4 to the Waste Guidelines ) and advise the transporter accordingly,
- (j) the person must inform the EPA (or such other person or body as may be approved for the purposes of this clause) of any suspected breach of the Act or this Regulation in connection with the transportation of the waste from the premises.

Maximum penalty: 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.

- (3) If a person carries on a non-licensed waste activity and the waste is transported from the premises on which the activity is carried on, the person is not required to comply with subclause (2) (d) if:
  - (a) the waste is asbestos waste or clinical waste (excluding recognisable body parts), or
  - (b) in any other case-the person has entered into a written agreement with an authorised contractor for the transportation of the waste from the premises.
- (4) If the person enters into such an agreement, the person must:
  - (a) before any waste is transported under the agreement:
    - (i) make a record of the name, address and licence number of the authorised contractor, and
    - (ii) retain that record and a copy of the agreement for a period of at least 3 years from the date the agreement was made, and
    - (iii) make the record and copy of the agreement available for inspection by an authorised officer on request, and
  - (b) in relation to each load of waste that is transported by the authorised contractor under the agreement:
    - (i) accurately identify the waste and advise the authorised contractor accordingly, and
    - (ii) inform the EPA (or such other person or body as may be approved for the purposes of this clause) if the person does not, within 21 days of the waste being collected by the authorised contractor, receive a receipt from the authorised contractor detailing the name and address of the person to whom the waste was delivered, and

- (iii) keep each receipt that is received by the person for a period of at least 3 years from the date of the collection of the waste, and
- (iv) make each such receipt available for inspection by an authorised officer on request.

Maximum penalty (subclause (4)): 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.'

## **17 Requirements relating to non-licensed waste transporting**

(1) In this clause:

**non-licensed waste transporting** means the activities of any person who, for fee or reward, transports waste but who is not licensed under the Act in respect of those activities.

(2) A person who carries on non-licensed waste transporting must comply with the following requirements:

(a) any vehicle used by the person to transport waste must:

- (i) be kept in a clean condition, and
- (ii) be constructed and maintained so as to prevent spillage of waste,

(b) any container used by the person to transport waste must be safely secured on the vehicle carrying the container,

(c) any vehicle used by the person to transport waste must be covered when loaded so as to prevent spillage and loss of waste and the emission of odours,

(d) incompatible wastes must not be mixed or transported together on any vehicle used by the person to transport waste,

(e) any hazardous waste or industrial waste transported by the person must not be mixed with any other type of waste or with any other material,

(f) any material segregated for recycling that is transported by the person must not be mixed with other waste,

(g) if any hazardous waste, industrial waste or Group A waste (not being asbestos waste or clinical waste, but including recognisable body parts) is transported, the person must:

- (i) obtain a copy of the waste data form from the occupier of the premises from which the waste is being transported (being the approved waste data form required under the occupier's licence or by this Regulation and that has been completed by the occupier to the required extent), and
- (ii) ensure that a copy of the form is kept in the vehicle transporting the waste while it is being transported, and
- (iii) complete the waste data form to the required extent, and
- (iv) give a copy of the form to the occupier of the waste facility, or the person operating the mobile plant, to which the waste is transported,
- (v) retain a copy of the form for a period of not less than 3 years from the time the form was completed,

(h) any waste transported by the person must be transported:

- (i) to a waste facility that is licensed under the Act, or
- (ii) to a person carrying on mobile waste processing that is licensed under the Act, or

- (iii) to a place that can otherwise lawfully be used as a waste facility for that waste,
- (i) the occupier of the waste facility, or the person operating the mobile plant, to which the waste is transported must be advised of the type of waste before it is unloaded,
- (j) the person must provide the EPA (or such other person or body as may be approved for the purposes of this clause) with such information as the EPA (or the other person or body) may require from time to time in relation to the transportation of waste by the person, and such information must be retained by the person for a period of at least 3 years from the time it was provided,
- (k) the person must inform the EPA (or such other person or body as may be approved for the purposes of this clause) of any suspected breach of the Act or this Regulation in connection with the transportation of waste by the person.

Maximum penalty: 200 penalty units in the case of a corporation, 100 in the case of an individual.'

