

# Chapter 1

## Introduction

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### 1.1 Objectives and scope

This document provides those with an interest in the management of hazardous waste with up-to-date information in the following areas:

- New Zealand legislation and regulations addressing hazardous waste;
- initiatives and programmes at central and local government level involving hazardous waste;
- general treatment and disposal processes and storage considerations;
- transport issues; and
- emergencies involving hazardous waste.

The document is a resource compiling New Zealand-specific information related to hazardous waste (e.g. the legislative framework) as well as providing more general information (e.g. on treatment methods). It aims to assist the reader with forming an understanding of the special requirements and care necessary when handling or dealing with this type of waste, and the need to practice due diligence. While it is acknowledged that liquid trade waste and air emissions may also have hazardous constituents, it is beyond the scope of this document to address these waste types in detail.

It is important to note that this document describes current practices and concerns related to hazardous waste, thus providing a 'snapshot' of hazardous waste issues. The information and references presented here are intended to serve as a background to enable the reader to research their own specific needs. It is not a guideline, nor does it provide definitive answers to specific problems.

### 1.2 Background

This document represents a revision and update of *Part 3: Hazardous Waste: Appropriate Technologies for New Zealand in Our Waste - Our Responsibility* (Centre for Advanced Engineering, 1992)<sup>1</sup>. Since the pub-

<sup>1</sup> For the remainder of this document, this report will be referred to as the *CAE 1992 Report*.

lication of the *CAE 1992 Report*, hazardous waste management as an issue has risen in prominence and become a focus of concern. A number of studies and reports have been released within the last three years alone, and the Ministry for the Environment (MfE) established a Hazardous Waste Programme (HWP) in 1997.

Hazardous waste management continues to be one of the major environmental issues in most parts of the world, including New Zealand. Most industrialised countries have strict rules and regulations in this area, with certain key features common to most of them (refer section 1.2). In contrast, New Zealand is characterised by a much less robust management system for hazardous waste (refer section 1.3). As a result, it can be difficult to access information on hazardous waste. This document was compiled to assist with this task and provide references for further study.

### 1.3 Hazardous waste management in the international context

In 1996, the review panel of the Organisation for Economic Co-operation and Development (OECD) undertook an investigation into New Zealand's management of environmental issues, including waste management. The resulting document, entitled *Environmental Performance Review: New Zealand* (OECD, 1996), noted that "New Zealand lacks comprehensive legislation dealing specifically with both waste and hazardous waste ... as a result, waste issues are poorly analysed and, in many cases, disregarded." (OECD, 1996, page 183). The report goes on to recommend "specific legislation for the control, treatment and disposal of hazardous waste, [to] take steps to facilitate the siting of dedicated treatment facilities within the country and negotiate disposal agreements with other OECD countries, as need be." (ibid., page 183).

A recent study commissioned by MfE (*A Review of Overseas Approaches to the Management and Landfilling of Hazardous Waste*, Environment and Business Group, 1997) investigated the hazardous waste management approaches of five industrialised

countries (Australia, Canada, Denmark, Germany and the USA). While each system reflected individual needs and political preferences, there were also a number of elements common to all systems:

- a clear definition for hazardous waste;
- comprehensive policies at government level addressing waste and hazardous waste;
- dedicated legislation and/or regulations for waste and hazardous waste;
- the implementation of the waste management hierarchy;
- the application of the user/polluter pays principle;
- minimum performance requirements for the siting, design and operation of hazardous waste facilities;
- registration and/or licensing of hazardous waste facilities;
- tracking of hazardous waste movements;
- reporting to regulatory authorities;
- exemptions for generators of small quantities of hazardous waste; and
- increasing emphasis on self-monitoring by industry and decreased involvement of regulatory agencies.

As all or most of these policy elements are commonly found in the hazardous waste management frameworks of the countries investigated, it is likely that they are key factors for the development and implementation of a successful hazardous waste management strategy.

## **1.4 Hazardous waste management in New Zealand**

The status of hazardous waste management in New Zealand is dictated by legislation, which sets the framework for implementing rules and regulations and allocates responsibilities to regulatory authorities. With the introduction of the Resource Management Act 1991 (RMA), environmental legislation has undergone considerable change and has affected the ways in which hazardous waste is managed. This section describes current relevant legislation and provides an overview of the studies and reports on hazardous waste management in New Zealand that have been published since the release of the *CAE 1992 Report*.

