WHAT IS HAZARDOUS WASTE AND WHAT MAKES IT HAZARDOUS?

Briefing Paper No. 2

This paper is intended to explore the issue of defining and classifying hazardous waste, with a view to raising issues for comment and feedback.

Rob White & Diane Heckenberg
School of Sociology and Social Work
University of Tasmania

March 2011

Environmental harm is a crime

This research is funded by a discovery grant from the Australian Research Council

We welcome feedback

We welcome feedback on any of the issues raised in this paper – please email r.d.white@utas.edu.au or diane.heckenberg@utas.edu.au with your comments.

Please include the phrase *What is hazardous waste?* in the subject line of your email.

Thank you
Rob White & Diane Heckenberg
School of Sociology and Social Work
University of Tasmania

March, 2011

Introduction

This paper discusses the varying approaches to labeling, defining and classifying hazardous waste and the sorts of things that make waste hazardous. The fact that this waste stream is vulnerable to mismanagement at certain stages of the waste cycle also makes it hazardous (see Vander Beken and Balcaen 2006). Moreover, from the point of view of the transboundary movement of waste, Lipman (2004) argues that 'the generality of the definition of hazardous waste has resulted in uncertainty as to which wastes are hazardous and subject to the Basel Convention. Consequently it has been possible for parties to argue that exports are "products" and not hazardous wastes'.

Reducing hazard and risk is one of the six key directions for work detailed in the Australian *National Waste Policy* (2010). The objective is to 'create a comprehensive nationally integrated system for the identification, classification, collection, treatment, disposal and monitoring of hazardous substances and waste that aligns with international obligations' (National Waste Policy Fact Sheet, DEWHA 2010).

What is hazardous waste?

'Hazardous waste' is the label assigned to a specific class of refuse. The key characteristic that identifies this refuse is that, in some way, it is potentially dangerous to living beings and/or the environment, particularly when handled, transported or disposed of in an unsafe manner. Hazardous waste can take different forms – solid, liquid or gaseous – and it can be emitted to land, water or air. Further, hazardous substances, materials or goods can potentially occur in the three major waste streams – MSW (Municipal), C & I (Commercial and Industrial) and C & D (Construction and Demolition). For example

- Hazardous *substances* or *contaminants* in the municipal waste stream
    - components of electronic waste such as cadmium and lead and PVC sheathing on cables;
    - household chemicals such as bleach, oven cleaners, mineral turpentine and paints
    - products incorporating nano particules (nano sized ingredients) such as zinc and titanium oxide in sunscreen and cosmetics and skin gel containing nano silver. 'One nanometer (nm) is a billionth of a metre and to put this in perspective, a human hair is about 80,000 nm-100,000 nm thick, while a single molecule of the protein haemoglobin (which carries the oxygen in

our blood) is about 4 nm across' (Choice 2009)

- hazardous *substances* in the commercial and industrial waste stream (e.g., chemicals, heavy metals)

- hazardous *materials* in the construction and demolition waste stream (e.g. asbestos), and

'Outside those waste streams bisolids, particularly sewage sludge, may be contaminated by a range of household chemicals, heavy metals and pharmaceuticals' (Environment Protection and Heritage Council 2010: 174)

The language used to describe the class of waste labeled "hazardous" differs between states, with only New South Wales and the ACT using the term hazardous waste. This raises the question as to whether some of these terms actually belie the nature of the hazard. For instance, how does an "outsider" know that prescribed industrial waste or controlled waste is dangerous? By contrast, the term hazardous is generally understood to be synonymous with danger. As reflected in the following table, different State Environmental Protection Agencies and Authorities use different labels, often interchangeably.

Table 2.1 : Labelling of hazardous waste

NSW	VIC	QLD	WA	SA	NT	ACT	TAS
Hazardous waste	Prescribed Industrial Waste	Regulated waste	Controlled Waste	Controlled waste	Listed Waste	Hazardous waste	Controlled waste

Each of these labels attracts a broad brush narrative description, typically drawn directly from international or national instruments, for example the Basel Convention on the Transboundary Movements of Hazardous Wastes and Their Disposal (The Basel Convention) or the Movement of Controlled Waste National Environmental Protection Measure (Controlled Waste NEPM). Narrative descriptions of hazardous waste also appear in national reports, policy statements and supporting documents like guidelines and fact sheets. The level of consistency in these labels is something worth considering.

In their analysis of the designation and classification of hazardous waste in Australia, Moore and Shin-Yu (1997) make an important distinction between designation (used for regulation) and classification (the system that facilitates the monitoring of waste).

Table 2.2 : Designating and Classifying hazardous waste

Designation	refers to the regulatory procedure that legally determines that a particular waste is caught in the hazardous waste control system for a particular region; it is normally written in Regulations under an Act controlling the management of wastes (Moore and Shin-Yu 1997). Designation determines whether or not a waste is hazardous
Classification	Refers to the system that facilitates the monitoring of wastes after they have been caught in the hazardous waste control system by the designation procedure (Moore and Shing-Yu 1997: 3) Once it is determined to be hazardous, the hazardous waste classification system is used to identify the waste, collect data on its occurrence, provide additional information on its characteristics to assist in management and to track movement

Source: Moore and Shin-Yu 1997

Moore and Shin-Yu (1997) also point to three key approaches that have been used in the development of designation and classification systems - generalized, exclusionary and inclusionary. These are summarized in the table below.

Table 2.3 Approaches to Classifying Hazardous Waste

Approach	**Classification**
Generalised	Hazardous waste is a waste which…. - may adversely affect human health - may adversely affect other living organisms - may damage property
Exclusionary	Hazardous wastes are those wastes excluded from being disposed of to conventional waste management systems of: - municipal solid waste landfills - sewerage systems - natural environmental systems (air, land water) Sometimes known as 'special' wastes, this label avoids the problem of whether they are actually hazardous or not
Inclusionary	Hazardous wastes are those wastes that fit a particular criteria or an inclusionary list which, if the waste satisfies these, designates it as hazardous. There are 3 types of inclusionary definitions - *Generic* (based on a description of the process from which the waste arises, eg sludge from the bottom of oil storage tanks) - *Constituents* (contains measurable concentrations of hazardous compounds) - *Characteristics* (exhibits one or more hazard, e.g. toxic, corrosive) Regulatory agencies commonly use a combination of all three.