## **28 Immobilisation of contaminants in waste**

- (1) The EPA may from time to time approve the immobilisation of contaminants in waste.
- (2) Such an approval has the effect of enabling the waste to which the approval relates to be assessed and classified in accordance with the procedures set out in the Waste Guidelines relating to immobilisation.
- (3) An approval under this clause may be a **general approval** or a **specific approval**.
- (4) A general approval may be given by way of notice published in the Gazette. A specific approval may be given after an application is made to the EPA.
- (5) An application for a specific approval must:
  - (a) be in the approved form, and
  - (b) be accompanied by such fee (if any) as the EPA may determine, and
  - (c) identify the contaminants to be immobilised, and
  - (d) be accompanied by such evidence as may be required by the EPA for the purposes of ascertaining whether the identified contaminants in the waste will be immobilised and will remain immobilised after disposal of the waste.
- (6) An approval is subject to such conditions as may be imposed by the EPA.
- (7) Without limiting the conditions to which an approval is subject, the EPA may impose conditions for or with respect to the following:
  - (a) disposal of the waste to which the approval relates,
  - (b) notification of certain matters to the EPA,
  - (c) record keeping requirements,
  - (d) the immobilisation of the contaminants concerned.
- (8) In giving an approval under this clause, the EPA is required to identify a person (or class of persons) to whom the approval relates (the **responsible person**).
- (9) A general approval may be amended or revoked by the EPA by way of notice published in the Gazette.
- (10) A specific approval may be amended or revoked by the EPA by way of written notice given to the responsible person.

- (11) If an approval is given under this clause, the responsible person must comply with the conditions to which the approval is subject.

Maximum penalty: 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.

## **29 Special requirements relating to asbestos waste**

- (1) This clause applies to any activity that involves the transportation, collection, storage, or disposal of any type of asbestos waste, regardless of whether the activity is required to be licensed.

- (2) A person who carries on an activity to which this clause applies must comply with the requirements specified in this clause in relation to the activity concerned.

Maximum penalty: 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.

- (3) The requirements relating to the transportation of asbestos waste are as follows:

- (a) any type of asbestos waste must not be transported unless it is conveyed in a covered leak-proof vehicle so as to prevent any spillage or dispersal of the waste,
- (b) if asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is to be transported and the waste is not stored in a bag in accordance with subclause (4) (c), the waste must be wetted before it is transported,
- (c) any vehicle used to transport any type of asbestos waste must be cleaned before leaving the landfill site at which the waste is disposed of so as to ensure that all residual asbestos waste is removed from the vehicle.

- (4) The requirements relating to the collection and storage of asbestos waste are as follows:

- (a) asbestos waste that is in the form of asbestos fibre and dust waste must be covered in such a manner as to prevent the emission of any dust,
- (b) asbestos waste that is in the form of asbestos fibre and dust waste must not be collected and stored except in accordance with the following procedures:
  - (i) the waste must be collected and stored in impermeable bags,
  - (ii) each bag must be made of heavy duty low density polyethylene of at least 0.2 mm thickness, and have dimensions of no more than 1.2 m in height and 0.9 m in width,
  - (iii) each bag must be sealed by a wire tie, and contain no more than 25 kg of waste,
  - (iv) each bag must be marked with the words 'CAUTION ASBESTOS' in letters of not less than 40 mm and which comply with *Australian Standard AS 1319-Safety Signs for the Occupational Environment*,

- (c) if asbestos waste in any form is stored in a bag, the following procedures must be followed:

- (i) the bag must be placed in a leak-proof container that is used only for the purposes of storing asbestos waste, and
- (ii) the container must be marked with the words 'DANGER-ASBESTOS WASTE ONLY-AVOID CREATING DUST' in letters of not less than 50 mm and which comply with Australian Standard referred to in paragraph (b) (iv), and
- (iii) the container have a close-fitting sealed cover so as to prevent any spillage or dispersal of the waste,

(d) asbestos waste in any form must not be stored except in accordance with the following procedures:

- (i) the waste must be stored in a secure area so as to prevent entry by unauthorised persons and to prevent the risk of environmental harm,
- (ii) the waste must, if it is practicable to do so, be stored separately from other types of waste,

(e) if asbestos waste that is in the form of stabilised asbestos waste in bonded matrix is stored otherwise than in a bag in accordance with paragraph (c), the following procedures must be followed:

- (i) if it is practicable to do so, the waste must be wetted so as to prevent the emission of any dust,
- (ii) in wetting the asbestos waste, care must be taken to ensure that the wetting process does not cause any emission of dust or lead to any discharge of polluted water,
- (iii) the waste must be kept covered at all times.