### **1.4.1 The regulatory framework for hazardous waste management in New Zealand**

Hazardous waste management in New Zealand is predominantly governed by three Acts of Parliament, although other legislation such as the Land Transport Act 1998 are also relevant. The effects-based and decentralised nature of the RMA in particular has led to divergent approaches to hazardous waste management throughout New Zealand, with the result that no clear and nationally applicable standards prevail. This is expressed by the different conditions under which waste facilities operate in different parts of the country. The following is a brief overview of the major legislation affecting hazardous waste management in New Zealand. Other relevant legislation includes the Health Act 1956, the Health and Safety in Employment Act 1992, and various regulations. A detailed description of applicable legislation and regulations is provided in Appendix 2.

#### ***The Resource Management Act 1991 (RMA)***

The purpose of the RMA is to promote the sustainable management of natural and physical resources. Section 5 (2) defines sustainable management as managing the use, development and protection of these resources while safeguarding the life-supporting capacity of air, water, soil and ecosystems and avoiding, remedying or mitigating any adverse effects of activities on the environment. Matters of national importance are addressed in Section 6 of the Act, other matters to be considered (such as the efficient use and development of natural and physical resources and the intrinsic value of ecosystems) are addressed in Section 7, while Section 8 requires that the principles of the Treaty of Waitangi are taken into account.

Implementation of the RMA rests predominantly with local government. Sections 30 and 31 respectively describe the functions of regional councils (RCs) and territorial authorities (TAs). In the context of hazardous waste management, RCs are responsible for controlling the discharge of 'contaminants'<sup>2</sup> to the environment (Section 15), while TAs have primary responsibility for land use matters.

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<sup>2</sup> The definition of contaminant in Section 2 of the RMA is sufficiently broad to cover waste, including hazardous waste: "Contaminant includes any substance (including gases, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy, or heat:

- (a) when discharged into water, changes or is likely to change the physical, chemical, or biological condition of water, or
- (b) when discharged onto or into land or into air, changes or is likely to change the physical, chemical, or biological condition of the land or air onto or into which it is discharged."

In practice, these provisions mean that:

- Any facility that discharges contaminants to the environment, including hazardous waste or the by-products of handling or treating such waste (e.g. odour, leachate, stack emissions, effluent) will require a resource consent from the RC or unitary authority<sup>3</sup> unless a regional plan exists that specifically permits the activity. A land use consent from the relevant TA may also be required.
- This does not apply to facilities that discharge contaminants to the sewer system. Such discharges are generally subject to trade waste by-laws adopted by TAs under the Local Government Act 1974. Only the discharge from a sewage treatment plant requires a resource consent from the RC/unitary authority<sup>4</sup>.
- There are no nationally applicable minimum standards specifying the conditions such a facility needs to comply with. Each regulatory authority is entitled to determine its own consent conditions relevant to individual circumstances.
- A facility that does not discharge any contaminants while storing, treating or otherwise handling hazardous substances or waste and therefore does not require resource consents from the RC/unitary authority, may however require a land use consent from the relevant TA under the District Plan<sup>5</sup>. As is the case with RCs, each TA has discretion with respect to the conditions it places on a land use consent.

As a result, the conditions under which a hazardous waste facility may operate vary between regions, and between districts as well. Any person involved in the development or operation of a facility must therefore liaise closely with their relevant consent authority, i.e. the city/district council (TA) and the regional council/unitary authority.

### ***The Local Government Act 1974 (LGA)***

The LGA predominantly defines the powers and duties of TAs (Section 37T). It is Part XXXI of this Act that enables TAs to undertake the function of waste management, and confers on them a duty to encourage efficient waste management (Section 538) while hav-

<sup>3</sup> A unitary authority fulfils the function of both a regional council and a territorial authority. "Unitary authority" means a territorial authority that, by virtue of section 37N (1) of the Local Government Act 1974, has the functions, duties, and powers of a regional council in respect of a region under its control.