Tabulated and adapted from Moore and Shin-Yu (1997: 4-5)

The question here is to what extent do these labels and systems of classification affect perceptions of this waste stream and how it is managed? In other words, how waste is defined has major implications for how it is managed and disposed of.

Examples of narrative descriptions of hazardous waste

The following examples reflect narrative descriptions drawn from international, regional, national and state conventions and agreements.

Basel Convention

1. The following wastes that are subject to transboundary movement shall be "hazardous wastes" for the purposes of this Convention:
   (a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III; and
   (b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit
2. Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention
3. Wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials, are **excluded** from the scope of this Convention
4. Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are **excluded** from the scope of this Convention (Basel Convention as amended 2005, Article 1 : 5-6)

Hazardous Waste (Regulation of Exports and Imports) Act 1989

For the purpose of importing hazardous waste into Australia or exporting hazardous waste from Australia, 'a waste is hazardous for the purposes of the Act (i.e.. the *Hazardous Waste Regulation of Imports and Exports Act 1989)* if it is *listed* as hazardous in the *Basel Convention* or in the *OECD Regulation*' (DEWHA 2010). The exclusion for Basel is radioactive wastes and for OECD radioactive materials. The *Hazardous Waste Regulation of Imports and Exports Act* 1989 does not govern the movement of hazardous waste *within* Australia.

Waigani Convention 1995 – Regional Agreement, South Pacific
The following substances shall be "hazardous wastes" for the purposes of this Convention:

(a) Wastes that belong to any category contained in Annex I of this Convention, unless they do not possess any of the characteristics contained in Annex II of this Convention; and
(b) Wastes that are not covered under sub-paragraph (a) above, but which are defined as, or are considered to be, hazardous wastes by the national legislation of the exporting, importing or transit Party to, from or through which such wastes are to be sent.

2. Radioactive wastes are excluded from the scope of this Convention except as specifically provided for in Articles 4.1, 4.2, 4.3, and 4.5 of this Convention.
3. Wastes which derive from the normal operations of a vessel, the discharge of which is covered by another international instrument, shall not fall within the scope of this Convention (Article 2, Waigani Convention, 1995).

Movement of Controlled Waste NEPM (National Environmental Protection Measure) - National

"Controlled Waste" means any waste in List 1 provided that the waste possesses one or more of the characteristics in List 2. Unless otherwise demonstrated to the satisfaction of the nominated agency in the jurisdiction of destination, wastes in List 1 are considered to possess one or more characteristics in List 2

National Waste Policy (2010)
Waste is defined as hazardous if it:

- belongs to a particular waste stream (e.g. waste oils/water, hydrocarbons/water mixtures, emulsions)
- is identified in a *list* of wastes with *hazardous constituents* (e.g. mercury or lead)
- is identified as a waste that requires *special consideration* (.e.g. household waste); or
- like the UN Recommendations on Dangerous Goods, if it is a waste that possesses *hazardous characteristics* (e.g. ecotoxicity) (National Waste Report, EPHC 2010: 171)

National Waste Policy Fact Sheet

a hazardous waste refers to a substance or object that exhibits hazardous *characteristics,* is no longer fit for its intended use and requires disposal. Some of these hazardous characteristics include being toxic, flammable, explosive and poisonous' (National Waste Policy Fact Sheet 2010)

Hazardous Waste Strategy – EPA South Australia

For the purpose of this strategy, hazardous waste means:

Any unwanted or discarded material (excluding radioactive material) which, because of its physical, chemical or infectious characteristics can cause significant hazard to human health or the environment when improperly treated, stored, transported, disposed of or otherwise managed. For the purpose of this strategy this means any waste stream that is specified in Appendix 1, provided that it possesses one or more of the characteristics specified in Appendix 2 (Hazardous Waste Strategy SA, Sergi 2008: 5)

Environment Protection (Industrial Waste Resource) Regulations 2009, Victoria

prescribed industrial waste means any industrial waste or mixture containing industrial waste other than industrial waste or a mixture containing industrial waste that—(a) is a Schedule 1 industrial waste; or (b) has a direct beneficial reuse and has been consigned for use; or (c) is exempt material; or (d) is not category A waste, category B waste or category C waste;

Environmental Protection (Waste Management) Regulation 2000 – Queensland

regulated waste means regulated waste within the meaning of the *Environmental Protection Regulation 2008 (p. 24)*

Under the *Environmental Protection Regulation 2008:*

1. *Regulated waste* is waste that—

(a) is commercial or industrial waste, whether or not it has been immobilised or treated; and

(b) is of a type, or contains a constituent of a type, mentioned in schedule 7

2. Waste prescribed under subsection (1) includes-

(a) for an element – any chemical compound containing the element; and

(b) anything that contains residues of the waste (p. 54)

i. for an element – any chemical compound containing the element; and

ii. anything that contains residues of the waste (p. 54)

The labels and broad-brushed descriptions attached to this waste stream reveal little or nothing about the true nature of the waste itself or the threat it poses. Answers to these important questions are gleaned through the process of categorization, classification and coding.

Typically there are six classes of waste, of which hazardous waste is only one.

- Special waste
- Liquid waste
- *Hazardous waste*
- Restricted solid waste
- General solid waste (putrescible)
- General solid waste (non-putrescible) (see DECC NSW 2008)

Approaches vary from state to state, but most, after determining the form of the waste, use as a starting point a standard set of hazard *characteristics* (see Table 2.4) drawn from the Basel Convention and closely reproduced in other legislative instruments such as the Movement of Controlled Waste NEPM. Broadly speaking, a waste is considered hazardous when it exhibits one or more of the listed hazard characteristics (e.g., explosive, corrosive).

This list of hazards can be used to identify waste as *hazardous* as well as to demonstrate that the waste is *safe* (not hazardous), based on the fact that it does not exhibit any of the characteristics listed.