(5) The requirements relating to the disposal of asbestos waste are as follows:

(a) asbestos waste in any form must be disposed of only at a landfill site that may lawfully receive the waste,

(b) disposal of asbestos waste in any form must be by way of burial,

(c) before disposal of the asbestos waste, arrangements must be made with the occupier of the landfill site for the purposes of ensuring that the asbestos waste will be covered:

- (i) initially to a depth of at least 0.5 m, and
- (ii) finally to a depth of at least 1 m (in the case of stabilised asbestos waste in bonded matrix) or 3 m (in the case of asbestos fibre and dust waste) beneath the planned final land surface of the landfill site,

(d) the asbestos waste must:

- (i) be disposed of in accordance with the arrangements under paragraph (c), and
- (ii) be buried to the initial depth on the same day it is received at the landfill site,

(e) in disposing of asbestos waste in any form at a landfill site, the waste must:

- (i) be unloaded in such a manner as to avoid the creation of dust, and
- (ii) not be compacted before it is covered, and
- (iii) not come into contact with any earthmoving equipment at any time.

(6) A person must not cause asbestos waste in any form to be used as road making material.

Maximum penalty: 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.

(7) In this clause, **asbestos waste** means any waste that contains asbestos as defined in the Waste Guidelines.

### **30 Special requirements relating to clinical waste**

If a person disposes of clinical waste at a waste facility that is not licensed under the Act, the person must comply with the following requirements:

- (a) the waste must be disposed of only at a waste facility that is operated by a local authority and located outside the Sydney metropolitan area or extended regulated area,
- (b) the written approval of the local authority must be obtained before the waste is disposed of,
- (c) the waste must not be disposed of unless it was generated outside the Sydney metropolitan area or extended regulated area,
- (d) the waste must not contain recognisable body parts, sharps waste, cytotoxic waste or radioactive waste,
- (e) the waste must be packaged in accordance with the requirements set out in the document called NSW Health: *Waste Management Guidelines for Health Care Facilities* issued by the Department of Health and dated August 1998,
- (f) the waste must not be disposed of in amounts that exceed 40 kg at any one time,
- (g) the waste must be buried, or be immediately contained, in a manner that prevents the waste coming into contact with any person or animal.

Maximum penalty: 200 penalty units in the case of a corporation, 100 penalty units in the case of an individual.

## DEFINITIONS AND GLOSSARY

### NOTES:

- The words in 'single quotes' are direct quotations from the Act and Regulations.
- The words in [square brackets] within the quotations are explanatory text.
- Reference to the Waste Guidelines in the quotations means these guidelines.

**Acid sulfate soils:** include *actual acid sulfate soils* and *potential acid sulfate soils*. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.

'**Actual acid sulfate soils**' are soils containing highly acidic soil horizons or layers resulting from the aeration of soil materials that are rich in iron sulfides, primarily sulfide. This oxidation produces hydrogen ions in excess of the sediment's capacity to neutralise the acidity, resulting in soils of pH of 4 or less when measured in dry season conditions. These soils can usually be identified by the presence of pale yellow mottles and coatings of jarosite.

'**Potential acid sulfate soils**' are soils that contain iron sulfides or sulfidic material that have not been exposed to air and oxidised. The field pH of these soils in their undisturbed state is pH 4 or more and may be neutral or slightly alkaline. However, they pose a considerable environmental risk when disturbed, as they will become severely acid when exposed to air and oxidised.

**Approved:** Approved by the EPA from time to time.

'**Aqueous liquid waste** means any liquid waste in which water constitutes more than 80% of the volume of liquid present.'

**Asbestos:** A generic name for a group of naturally occurring mineral silicates of the amphibole or serpentine series that are characterised by fibres or bundles of fine single crystal fibrils. Naturally occurring asbestos fibres typically have length-to-width ratios of the order of 100 or higher. Included in the definition are the following minerals: chrysotile, crocidolite, amosite, anthophyllite, tremolite and actinolite.

'**Asbestos waste** means any waste that contains asbestos as defined in the Waste Guidelines [these guidelines].' (See above.)

**AVCARE:** National Association for Crop Protection and Animal Health Ltd.

**Becquerels:** The activity of a radionuclide that decays at an average of one spontaneous nuclear transformation per second.

'**Biosolids** means the organic product that results from sewage treatment processes (namely, material referred to alternatively as sewage sludge).'

'**Biosolids Guidelines**' means the document called *Environmental Guidelines: Use and Disposal of Biosolids Products* issued by the EPA and in force as at 31 December 1997.