<sup>4</sup> Note that in a large part of the Auckland Region, the Trade Waste Bylaw (ARC, 1991) is administered by Watercare Services.

<sup>5</sup> Note that District Plans are mandatory while regional plans are optional.

ing regard to environmental and economic costs and benefits for the district, and ensuring that the management of waste does not cause a nuisance or is injurious to health. Under Section 539, TAs are also required to adopt a waste management plan for their district to make provision for the collection, reduction, reuse, recycling, recovery, treatment or disposal of waste.

Section XXVIII of the LGA enables TAs to undertake trade waste disposal and to make bylaws regulating trade waste disposal.

The LGA therefore states quite clearly that city and district councils have primary responsibility for ensuring that waste (including hazardous waste) is managed appropriately in their own districts, regardless of whether it is solid or liquid. This is backed up by the provisions of the Health Act 1965, which states that local authorities are empowered and directed to cause regular inspection of [their] districts to ascertain the existence of any nuisance, or any conditions likely to be injurious to health or offensive, and to cause all proper steps to be taken to secure the abatement of such nuisance or the removal of such condition (Section 23 of the Health Act 1956). However, as defined by the LGA, waste and trade waste falls within the RMA definition of contaminants, and any discharges from facilities a TA may use to fulfil their LGA function requires a resource consent from the RC unless specified otherwise in a regional plan.

Although most of the provisions for waste management in the LGA relate to TAs, RCs are authorised under Section 37SB to fund, establish and manage sites for the regional disposal of hazardous waste.

### ***The Hazardous Substances and New Organisms Act 1996 (HSNO)***

Note that at the time of writing (January 2000) the hazardous substances component of HSNO has not come into force.

The main focus of this Act is the management of the life cycle (i.e. identification, packaging, storage, emergency preparedness, tracking, use and disposal) of imported and manufactured hazardous substances (and new organisms), with the aim of protecting the environment and health and safety of people and communities, by preventing or managing the adverse effects of hazardous substances and new organisms.

It does so by making provisions for the establishment of an Environmental Risk Management Authority (ERMA), which is charged with the assessment and approval (or decline) and sets controls on hazardous substances and new organisms for use and/or release in New Zealand. To do so, the ERMA relies on the HSNO

Regulations, which specify the thresholds below/above which a substance is classified as hazardous, as well as a range of controls applying throughout the life-cycle of these substances.

The HSNO Act requires that all hazardous substances are assessed and approved or declined by ERMA. If a hazardous substance is approved, ERMA is required to set controls on the management of the hazardous substance.

A substance is hazardous if it exceeds the threshold level set by HSNO Regulations. It is important to note that HSNO applies only to *manufactured or imported* hazardous substances. Regulations can also be set for by-products from the manufacture of a hazardous substance under Section 140 (although none have been written at the time of writing).

A set of regulations has been developed that will be used by ERMA as a 'tool box' to select and apply controls to hazardous substances that are approved under the Act. The controls on hazardous substances are broadly divided into:

- controls on their hazardous properties (oxidising, flammable, toxic, etc.); and
- controls on their life cycle (packaging, identification, disposal, etc.).

The level of control placed on the substance is linked to the *hazard classification* of the hazardous substance. In other words, the more hazardous the classification, the greater the level of control. The Act allows ERMA some flexibility when setting controls; section 77(4) allows ERMA to vary the controls applying throughout the life-cycle of these substances, if appropriate.

The HSNO disposal regulations are likely to impact on the management of hazardous waste. Disposal of a hazardous substance is defined as "treating, discharging to the environment or exporting". The disposal regulations, if promulgated in their current form, will enable ERMA to set controls on disposal based on the assumption that landfills and sewage treatment facilities (among other methods of disposal) are considered to be *treatment*. Treatment will be defined in the regulations as reducing the hazard to below the HSNO threshold criteria.

In addition, the HSNO disposal regulations will allow ERMA to require that disposal of oxidising, flammable or explosive substances is managed to prevent explosion or fire. Substances with toxic and ecotoxic properties will only be allowed to be discharged to the environment if they do not exceed the environmental exposure limits set by the ERMA (this includes discharge *from* landfill and sewage treatment facilities).