Table 2.4

Characteristics of Controlled Wastes

Dangerous Goods Class (UN Class)	Code	Characteristics
1	H1	Explosive
3	H3	Flammable liquids
4.1	H4.1	Flammable solids
4.2	H4.2	Substances or wastes liable to spontaneous combustion
4.3	H4.3	Substances or gases which, in contact with water, emit flammable gases
5.1	H5.1	Oxidising
5.2	H5.2	Organic peroxides
6.1	H6.1	Poisonous (acute)
6.2	H6.2	Infectious substances
8	H8	Corrosives
9	H10	Liberation of toxic gases in contact with air or water
9	H11	Toxic (delayed or chronic)
9	H12	Ecotoxic
9	H13	Capable of yielding another material which possesses H1-H12
		Other reasons Potential to have a significant adverse impact on ambient air quality Potential to have a significant adverse impact on ambient marine, estuarine or fresh water quality

Source: *National Environment Protection (Movement of Controlled Waste Between States and Territories) Measure* as varied November 2010, p 14

Process of waste determination

The classification of waste as hazardous requires somebody (usually the producer) to make a series of critically important decisions about the nature and volatility of the waste. This process is informed by consulting documented catalogues of hazardous substances and materials (e.g., schedules, appendices, lists). The outcome of these decisions determines how the waste is "managed" (transported, treated, destroyed) throughout its lifecycle.

If waste is deemed not to be hazardous and this translates into it not being subject to regulation (avoiding regulation), then the decision-making process that determines classification becomes even more important to the imperative of protection .It is this process of categorisation, classification and coding that progressively reveals the true nature of the waste in terms of the presence of a *substance, material, contaminant* or *constituent* (above or below a certain threshold).

Each state has its own approach to categorization and classification, reflected in strategies, policies, guidelines and fact sheets. Some states have a stepped process (e.g., New South Wales), others have a two-pronged approach (e.g., Victoria) and others a detailed strategy (e.g., South Australia). It is not the purpose of this paper to critique the classification process, simply to draw attention to different approaches to the task.

New South Wales – A stepped approach

A series of strategic questions:

Step 1 Is the waste 'special waste' (eg clinical, asbestos, waste tyres)
Step 2 Is the waste 'liquid waste'
Step 3 Is the waste pre-classified (eg hazardous waste; restricted solid waste; general solid waste (putrescibles); general solid waste (non putrescibles)?
Step 4 Does the waste possess *hazardous characteristics?*
Step 5 Determine a waste's classification using chemical assessment (measurable properties of waste; classifying a waste using test
Step 6 Is the waste putrescible? (DECC NSW 2008)

Victoria – a two-pronged approach

EPA has issued several classifications for prescribed industrial wastes, for both manufacturing waste and contaminated soil, in accordance with clause 11(1) of the Industrial Waste Management Policy (Prescribed Industrial Waste). Those Classifications that have not expired, will remain in effect until they expire or are revoked by the EPA. Classificationswill now be issued under clause 11 of the *Environment Protection (Industrial Waste Resource) Regulations 2009.* These classifications may be grouped into the following categories:

- **Classifications for Reuse (**opportunities for re-use) e.g. used oil filters, large containers, grease interceptor trap waste
- **Classifications – for Disposal** may be issued to industry-wide waste streams or to an individual waste stream
    - General Classification (industry-wide waste streams) e.g., ceramic based fibres, contaminated absorbent materials
    - Specific Classification (individual waste streams), e.g., industry specific filter cake, contaminated soil stockpiles, treatment plant residue (EPA Victoria 2010)

Regardless of the approach, the process of categorisation and classification requires the waste generator (sometimes with assistance from the EPA) to make a number of strategic decisions about the nature of the waste produced. Some of these decisions involve:

- identifying whether the waste is hazardous or not according to listed hazard characteristics (see the clipboard)
- consulting a ‘catalogue’ of hazardous substances, materials and constituents, in the form of lists, schedules, annexures or tables, forming part of Conventions, Legislation, Regulations, Measures and Strategies, culminating in a coding process
- deciding whether a waste requires special testing to determine those constituents that represents a hazard(s), the proportion of the waste they represent and their individual toxicity(above or below a certain threshold)
- determining whether the waste requires special handling and transportation (eg as Dangerous Goods)
- deciding which wastes are exempt for one reason or another

Table 2.5 is a typical *list* of prescribed [hazardous] wastes used for the process of classification, taken from an EPA Victoria publication.

Table 2.5 : Prescribed Waste List

General prescribed wastes Grease interceptor trap effluent arising from domestic premises **Prescribed industrial wastes** Acids in a solid form and acidic solutions with a pH value of 4 or less Alkaline solids and alkaline solutions with a pH value of 9 or more Animal and vegetable oils and derivatives Animal effluent and residues including abattoir effluent, poultry and fish processing wastes Antimony and antimony compounds Any congener of polychlorinated dibenzo-furans (PCDFs) Any congener of polychlorinated dibenzo-p-dioxins (PCDDs) Arsenic and arsenic compounds Asbestos (all forms) Barium and barium compounds Beryllium and beryllium compounds Boron and boron compounds Cadmium and cadmium compounds Caustic neutralised wastes containing metallic constituents Ceramic based fibres with physicochemical characteristics similar to those of asbestos Chromium compounds Clinical and related wastes (not otherwise specified) Cobalt and cobalt compounds Contaminated soil that is either Category A waste, Category B waste or Category C waste, as defined in the *Environment Protection (Prescribed Waste) Regulations 1998*. Copper compounds Cyanides (inorganic) Cyanides (organic) Detergents and surface active agents (surfactants) Filter cake Fly ash Grease interceptor trap effluent	Halogenated organic chemicals (not otherwise specified) Halogenated organic solvents Heterocyclic organic compounds containing oxygen, nitrogen or sulphur Highly odorous organic chemicals (including mercaptans and acrylates) Highly reactive chemicals (not otherwise specified) Inert sludges or slurries Inorganic chemicals (not otherwise specified) Inorganic fluorine compounds (excluding calcium fluoride) Inorganic sulphur containing compounds Isocyanate compounds Lead and lead compounds Mercury and mercury compounds Metal carbonyls Nickel compounds Non-halogenated organic chemicals (not otherwise specified) Non-toxic salts Organic solvents (excluding halogenated solvents) Oxidising agents including chlorates, perchlorates, peroxides Phenol and phenol compounds (including halogenated phenols) Phosphorus and phosphorous compounds Prescribed industrial wastes that are encapsulated, chemically fixed, solidified or polymerised Residues from industrial waste treatment or disposal operations (not otherwise specified) including filter backwash waters Selenium and selenium compounds Silver and silver compounds Spent catalysts Tannery wastes (not otherwise specified) including leather dust, ash, sludges and flours Tellurium and tellurium compounds Textile effluent and residues (not otherwise specified) Thallium and thallium compounds	Vanadium compounds Vegetable, fruit, food processing effluent Vehicle, machinery and industrial washwaters with or without detergents Waste chemical substances arising from research and development or teaching activities (not otherwise specified), that are new or unidentified substances with unknown human health or environmental effects Waste from the production, formulation and use of: — biocides and phytopharmaceuticals (not otherwise specified) — inks, dyes, pigments, paints, lacquers and varnish (not otherwise specified) — organic solvents (not otherwise specified) — photographic chemicals and processing materials — resins, latex, plasticisers, glues and adhesives (not otherwise specified) excluding solid inert polymeric materials — wood-preserving chemicals (not otherwise specified) — pharmaceutical products (not otherwise specified) Waste oils unfit for their original intended use Waste oil and water mixtures or emulsions and hydrocarbon and water mixtures or emulsions Waste resulting from surface treatment of metals and plastics Waste substances or articles containing or contaminated with polychlorinated biphenyls (PCBs) or polybrominated biphenyls (PBBs) Waste tarry residues arising from refining, distillation, and any pyrolytic treatment Wastes of an explosive nature not subject to any other legislation including azides Wool scouring wastes Zinc compounds