'**Building and demolition waste:** (eg bricks, concrete, paper, plastics, glass, metal and timber), being material resulting from the demolition, erection, construction, refurbishment or alteration of buildings or from the construction, repair or alteration of infrastructure-type development such as roads, bridges, dams, tunnels, railways and airports, and which:

- (a) is not mixed with any other type of waste, and
- (b) does not contain any asbestos waste.'

**Chemical control order (CCO):** An order made and enforced by the NSW EPA for the control of specific environmentally hazardous chemicals and declared chemical wastes under sections 22 and 23 of the *Environmentally Hazardous Chemicals Act 1985*.

**'Clinical waste** means any waste resulting from medical, nursing, dental, pharmaceutical, skin penetration or other related clinical activity, being waste that has the potential to cause injury, infection or offence, and includes waste containing any of the following:

- (a) human tissue (other than hair, teeth and nails),
- (b) bulk body fluids or blood,
- (c) visibly blood-stained body fluids, materials or equipment,
- (d) laboratory specimens and cultures,
- (e) animal tissue, carcasses, or other waste, from animals used for medical research,

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.'

**Commercial and industrial waste:** Inert, solid, industrial or hazardous wastes generated by businesses and industries (including shopping centres, restaurants and offices) and institutions (such as schools, hospitals and government offices), excluding building and demolition waste and municipal waste.

**'Controlled aqueous liquid waste** means aqueous liquid waste that is assessed and classified as controlled aqueous liquid waste in accordance with [Section 3 and Technical Appendix 1 of] the Waste Guidelines [these guidelines], but does not include any of the types of waste specified as hazardous, Group B or Group C liquid wastes in Parts 3, 6 or 7 of the following Appendix.' (reproduced in Tables 4 and 5 in Section 3 of these guidelines).

**'Cytotoxic waste** means any substance contaminated with any residues or preparations that contain materials toxic to cells, principally through action on cell reproduction.'

**Declared chemical waste:** A chemical substance (including any mixture) that the EPA is satisfied is, or is likely to be, stored in accumulating deposits or dumped or abandoned or otherwise dealt with as chemical waste. The EPA can declare that substance to be a chemical waste by order published in the Government Gazette and set controls for the waste by Chemical Control Orders made under the *Environmentally Hazardous Chemicals Act 1985*.

**Decomposition:** The breakdown of organic waste materials by micro-organisms.

**Ecotoxic:** Substances that, if released into the environment, will cause or may cause immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.

**'Effluent** means:

- (a) waste water from sewage collection or treatment plants, or
- (b) waste water from collection or treatment systems that are ancillary to processing industries involving livestock, agriculture, wood, paper or food, being waste water that is conveyed from the place of generation by means of a pipe, canal or other conventional method used in irrigation (but not by means of a tanker or truck), or
- (c) waste water from collection or treatment systems that are ancillary to intensive livestock, aquaculture or agricultural industries, being waste water that is released by means of a pipe, canal or other conventional method used in irrigation as part of day-to-day farming operations.'

**Environmentally Hazardous Chemicals Act:** Provides for the control of the effect of environmentally hazardous chemicals and chemical wastes on the environment.

**EPA:** New South Wales Environment Protection Authority

**EPA-accepted treatment process:** Such a process should ideally:

- be technically sound
- be environmentally safe
- reduce the level of contaminants or reduce the extent of the environmental hazard (for example, by providing reliable and long-term immobilisation/fixation of the hazardous components of the waste)
- recover useful materials from the waste
- not increase the overall quantity of waste substantially
- meet other EPA requirements for emissions to air and water, should they be specified
- meet other EPA requirements pertaining to the specific waste type, should they be specified.

'**Extended regulated area** means the area comprising the local government areas of Cessnock, Gosford, Kiama, Lake Macquarie, Maitland, Newcastle, Port Stephens, Shellharbour, Shoalhaven, Wingecarribee, Wollongong and Wyong.'

'**Food waste** means waste generated by any one or more of the following activities:

- (a) the preparation or manufacturing of food (including beverages),
- (b) the processing of meat, poultry or fish,
- (c) the manufacturing of edible grocery products,

but does not include grease trap waste.'

**Free liquids:** Whether waste contains *free liquids* must be determined by testing in accordance with the USEPA *Paint Filter Liquids Test —Method 9095*. (See References: USEPA 1986.)

'**Group A waste:**

- (1) Non-aqueous liquid waste.
- (2) Controlled aqueous liquid waste.'

'**Group B waste:**

- (1) Liquid food waste.
- (2) Liquid grease-trap waste resulting from the preparation or manufacturing of food.'