The number of hazardous wastes covered by HSNO are unknown because the hazardous substances part of the HSNO Act has not been tested. Because only substances that are manufactured or imported (and some byproducts) are covered by the Act, the definition of "manufacture" dictates whether the hazardous waste is a hazardous substance and therefore must be approved and controlled under HSNO. The definition in the Oxford English Dictionary is "to bring material into a form *suitable for use*". This indicates that wastes that are created with no use value are unlikely to be subject to HSNO, even though they may be hazardous.

### **The Land Transport Act 1998 (LTA)**

The LTA revokes the Transport Act 1962 and the Land Transport Act 1993. In 1993, the LTA introduced a system which provided the option for making a Rule, with regulatory status, for the land transport of dangerous goods. Consequently, the requirements for transporting dangerous goods are now enshrined in the *Land Transport Rule: Dangerous Goods 1999* (LTDG Rule 1999), which came into force on 3 May 1999. The New Zealand Standard *NZS 5433:1999 - Transport of Dangerous Goods on Land* is incorporated by reference in the LTDG Rule 1999. A detailed account of the requirements for dangerous goods transport is presented in Chapter 10.

### **The roles of government departments and regulatory authorities**

Under the above legislation, several different authorities have responsibilities for hazardous waste:

- Ministry for the Environment (MfE) — national hazardous waste policy;
- Environmental Risk Management Authority (ERMA) — implementation of HSNO, including



**Illegal dumping of hazardous waste**  
(Auckland Regional Council)

aspects concerning waste hazardous substances covered under this legislation;

- Regional Councils — responsibility for discharges of contaminants (including hazardous waste) to the environment under Section 15 of the RMA;
- Territorial Authorities — responsibility for land use issues associated with hazardous substances under Section 30 of the RMA; and
- Ministry of Health/Public Health providers — protection of public health and toxic substances management.

#### **1.4.2 New Zealand hazardous waste management studies**

Since the publication of the *CAE 1992 Report*, the profile of hazardous waste management has increased. This was further underlined by the changes brought about by the introduction of the RMA. In subsequent years, a number of studies provided further information on how hazardous waste is managed in New Zealand.

##### ***The Hazardous Waste Management Handbook***

In 1994, the MfE responded to the need for guidance by publishing the *Hazardous Waste Management Handbook* (MfE, 1994), which was specifically designed to aid hazardous waste practitioners in local government. The handbook focuses on practical advice and collates much needed information ranging from waste classification lists to recycling opportunities. In its technical information, the handbook relies significantly on the *CAE 1992 Report*. The significance of this publication is not so much that it provides new information or data, but in its implicit recognition of the need to address hazardous waste management in an integrated and committed fashion.

##### ***The 1995 National Landfill Census***

In 1995, the MfE carried out a postal survey of the regulatory agencies responsible for landfills and their operators to obtain baseline data on various aspects of landfill management in New Zealand. The survey also included a brief section on hazardous waste.

The response rate to the survey was high — 87% of those questioned returned the questionnaire, identifying 327 operational landfills. Information was obtained for 271 (83%) of those landfills.

211 landfills (79%) did not accept all types of waste. This generally referred to hazardous waste (in 92% of these cases) but could also mean waste that is not

hazardous but difficult to handle. However, closer investigation of how landfill operators defined hazardous waste revealed a wide range of criteria used, ranging from the co-disposal criteria in the *CAE 1992 Report* to USEPA TCLP criteria to specific exclusions such as chemicals, pesticides, asbestos and hot ashes. It was noted that larger landfills were generally more aware of the need to manage hazardous waste, and better equipped to do so. Results also indicated that only 39 landfills (14%) utilised some sort of manifest system to identify potential hazardous waste entering their landfill.

The landfill census thus showed quite clearly that the inconsistency in which hazardous waste is defined resulted in such waste entering landfills throughout New Zealand, and that more than 20% of landfills covered in the survey did not even attempt to control the influx of hazardous waste. Nothing is known about the 56 (17%) landfills for which no information was obtained during the survey.