Source: EPA Victoria (2007) Publication 448 Classification of Wastes

Important safety considerations also attach to a waste's categorisation and coding. These involve key decisions about

- management and handling that may involve other agencies (eg Occupational Health and Safety; Health; Primary Industries), transport (eg Dangerous Goods)
- whether the waste is trackable (or not) - interstate and/or intrastate
- appropriate treatment methods depending on the type of waste (eg disinfection or incineration of clinical waste; slashing or incineration of tyres),
- short or long-term storage options (eg stockpile; burial in containers)
- end of life disposal (eg landfill; incineration)
- site of disposal geographically (eg local, intrastate, interstate, international; urban or rural and in nature (e.g., on or beneath the earth; as liquid waste to waterway, as emissions to air)
- consideration of harm(s) to present and future generations (eg leachate to land, water or air; legacy wastes).

Factoring into these decisions are questions such as

- Which hazard?
- How dangerous? (level of threat to species and the environment)
- How volatile? (alone or in conjunction with something else; during transport; potential for transference)
- How toxic? (testing; threshold below which something is 'safe' and above which something is 'hazardous')
- Transformation value? (re-use, recycling, reprocessing, energy recovery)

The outcome of these decisions determines how the waste is 'managed' (transported, handled, treated, destroyed) and its final destination (which may or may not be the site at which it is treated). Concerns include:

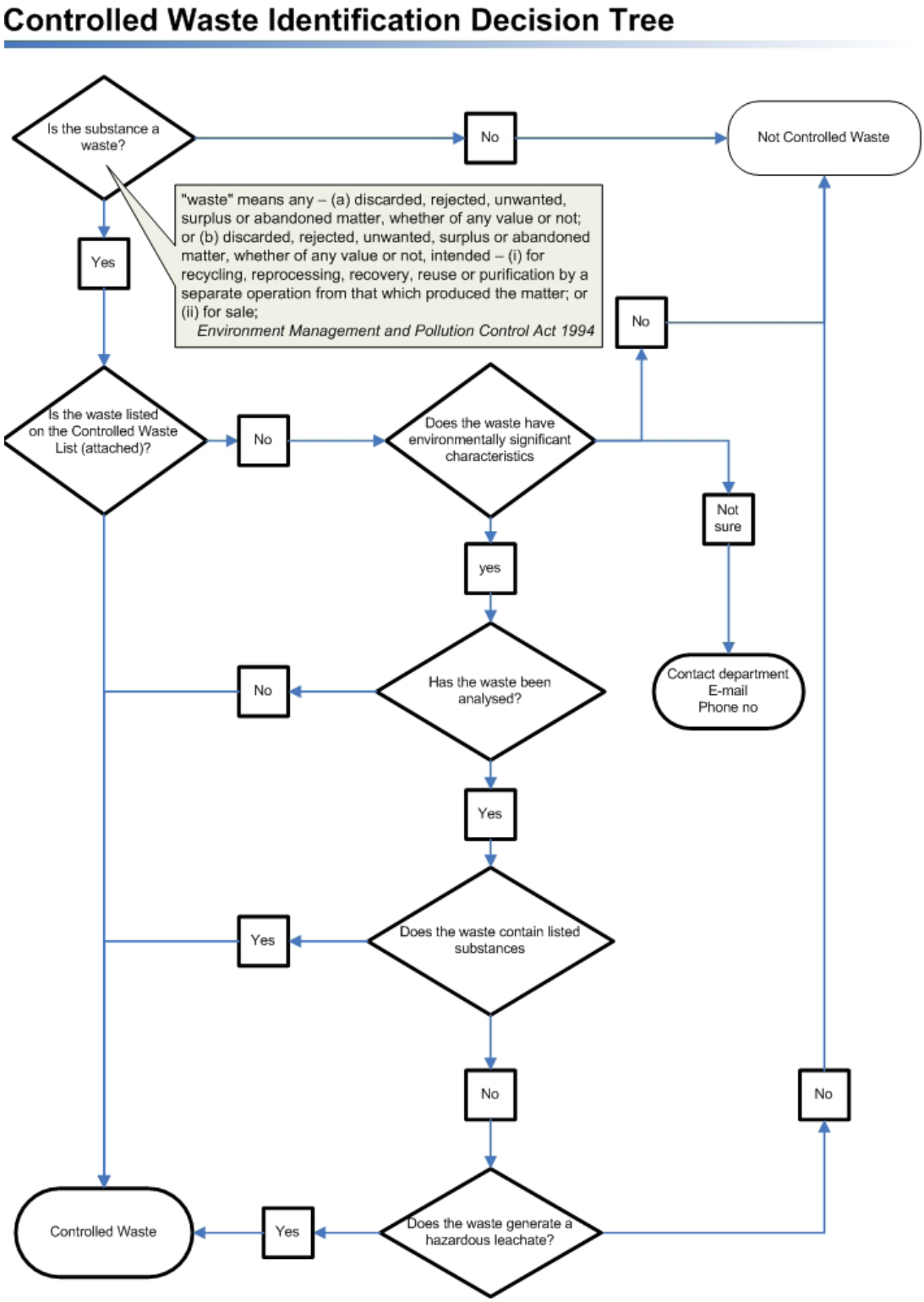
- Where it goes (incineration, treatment, disposal)
- Where it stays (stockpile, temporary storage; longterm storage)
- How it moves (dangerous goods)
- Where it moves (intrastate, interstate, transboundary)
- Whether its movement has to be tracked (or not)
- Where it finally ends up (landfill, buried underground; dumped)