'**Group C waste:**

Liquid waste from human waste storage facilities or waste treatment devices (within the meaning of the Waste Guidelines [these guidelines]) including pump-out waste and septage.'

'**Hazardous waste** means any liquid or non-liquid waste that is:

- (a) specified in Part 3 of the following Appendix [also shown in Table 4 of these guidelines], or
- (b) otherwise assessed and classified as hazardous waste in accordance with the procedures set out in [Technical Appendix 1] of the Waste Guidelines [these guidelines].'

**Human waste storage facility:** A device for holding or disposing of human waste, such as a cesspit, pan, septic tank, septic closet, water closet, chemical closet, humus closet and combustion closet.

**Immobilisation:** Immobilisation of a contaminant in waste is a measure of how securely that contaminant is *fixed* or *locked-up* in the waste for the long term.

**Incompatible wastes:** Materials that, subsequent to their mixing:

- undergo violent chemical reactions or less vigorous chemical changes, producing different chemical species that are of a greater threat to human health and/or the environment than the original chemical species present, or
- become more difficult to reuse, recycle, process, treat, or dispose of than the original wastes before mixing.

**'Industrial waste** means any non-liquid waste that is:

- (a) specified in Part 1 of the following Appendix [also shown in Table 3 of these guidelines], or
- (b) otherwise assessed and classified as industrial waste in accordance with the procedures set out in [Technical Appendix 1 of] the Waste Guidelines [these guidelines].'

**Industrial waste landfill/monofill/cell/monocell:** A landfill/monofill/cell/monocell licensed under the *Protection of the Environment Operations Act 1997* to accept waste that is classified or assessed as industrial waste in accordance with Section 3 or Technical Appendix 1 of these guidelines, or that is otherwise specified in Table 7. (See also Section 4.)

**'Inert waste** means any non-liquid waste that is:

- (a) specified in Part 2 of the following Appendix [also shown in Table 1 of these guidelines], or
- (b) otherwise assessed and classified as inert waste in accordance with the procedures set out in Technical Appendix 1 of the Waste Guidelines [these guidelines].'

**Inert waste class 1 landfill:** Accepts all wastes that are classified or assessed as inert waste in accordance with Section 3 or Technical Appendix 1 of these guidelines or otherwise specified in Table 7.

**Inert waste class 2 landfill:** Accepts all wastes that are classified or assessed as inert waste in accordance with Section 3 or Technical Appendix 1 of these guidelines or otherwise specified in Table 7, except physically, chemically or biologically immobilised, treated or processed waste.

**'Landfill site** means a waste facility used for the purpose of disposing of waste to land.'

**Leachate:** Liquid released by, or water that has percolated through, waste, and that contains dissolved and/or suspended liquids and/or solids and/or gases.

**Liquid:** Any substance that does not meet all of the criteria of *non-liquid*, and that is not a gas.

**Mineralise:** To turn contaminating substances that are deposited in the environment (such as chemicals or organic wastes) into harmless substances (for example, minerals) by means of the physical, chemical or biological processes occurring in nature.

**'Mobile plant** means any equipment or machinery that:

- (a) is capable of carrying on any one or more of the activities referred to in Schedule 1 of the *Protection of the Environment Operations Act 1997*, and
- (b) is capable of moving under its own motive power or of being transported, and
- (c) is used at a particular site on a temporary basis only (ie for a total period of not more than 6 months in any 12-month period at that site).'

**'Mobile waste processing** being the treatment, processing or reprocessing of hazardous waste, industrial waste or Group A waste (or any combination of those types of waste) by mobile plant and that is carried on for business or other commercial purposes.'

**Monocell:** A part of a landfill cell isolated from the rest of the cell by means of a leachate/gas barrier of low permeability for the disposal of one specific waste type. A monocell, one side of which must be at an edge of the landfill cell, may not have other types of waste either above or below it.

**Monofill:** An isolated landfill unit for disposal of one specific waste type.

**'Municipal waste** being waste consisting of:

- (a) household domestic waste that is set aside for kerb side collection or delivered by the householder directly to a waste facility, or
- (b) other types of domestic waste (eg domestic clean-up and residential garden waste), or
- (c) local council generated waste (eg waste from street sweeping, litter bins and parks).'

**Night soil:** The contents of a cesspit or pan.

**'Non-aqueous liquid waste** means any liquid waste in which a liquid other than water constitutes 20% or more of the volume of liquid present.'