##### ***The Auckland Region Hazardous Waste Survey 1996***

A detailed characterisation of hazardous waste issues was provided in the *Auckland Region Hazardous Waste Survey 1996* (Environment and Business Group & Auckland Regional Council, 1996). Unlike other waste surveys, this study focused exclusively on hazardous waste in the Auckland Region and attempted to establish a profile of waste generation, handling and final disposal. The major findings of this study can be summarised as follows:

- The lack of a nationally applicable, clear definition for hazardous waste resulted in the adoption of a waste definition specific to this survey. This definition included high strength organic waste such as food processing waste as these were considered a significant contaminant within the meaning of the RMA. As a result, the study's findings may not be immediately comparable to other studies.
- The lack of legal requirements for waste generators to keep records, coupled with the lack of a clear definition, resulted in significant difficulties when obtaining data and affected the accuracy of the data that were obtained.
- The survey found that 97.7% of the hazardous wastes generated were in the form of liquids and were discharged to the trade waste sewer, not always in compliance with the trade waste bylaw. Only 1.9% were solids and 0.4% sludges.
- Approximately 99% of the waste was generated by

the manufacturing sector; only small amounts came from businesses in the Community, Social & Personal Services sector (0.24%) and the Transport, Storage & Communication sector (0.09%).

- More accurate data was obtained for the quantities of hazardous waste disposed of, as landfill operators and sewage treatment facilities are required to keep records for compliance with their resource consent conditions. Based on this information, it was estimated that 10% (9,535,787 tonnes) of the total sewage treated at the region's sewage treatment plants in 1995 were hazardous trade waste, and that 15% (110,605 tonnes) of all waste disposed of in landfills in 1995 was hazardous.
- The survey also found a notable lack of education and training among those involved in generating and handling hazardous waste.
- Many of those interviewed during the survey stated that better and clearer rules and regulations in hazardous waste management are needed.

### **Hazardous Waste Management Options for the Canterbury Region**

In 1996, the Canterbury Regional Council investigated hazardous waste management in the Canterbury Region (*Regional Hazardous Waste Management Investigation*, Royds Consulting, 1996). Because of the limited time frame, the investigation was in the form of a desk-top study and derived its information predominantly from existing data sources and communication with those involved in the field. The findings were as follows:

- An estimated 25,000 tonnes of hazardous waste<sup>6</sup> was generated by the industrial, agricultural and household sectors in the region each year, 19,000 tonnes of which are thought to come from the Christchurch City area.
- The report estimated that 80% of this waste consists of materials at the lower end of the hazard scale, e.g. contaminated sewage sludge, contaminated soils and waste oil. Hazardous waste such as solvents, cyanides and metal waste is thought to comprise less than 5%.
- The majority of hazardous waste generated in the

region is co-disposed in the Burwood landfill, which is due to close in 2001. Treatment methods tend to be limited to stabilisation prior to landfilling.

- No satisfactory disposal options exist for highly hazardous waste such as some types of unwanted agricultural chemicals, boron sludges, chlorinated solvent sludges, CFCs and oil or chemical containers.

### **The National Waste Data Report 1997**

This report (MfE, 1997) collates information from a wide range of sources with the aim of generating a detailed picture of waste generation and disposal in New Zealand. The first of its kind, it highlights the inconsistent approaches to defining waste and, consequently, hazardous waste management throughout the country. It also notes that waste data are produced in an ad-hoc fashion and are, therefore, generally scarce and of questionable accuracy, especially with respect to hazardous waste.

Unlike the information presented in other sections of the report, which is presented as New Zealand wide data, the information on hazardous waste quantities generated and disposed of is too deficient to provide a coherent national picture. Information is presented in the form of case studies, with each information source being described separately.

The main data source for the hazardous waste chapter is the *Auckland Region Waste Survey 1996* (see above). Other sources cited are the *1995 National Landfill Census* (see above), data on hazardous waste generated in the Taranaki Region (extracted from the *Hazardous Waste Management Handbook*, MfE, 1994), a 1996 report on hazardous waste by the Otago Regional Council (Works Consultancy Services Ltd., 1996) and information covering the collection of unwanted agricultural chemicals by regional councils/unitary authorities, hazardous waste exports and contaminated site investigations and clean-up. Information on the latter projects is inconsistent in its scope and availability.