A key concern here is transference (the mobility of the harm – can it ooze, seep into a water table, dissipate, dissolve?) and the contribution a specific hazard makes to a cumulative hazard (e.g., in combination with other wastes at a particular location). Another issue is the paradoxical environmental harms that may result from hazardous waste treatment or the residue of that treatment (e.g., dioxin emissions, leachate) or the residue from treatment (e.g. contaminated incinerator ash).

- What happens to the hazard once it is mixed with other hazards (e.g., another chemical) or mixed with other, perhaps incompatible hazards (e.g., in landfill or in a waste collection receptacle)?

Some states provide tools such as decision trees, to guide waste producers in making these important decisions (see Figure 2.1)

Figure 2.1 : Decision Tree Tasmania



Waste on the move

Reasons cited for tracking wastes include 'stamping out illegal dumping, preventing waste from ending up at the wrong destination and stopping unfair competition' (DECC NSW 2007). A range of stakeholders can be involved in the movement of waste including producers, transporters, receiving facilities, authorized agents and interstate/overseas transporters. Some wastes are subject to tracking in one state but not in another. Again, trackable wastes are defined by listed hazard characteristics (see clipboard Table 2.4)

Certain wastes are tracked when they move interstate, but it is less clear what the arrangements are when they move intrastate. Taking New South Wales as an example:

- wastes that must be tracked when transported within New South Wales [intrastate] or interstate include, but are not limited to, arsenic, filter cake, fly ash, mercury and mercury compounds, residues from industrial waste treatment/disposal operations
- wastes that must be tracked when transported interstate only include, but are not limited to, asbestos, grease trap wastes, tyres and tannery wastes

Then, there are certain circumstances under which waste does not need to be tracked. For instance, the Department of Environment and Climate Change, New South Wales, describes it this way.

- Waste does not need to be tracked if it does not exhibit any of the hazard characteristics (e.g., corrosive, explosive, infectious etc.), or if it is subject to an exemption [the Department exempts certain waste from some or all tracking requirements under certain circumstances – current list of exemptions appears on the Department's website] (DECC NSW 2007: 1)

Other conditions under which a waste may be exempt from tracking include:

- transportation of waste in an emergency to protect human health, the environment or property
- transportation of waste by pipeline
- transportation of any residue of a substance in a container, if the container will be refilled with the same type of substance and the substance in the refilled container is intended for use
- transportation of waste for analysis relating to waste categorization or research, but only if the transportation and use of the waste is approved in writing by DECC NSW

- transportation of unwanted chemicals, used for the operation of the farm by the owner or occupier of a farm, to a collection place provided by an approved collection scheme
- transportation of waste in accordance with a product recall approved by the Australian Pesticides and Veterinary Medicines Authority, Food Standards Australia and New Zealand or the Therapeutic Goods Administration of the Commonwealth Government (DECC NSW 2007: 1)

An exemption does not necessarily mean the waste is not regulated, it may mean the waste is regulated under separate legislation, and may also involve another agency outside the EPA (e.g., Department of Health, Department of Primary Industries, Australian Customs Service).

The following excluded wastes (Figure 2.2), for instance, are listed in South Australia's Hazardous Waste Strategy 2006-2010 (Sergi 2008: 6)

Figure 2.2 : Excluded Waste Streams

4. EXCLUDED WASTE STREAMS
This strategy does NOT apply to the following waste streams:

4.1 Radioactive waste
This waste stream is controlled by the *Radiation Protection and Control Act 1982.*

4.2 Non-hazardous solid inert waste
By definition, this waste stream is non-hazardous. It is therefore dealt with through other disposal avenues and recycling facilities.

4.3.1 Discharge of trade waste to sewer
SA Water controls and manages waste that is discharged to the sewerage system as trade waste in compliance with the *Sewerage Act 1929.* Trade waste is managed by SA Water and therefore excluded from this strategy.

4.4 Containers
It is considered that empty containers contaminated with residues of substances referred to in Appendix 1, pose an insignificant impact due to the unlikely presence of the hazardous characteristics referred to in Appendix 2.

4.5 Grease trap waste
There are numerous existing recycling outlets for grease trap waste in South Australia. This waste does not display any of the hazard characteristics listed in Appendix 2; however, this does not preclude it from being defined as a waste through other legislative instruments – for example, the *Environment Protection Act 1993.*

4.6 Non-toxic salts

These chemicals do not display any of the hazardous characteristics listed in Appendix 2 and may be dealt with through normal disposal avenues and recycling facilities.

4.7 Tyres

There are numerous existing recycling outlets for tyres in South Australia, but this does not preclude tyres from being defines as a waste through other legislative instruments, for example, the *Environment Protection Act.*

4.8 Explosive waste

These wastes are addressed and controlled under the *Explosives Act 1936,* which is administered by the Department for Administrative and Information Services.

4.9 Sewage sludge and residue

This waste stream includes nightsoil and septic tank sludge and is currently managed under the *South Australian Biosolids* (EPA 093/97) and through conditions within EPA issued licences.

As indicated previously, it is not the purpose of this paper to critique state classification systems, only to point out that variations in approach may potentially add layers of confusion to the definition and classification process, not only for EPA personnel but also for waste producers, particularly those operating businesses in more than one state, as well as other stakeholders (eg transporters; waste management companies) who have to navigate different classification systems and codes in different states.

Transpacific Industries presented several examples (Tables 2.6, 2.7 and 2.8) of this, as part of their submission to the National Waste Policy (2010).