**Non-controlled aqueous liquid waste** means aqueous liquid waste which:

- (i) is not of a type which is specified as hazardous, Group B or Group C liquid wastes in Tables 4 and 5 in Section 3 of these guidelines, and
- (ii) is assessed as non-controlled aqueous liquid waste in accordance with Section 3 and Technical Appendix 1 of these guidelines.

**'Non-liquid waste** means any waste that:

- (a) has an angle of repose of more than 5 degrees, and
- (b) does not contain, or is not comprised of, any free liquids (as determined in accordance with the Waste Guidelines [these guidelines—see definition of 'free liquids']), and
- (c) does not contain, or is not comprised of, any liquids that are capable of being released when the waste is transported, and
- (d) does not become free-flowing at or below 60 degrees Celsius or when it is transported, and
- (e) is generally capable of being picked up by a spade or shovel.'

**Non-scheduled pesticides:** Any pesticides that are not controlled by the Scheduled Chemical Wastes Chemical Control Order 1994. (See also 'Scheduled chemical wastes'.)

**Not capable of environmentally significant biological transformation:** In relation to organic waste materials, those:

- that have a specific oxygen uptake of less than 1.5 mg O<sub>2</sub>/hour/g total organic solids at 20°C, or
- in which, during composting (for the purposes of stabilisation), the mass of volatile solids in the organic waste has been reduced by at least 38%, or
- that have been treated by composting for at least 14 days, during which time the temperature of the organic waste must have been >40°C and the average temperature >45°C, or
- that have been subjected to and have met the requirements of EPA-approved alternative tests.

**Not capable of environmentally significant chemical transformation:** In relation to waste materials, those that do not undergo chemical changes producing other chemical species that are significant environmental pollutants, when exposed to: air (oxygen), moisture, ground water, leachate, other waste types or any combination of these (for example: sulfidic soils or ores that undergo acid sulfate transformation *do not* satisfy this criterion).

**Not capable of environmentally significant physical transformation:** In relation to waste materials, those that do not undergo significant physical changes when stored, transported, manipulated or landfilled (for example, solids that either release liquids or crumble, releasing fine particles capable of forming airborne dust or suspensions in water, *do not* satisfy this criterion).

**'On site'**—a reference to something being done in relation to waste on site is a reference to that thing being done only on the premises on which the waste was generated.'

**Organic waste:** Includes wood, garden, food, animal, vegetative and natural fibrous material wastes and biosolids.

**Orphan waste:** Any waste that has been dumped by a person or persons unknown, and of which the generator/owner is not identifiable.

**Pan:** Any movable receptacle kept in a closet and used for the reception of human waste.

**Physically solid:** See: 'Non-liquid'.

**'Pharmaceuticals and poisons'** (being waste generated by activities carried out for business or other commercial purposes and that consists of pharmaceutical or other chemical substances specified in the Poisons List under the *Poisons and Therapeutic Goods Act 1966*).

**Practical quantitation limit (PQL):** The lowest concentration that can be reproduced and measured in routine laboratory analyses irrespective of any interference caused by the presence of other substances, such as chemicals, during the analysis. The practical quantitation limit value of any analyte is significantly higher than its detection limit value ('quantitation' = quantification).

**Processing:** Subjecting a substance to a physical, chemical or biological treatment or a combination of treatments.

**Pump-out waste:** Treated or untreated human waste and/or sullage that is retained on the site of its generation in a human-waste-storage facility, holding tank, or collection well, before removal by a waste transporter.

**'Putrescible waste'** means:

- (a) food waste, or
- (b) waste consisting of animal matter (including dead animals or animal parts), or
- (c) biosolids categorised as Stabilisation Grade C in accordance with the criteria set out in the Biosolids Guidelines.'

**Quantitation:** Quantification. See: 'Practical quantitation limit'.

**Quarantine waste:** Examples are waste generated during an aircraft or ship journey outside Australia, and also materials that originate from Australia and are bought back into the country on the return journey. Quarantine waste also includes unwanted material that is attached to imported goods (for example, soil), as well as contaminated articles of clothing or other materials produced during the removal of the unwanted materials.

**Radioactive substances:** refer to Section 3.5.

**'Recycling'** of waste means the processing of waste into a similar non-waste product.'

**Releases liquids:** Whether waste *releases liquids* must be determined by testing in accordance with the USEPA *Liquid Release Test—Method 9096*. (See References: USEPA 1986.)

**'Reprocessing'** of waste means the processing of waste into a different non-waste product.'

**Reuse:** Waste reused with or without cleaning and/or repairing.

**Scheduled chemical wastes:** Any waste liquid, sludge or solid (including waste articles and containers) that contain one or more of the constituents listed in Schedule A of the *Scheduled Chemical Wastes Chemical Control Order 1994* where the total concentration of those constituents is more than one milligram per kilogram. (For a list of scheduled chemical wastes see Technical Appendix 5 of these guidelines.)

**Scum:** The floatable materials that form an accumulating layer on the liquid surface inside a primary waste water treatment tank; includes oils, grease and soaps.

**Septage:** Material removed from a waste-treatment device during desludging; contains partly decomposed scum, sludge and liquid.

**'Sharps waste** means any waste resulting from medical, nursing, dental, veterinary, pharmaceutical, skin penetration or other related clinical activity, and that contains instruments or devices:

- (a) that have sharp points or edges capable of cutting, piercing or penetrating the skin (eg needles, syringes with needles or surgical instruments), and
- (b) that are designed for such a purpose, and
- (c) that have the potential to cause injury or infection,

but does not include any such waste that has been treated by a method approved in writing by the Director-General of the Department of Health.'

**Sludge:** Materials that have settled to the bottom of a waste treatment device.

**'Solid waste** means any non-liquid waste that is:

- (a) specified in Part 4 of the following Appendix [also shown in Table 2 of these guidelines], or
- (b) otherwise assessed and classified as solid waste in accordance with the procedures set out in [Technical Appendix 1 of] the Waste Guidelines [these guidelines].'

**Solid waste class 1 landfill:** A landfill that accepts wastes that are classified or assessed as solid waste in accordance with Section 3 or Technical Appendix 1 of these guidelines or otherwise specified in Table 7, including putrescible wastes (See also Section 4.)

**Solid waste class 2 landfill:** A landfill that accepts wastes that are classified or assessed as solid waste in accordance with Section 3 or Technical Appendix 1 of these guidelines or otherwise specified in Table 7, but excluding putrescible wastes. (See also Section 4.)

**Spadeable:** A physical state of a material where the material behaves sufficiently like a solid to be moved by a spade at normal outdoor temperatures.

**Specific contaminant concentration (SCC) test:** Provides a quantitative measure of both organic and inorganic chemical contaminants within a waste.

**Sullage:** Liquid wastes from baths, showers, basins, laundries and kitchens, including floor wastes from these sources.

**'Sydney metropolitan area** means the area constituting the Metropolitan Waste Disposal Region under the *Waste Recycling and Processing Service Act 1970* immediately before 1 November 1996.'

**Toxicity characteristics leaching procedure (TCLP) test:** Estimates the potential for both organic and inorganic constituents to leach from a *non-liquid* waste type when it is deposited within a landfill. The test results indicate the environmental acceptability of disposing the non-liquid waste to landfill. It is recommended that procedures described in the following new series of Australian Standards for leachate preparation be followed, subject to the provisions outlined in Technical Appendix 1: AS 4439–1997: *Wastes, Sediments and Contaminated Soils*; AS 4439.2–1997: *Wastes, Sediments and Contaminated Soils, Part 2: Preparation of Leachates—Zero Headspace Procedure*; and AS 4439.3–1997: *Wastes, Sediments and Contaminated Soils Part 3: Preparation of Leachates—Bottle Leaching Procedure*.

‘**Treatment** of waste means the processing of waste into a different type of waste.’

‘**Virgin excavated natural material** (eg clay, gravel, sand, soil and rock) that is not mixed with any other waste and that:

- (a) has been excavated from areas that are not contaminated, as a result of industrial, commercial, mining or agricultural activities, with manufactured chemicals and that does not contain sulphidic ores or soils, or
- (b) consists of excavated natural materials that meet such criteria as may be approved by the EPA.’

**Waste:** As defined in the *Waste Minimisation and Management Act 1995* and the *Protection of the Environment Operations Act 1997*:

‘waste includes:

- (a) any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment, or
- (b) any discarded, rejected, unwanted, surplus or abandoned substance, or
- (c) any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the substance, or
- (d) any substance prescribed by the regulations to be waste for the purposes of this Act.

A substance is not precluded from being waste for the purposes of this Act merely because it can be reprocessed, re-used or recycled.’

**Waste activity:** is defined Schedule 1 of the *Protection of the Environment Operations Act 1997*. (See also Section 2.1.1 of these guidelines.)

**Waste facility:** is defined Schedule 1 of the *Protection of the Environment Operations Act 1997*. (See also Section 2.1.3 of these guidelines.)

‘**Waste Guidelines** means the document called *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes*, issued by the EPA and in force as at 1 July 1999 [these guidelines].’