Table 2.6 : Waste Classification Differences

Classification	Range of Landfill Waste Classification from least to most Hazardous				
	NSW				
Waste/Landfill Class	General solid waste - non putrescible	General solid waste - putrescible	Restricted solid waste	Hazardous waste No disposal to landfill	
Lead conc. mg/kg	1,500	1,500	6,000	6,000+	
Lead leachability mg/L	5	5	20	20+	
	QLD				
	No landfill waste classification system. Waste acceptance criteria are provided in each individual landfill's EPA licence and are site specific.				
	SA				
Waste/Landfill Class	Waste Fill	Above this limit waste must go to landfills which are licensed to accept waste with certain levels of contamination as approved by the EPA.			
Lead conc. mg/kg	300				
	TAS				
Waste/Landfill Class	A - Solid Inert	B - Putrescible	C - Secure	No disposal to landfill	
Soil Class	1 - Fill	2 - Low level contaminated soil	3 - Contaminated soil	4 - Contaminated soil for remediation	
Lead conc. mg/kg	300	1,200	3,000	3,000+	
Lead leachability mg/L	n/a	1	5	5+	
	VIC				
Waste/Landfill Class	Fill / Putrescible	Cat. C prescribed industr. waste	Cat. B prescribed industr. waste	Cat. A prescribed industr. waste No disposal to landfill	
Lead conc. mg/kg	300	1,500	6,000	6,000+	
Lead leachability mg/L	n/a	1	4	4+	
	WA				
Waste/Landfill Class	Class 1	Class 2	Class 3	Class 4	Class 5
Landfill Name	Inert	Putrescible	Putrescible	Secure	Intractable
Lead conc. mg/kg	1,500	1,500	15,000	60,000	60,000+
Lead leachability mg/L	0.5	0.5	1	10	10+

NB: NT and ACT do not have any particular rules about landfill classifications other than in general, anything hazardous does not go to landfill.
Source: Table 1: Transpacific Industries NWP Submission 2009:3

Table 2.7 Waste Code Nomenclature Differences

	Tracking Information	VIC	NSW	QLD	SA	WA	TAS[1]
Oil filters from vehicle workshops	**Waste Code/Category[2]**	J170	J100	J100	J100	6.04	J200
	Waste Description	Used oil filters	Waste mineral oils	Mineral oils	Waste mineral oils unfit for their original intended use	Waste mineral oils unfit for their originally intended use	Materials contaminated with mineral oils where the oils are free or expressible
	Waste Origin	9419	G5329	G532	5239	n/a	n/a
Grease Trap waste from restaurant	**Waste Code/Category[2]**	K110, or K120	K110	K110	K110	1.03	K110
	Waste Description	Grease interceptor trap effluent – domestic, or Grease interceptor trap effluent - industrial	Grease trap waste	Grease trap waste	Grease trap waste	Grease wastes – wastes resulting from food preparation processes	Grease trap waste
	Waste Origin	4511	H5730	H573	2179 (food manufacturing)	n/a	n/a

*Note – no intra-jurisdictional waste tracking currently occurs in ACT or NT.
[1] No intra-jurisdictional waste tracking currently occurs in Tasmania, however a waste coding system has been developed.
[2] Waste streams are classified into waste codes in all jurisdictions except WA. Waste is classified into categories when identifying waste streams in WA.

Source: Section of Table 2 : Transpacific Industries NWP Submission 2009:4

Table 2.8 : Tracking Requirements within State Borders

Tracking System	VIC	NSW	QLD	SA	WA
Waste Name	Prescribed	Controlled	Trackable	Listed	Controlled
Waste Codes?	Yes	Yes	Yes	Yes	No
Origin Codes?	Yes	Yes	Yes	Yes	No
Contaminant codes?	Yes	No	No	Yes	No
Licence for transport?	Vehicle Permit	Yes	Yes	Yes	Yes
Online or Paper?	Both	Online only	Paper or electronic	Paper only	Both
Use your own system?	No	Yes if approved by EPA	Yes but only for certain wastes and if approved by EPA.	No	No

Source: Section of Table 3: Transpacific Industries NWP Submission 2009:5

Some of the problematic wastes identified in our study include radioactive wastes, clinical wastes and tyres – problematic because of the uncertainty surrounding who regulates which wastes under which legislative parameters and because of the different 'takes' on particular wastes, such as tyres, which rather than being labeled hazardous from the outset are sometimes labeled 'special wastes' or are seen to only become hazardous over time.

Radioactive Waste

In Australia, 'there is currently no grand unified classification system for radioactive waste. However, for practical purposes radioactive waste is classified into five different categories - Very Low Level, A, B, C and S. The latter four categories are defined in the *Code of practice for the near surface disposal of radioactive waste in Australia 1992: 14-15).* Very Low Level Radioactive Waste can be disposed of by the user under the *Code of practice for the disposal of radioactive wastes by the user (1985).* Such waste is defined as having radioactivity content greater than for exempt waste but less than the upper limit specified in the *user disposal code*. Solid waste, particularly short-lived waste, can be disposed to an approved landfill not specifically intended for radioactive waste. The *user disposal code* also controls discharges of liquid waste to the environment and gaseous waste to the air. This class of waste is aimed at users of small quantities of radioactive materials. Thus, this class of waste does not cover bulk materials' (ARPANSA 2009)