**Waste treatment device:** A device for treating human waste and/or sullage on the site of its generation (for example, a septic tank or aerated wastewater-treatment system).

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## HOW TO OBTAIN ADVICE

### DEC offices

For guidance or technical advice on the disposal of waste or the application of these guidelines, contact your nearest DEC office listed below.

Offices are open 8:30 a.m. – 5:00 p.m. weekdays, except public holidays. An answering service is available at times when district offices are not attended.

### Sydney offices

#### Sydney

59–61 Goulburn Street  
Sydney  
PO Box A290  
Sydney South 1232  
Phone: (02) 9995 5000  
(switchboard)  
Phone: 131 555 (info &  
publication requests)  
Fax: (02) 9995 5999

#### Parramatta

Level 7  
79 George Street  
Parramatta 2150  
PO Box 668  
Parramatta 2124  
Phone: (02) 9995 5000  
Fax: (02) 9995 6900

### Regional offices

#### Albury

4th floor, Albury City Council  
Chambers  
553 Kiewa Street  
PO Box 544  
Albury 2640  
Phone: (02) 6022 0600  
Fax: (02) 6022 0610

#### Armidale

Level 1, NSW Govt Offices  
85 Faulkner Street  
PO Box 494  
Armidale 2350  
Phone: (02) 6773 7000  
Fax: (02) 6772 2336

#### Bathurst

219 Howick Street  
PO Box 1338  
Bathurst 2795  
Phone: (02) 6332 7600  
Fax: (02) 6332 2387

#### Grafton

NSW Government Offices  
49 Victoria Street  
PO Box 498  
Grafton 2460  
Phone: (02) 6640 2500  
Fax: (02) 6642 7743

#### Griffith

Suites 7-8, Level 1,  
Griffith City Plaza  
130–140 Banna Avenue  
Griffith 2680  
Phone: (02) 6969 0700  
Fax: (02) 6969 0710

#### Newcastle

Ground floor  
NSW Government Offices  
117 Bull Street  
Newcastle West 2302  
PO Box 488G, Newcastle 2300  
Phone: (02) 4908 6800  
Fax: (02) 4908 6810

#### Queanbeyan

Suite 4, Robert Lowe Building  
30 Lowe Street  
PO Box 622  
Queanbeyan 2620  
Phone: (02) 6122 3100  
Fax: (02) 6299 3525

#### Wollongong

Level 3, NSW Govt Offices  
84 Crown Street  
Wollongong 2500  
PO Box 513  
Wollongong East 2520  
Phone: (02) 4224 4100  
Fax: (02) 4224 4110

### District offices

#### Buronga

Unit 2/1, Silver City Highway  
PO Box 386  
Buronga 2739  
Phone: (03) 5022 1096  
Fax: (03) 5021 0547

#### Dubbo

Level 2, NSW Government  
Offices  
37–39 Carrington Avenue  
PO Box 1020  
Dubbo 2830  
Phone: (02) 6841 9801  
Fax: (02) 6882 9217

#### Kariong

Building 19  
Mt Penang Parklands  
Pacific Highway  
Kariong 2250  
Phone: (02) 4340 5148  
Fax: (02) 4340 5866

**Murwillumbah**

Suite 2A, Warina Walk Bldg  
Cnr Main & Brisbane Streets  
PO Box 723  
Murwillumbah 2484  
Phone: (02) 6672 6134  
Fax: (02) 6672 6134

**Muswellbrook**

Suite 1, 56 Brook Street  
Muswellbrook 2333  
Phone: (02) 6541 2381  
Fax: (02) 6541 1634

**Tamworth**

Level 1, Noel Park House  
155-157 Marius Street  
PO Box 2140  
Tamworth 2340  
Phone: (02) 6767 2700  
Fax: (02) 6766 7493

## Specialist advice

For specialist guidance or technical advice on the assessment, classification (including immobilisation) and management of waste, contact:

Waste Management Section  
Department of Environment and Conservation  
PO Box A290  
Sydney South 1232  
Phone: (02) 9995 5000  
Phone: 131 555

For information on chemicals and declared chemical wastes controlled by Chemical Control Orders (CCOs) under the *Environmentally Hazardous Chemicals Act 1985* contact:

Chemicals Policy Section at the above address.

For information on the administration of licences for waste facilities, contact:

Environment and Conservation Operations Service Centre, phone 133 372.

If you require information on the control of radioactive substances, contact:

Radiation Control Section at the above address.