Table 2.9 : Summary of the IAEA Classification of Radioactive Waste

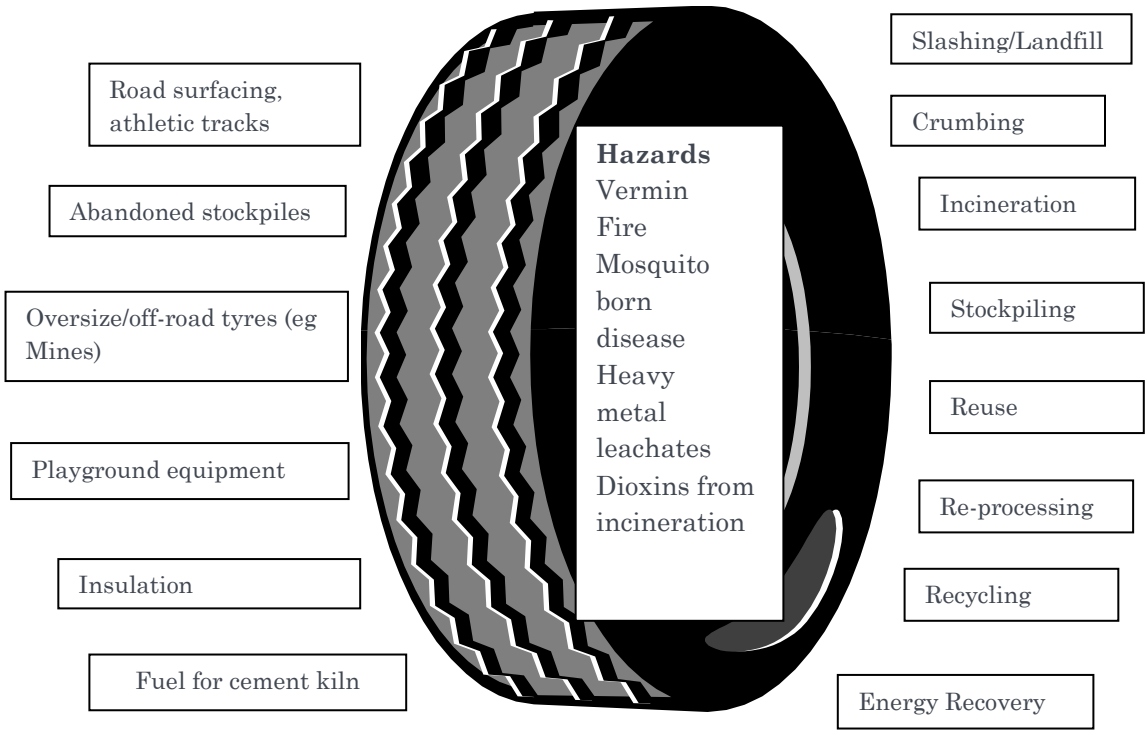
Waste Type	Definition
Exempt waste	Activity levels at or below clearance levels
Low Level waste	Activity levels above clearance levels. Contains enough radioactive material to require action for the protection of people, but not so much that it requires shielding in handling, storage or transportation.
Short-lived Intermediate Level Waste	Waste that requires shielding, but needs little or no provision for heat dissipation, and contains low concentrations of long-lived radionuclides* (less than 4000 Bq/g of alpha emitters). Radionuclides generally have a half-life of less than 30 years.
Long-lived Intermediate Level Waste	Waste that requires shielding, but needs little or no provision for heat dissipation. Concentrations of long-lived radionuclides (which generally have a half-life of greater than 30 years) exceed limitations for short lived waste.
High Level Waste	Waste which contains large concentrations of both short and long-lived radioactive nuclides, and is sufficiently radioactive to require both shielding and cooling. It generates more than two kilowatts per cubic metre of heat.

Source: Australian Radiation Protection and Nuclear Safety Agency (ARPANSA 2009)

Tyres as Waste

Some wastes are seen to become hazardous over time, at the point of treatment, at the site of disposal or during re-use/recovery. Tyres provide a good example of this.

Figure 2.3 : Does destination determine definition?



From a regulation and classification point of view, tyres may be hazardous waste in one state and not in another. How tyres are used and where they eventually end up has major implications in regards to the risks involved.

All of this points to the need for consideration of a harmonised approach to labeling, defining and classifying hazardous waste.

Towards a national definition of waste

Developing a nationally consistent waste definition across jurisdictions is an explicit strategy of the Environmental Protection Heritage Council's (EPHC) Strategic Plan for 2009-2011 (EPHC 2009:4). Faced with a similar goal in 1999, the New Zealand Ministry for the Environment (MfE 1999) published a discussion paper on how this might be achieved. At the time the MfE identified five options for defining hazardous waste:

Table 2.10 : Options for defining hazardous waste

Option 1	*No national definition*.	Under this option the status quo would be maintained with the *Resource Management Act* (RMA) defining hazardous waste through its effects on the environment [that is defined in legislation]
Option 2	*Narrative* definition	Based on, for example, the draft joint Australia/New Zealand Standard - this standard defines as hazardous waste as *'a component of the waste stream, which by its characteristics, poses a threat to public health, safety or the environment'*
Option 3	*Lists* of industries/processes, hazardous waste *types* and hazardous waste *constituents*	Under this option, any waste that is covered by the list is deemed to be hazardous [known as pre-classified wastes in some jurisdictions]
Option 4	Hazardous *thresholds*	Used as 'bottom line denominators' to assess whether a waste is hazardous or not. Any wastes which exceed these thresholds are defined as hazardous
Option 5	Hazardous waste *list* combined with hazardous *characteristic* thresholds	Hazardous thresholds are used to provide certainty in terms of the hazardous wastes that need to be added to the list and declaring which wastes are deemed to be non-hazardous

Source : Ministry for Environment (MfE 1999: 4)

Examples of feedback from this process reveal some of the key concerns associated with moving towards a national definition (MfE New Zealand 1999:4)

- the question was raised as to whether a hazardous waste definition would be effects-based
- a hazardous waste definition must be able to be understood by all and be unambiguous, simple and inexpensive to use
- There is a need to distinguish between offensive and hazardous wastes
- Option 5 [above] allows hazardous waste operators to de-list a hazardous waste once it is shown to be below critical thresholds

- Any list must be easily updateable, and must be relevant to a range of industries and waste types
- Definitions need to address the source of waste and recognize the fact that wastes are transformed through their lifecycle
- Maori concerns/definitions should be considered [e.g., the number of waste discharges around areas of spiritual significance) (MfE 1999: 4)

Questions arising from this paper

It is clear from this preliminary scan that defining and classifying hazardous waste is a controversial and complex area, where the language itself is not uniform and there are different approaches to the task.

- What criminogenic risks are inherent in the classification process?
- Does *hazard* determine definition?
- Does *destination* determine definition or vice versa? (e.g., tyres)
- What happens to hazardous waste that is *not* transported (e.g., stockpiles)
- What is hazardous waste and where is it going?
- What paradoxical harms occur as a result of treatment, immobilization, or disposal?
- Which hazardous wastes are not captured?
- What are the issues surrounding generator/producer self-classification of hazardous wastes?
- What are the issues surrounding classification, de-classification, re-classification and misclassification?
- How do you police what you cannot define?
- How do you know when hazardous waste is incorrectly classified?
- Who says which wastes are hazardous and why?
- Which classification system should be adopted and why?
- What do these labels tell us about the harmful nature of the waste?
- How do ‘outsiders’ know what is hazardous?
- What are the advantages/disadvantages of harmonized labeling of this waste stream?
- Are these ‘legal labels’- that is are they defined in law?
- What are the legal, human rights, social, political and cultural dimensions of these definitions?

- Who regulates which hazardous wastes?
- Which wastes, which thresholds?
- What are the issues surrounding co-mixing of hazardous and non hazardous wastes?
- How do generators (and law enforcement practitioners) learn how to classify waste?
- Who monitors the waste classifiers?
- What national differences exist in waste classification systems and approaches?
- Who oversees hazardous wastes that are classified for re-use?
- How is toxicity measured?
- How effective are thresholds?

As the study progresses we hope to answer some of these questions as well as raise other issues for further consideration.

References

Australian Radiation Protection and Nuclear Safety Agency (ARPANSA 2009) <http://www.arpansa.gov.au/radiationprotection/factsheets/is_waste.cfm> (accessed 7 February, 2011)

Basel Convention on the Control of Transboundary Movements of Hazardous Waste and Their Disposal (Basel Convention 2005, as amended). *Article 1 : Scope of the Convention.*

Brisbane City Council (BCC 2011). *Household Hazardous Wastes.* Brisbane City Council website (last updated 25 January 2011). <http://www.brisbane.qld.gov.au/environment-waste/rubbish-bins/household-hazardous-waste/index.htm > (February 2011).

Choice Online (2009). *Nanotechnology Project : Nanotechnology and Food. http://www.choice.com.au/reviews-and-tests/food-and-health/food-and-drink/safety/nanotechnology-and-food.aspx* (accessed March 2011)

Department of the Environment, Water, Heritage and the Arts (DEWHA 2010). *National Waste Policy Fact Sheet : Hazardous Substances and Hazardous Waste.* ENV14.0310. Australian Government.

Department of Environment, Climate Change and Water (DECCW NSW 2008). *Waste Classification Guidelines. Part 1 : Classifying Waste. <* http://www.environment.nsw.gov.au/resources/waste/08202classifyingwaste.pdf> (accessed February 2011)

Department of Environment and Climate Change (DECC NSW 2007). *Waste Tracking Fact Sheet – Protecting the environment and your business. Waste that Must be Tracked.* http://www.environment.nsw.gov.au/resources/owt/trackwaste07522.pdf> (downloaded

Department of Sustainability, Environment, Water, Population and Communities (2011). *Hazardous Waste (Regulation of Exports and Imports) Act 1989 : About the Act.* <http://www.environment.gov.au/settlements/chemicals/hazardous-waste/guide.html > (accessed February 2011)

Environment Protection Authority (EPA VIC 2010). *Classifications issued by EPA.* Last Updated 29 November, 2010. <http://www.epa.vic.gov.au/waste/classifications_by_EPA.asp# > (accessed February 2011)

Environmental Protection Authority (EPA VIC 2007). *Publication 448 : Classification of Wastes.* Information Bulletin. May 2007. <http://www.esdat.com.au/Environmental%20Standards/Australia/448.3%20Waste%20Classification.pdf> (accessed February 2011)

Environment Protection and Heritage Council (EPHC 2010). *National Waste Report 2010.* Department of the Environment, Water, Heritage and the Arts (DEWHA). *National* <http://www.ephc.gov.au/sites/default/files/WasteMgt_Nat_Waste_Report_FINAL_20_FullReport_201005_0.pdf> (accessed January 2011)

EPA Division Tasmania (EPA TAS 2010). *Controlled Waste Identification Decision Tree.* Department of Primary Industries, Parks, Water and Environment. <http://www.environment.tas.gov.au/file.aspx?id=2259> (accessed February 2011)

Hazardous Waste (Regulation of Exports and Imports) Act 1989. Act No. 6 of 1990 as amended. Prepared on 14 December 2010, taking into account amendments up to Act 139 of 2010.

Lipman, Z. (2004). *Trade in Hazardous Waste : Environmental Justice Versus Economic Growth. Environmental Justice and Legal Process.* Basel Action Network (BAN) Library. < http://www.ban.org/Library/lipman.html> (accessed February 2011)

Ministry for the Environment, *Manatū Mō Te Taiao* (MfE 1999). *Towards a New Zealand Definition of Hazardous Waste : Issues and Options.* June 1999. Prepared by the Environment Business Group, for the Ministry for the Environment, Manatū Mō Te Taiao <http://www.bvsde.paho.org/bvsacd/cd48/national-definition.pdf> (December 2010).

Moore, S. and Shin-Yu, T. (1997). *Designation & Classification of Hazardous Wastes.* Version 2. School of Civil & Environmental Engineering, University of New South Wales. <http://awd.csiro.au/awdwebsite2003/Awd%20pubn%20PDFiles/Hazw_.PDF> (accessed February 2011)

Sergi, S. (2008). *Hazardous Waste Strategy 2006-2010.* March 2008. Environment Protection Authority (EPA SA 2008).

Transpacific Industries Group Limited (Transpacific 2009). *Submission in reply to the National Waste Policy Consultation Paper.* 13 May, 2009. <http://www.environment.gov.au/wastepolicy/consultation/submissions/pubs/047-transpacificindustries.pdf> (accessed January 2011)

Van Daele, S., Vander Beken, T., & Dorn, N. (2007). 'European waste disposal sector'. In T. Vander Beken (Ed.), *The European waste industry and crime vulnerabilities* (pp. 17-142). Ant-werp/Apeldoorn: Maklu

Vander Beken, T. and Balcaen, A. (2006). 'Crime Opportunities Provided by Legislation in Market Sectors : Mobile Phones, Waste Disposal, Banking, Pharmaceuticals'. *European Journal of Criminal Policy Res*, 12, 2006: 299-323.

Waigani Convention (1995) *Article 2 : Scope of the Convention and Area of Coverage.*<http://www.forumsec.org.fj/resources/uploads/attachments/documents/Waigani%20Convention%20Text1.pdf> (accessed February 2011)