### **Hazardous Waste Management**

This report was published by the Parliamentary Commissioner for the Environment (PCE) in 1998. In contrast to most other studies discussed, this report investigates the management framework for hazardous waste and its shortcomings, rather than quantifying waste generation and disposal or describing management issues. The report acknowledges and welcomes the establishment of the MfE Hazardous Waste Programme, and establishes a monitoring and auditing framework to enable the Parliamentary Commissioner to assess the programme's progress.

<sup>6</sup> In the Canterbury study, hazardous waste is defined as unwanted material with the characteristics of a hazardous substance as defined by the HSNO Act. Ecotoxic waste was excluded, although sewage sludge from Christchurch City was included due to its perceived hazardous properties. It is predominantly because of the differences in definition that the quantities estimated in the Canterbury Region differ from those recorded in the Auckland Region.

The findings of the report can be summarised as follows:

- The report was prompted by concern within local authorities and the waste treatment/disposal industry about the history of poor management of hazardous waste in New Zealand.
- The management of hazardous waste in New Zealand has been carried out in a piecemeal fashion without any overall strategy or commitment to monitor and review the existing system.
- Specific issues identified are:
  - lack of data does not allow for a reliable assessment of risk from hazardous waste;
  - the mechanisms for collecting such data are inadequate;
  - the mechanisms for managing the risk (e.g. existence and access to treatment facilities, tracking of hazardous waste, etc.) are insufficient for the task; and
  - the reduction of waste and risk need to be a part of any management programme for hazardous waste.
- Although the issues have been acknowledged by the government and commitment was made to address them in the form of the Hazardous Waste Programme (HWP), the report states that the programme should also incorporate objectives aimed at minimising hazardous waste (waste reduction) and the effects on the environment and public health arising from the disposal of hazardous waste (risk reduction).

### 1.4.3 Conclusions

Since the publication of the *CAE 1992 Report*, interest in hazardous waste management has increased steadily, as is evidenced by the number of publications on various aspects of this area throughout the 1990s.

These reports show that many of the basic elements utilised by other countries to control this waste are not available or used in New Zealand. As a result, hazardous waste management in New Zealand is characterised by:

- inconsistencies between geographical areas due to different rules and regulations;
- high cost due to the lack of availability or access to appropriate hazardous waste facilities for those who wish to deal responsibly with their hazardous waste; and

- haphazardness due to a general lack of education and knowledge on the parts of generators, facility operators and regulators.

This has been recognised by the responsible authorities and initiatives are now in place to remedy the situation. This document represents one part of this undertaking in that it provides some of the technical information necessary to improve the level of knowledge and current hazardous waste management practices in New Zealand.

## 1.5 Future developments

In response to the intense interest in hazardous waste management issues in recent years, the MfE established the Hazardous Waste Programme (HWP) in September 1997. Funding to undertake this work was granted for three years, with the aim of improving the management of hazardous waste in New Zealand. Ongoing funding is uncertain.

The first publication of the Programme was a discussion paper entitled *Managing Hazardous Waste* (MfE, 1998). The document outlines the reasoning behind the HWP, discusses the nature of hazardous waste, including its environmental effects, and presents a brief overview of the way in which hazardous waste is currently managed in New Zealand. It describes the elements of an effective hazardous waste management framework and presents options for achieving an improved system in New Zealand, in the light of New Zealand's legislation. In essence, the Ministry aims at establishing a management system with three fundamental elements:

- a definition for hazardous waste;
- controls on the disposal of both solid and liquid hazardous waste<sup>7</sup>; and
- monitoring and enforcement of hazardous waste controls.

The document implies that any improvements to the existing management framework for hazardous waste will occur within the structure of the RMA, and cites the development of a National Environmental Standard as the logical option. Minor amendments to the RMA may be necessary to enable full regulatory impact to occur. The MfE also notes that an array of guidelines, educational tools and model bylaws will be needed to ensure the successful implementation of the new framework.

<sup>7</sup> The discussion paper notes that the discharge of gaseous hazardous waste to air will be addressed through a separate work programme.

Hazardous waste is also considered in the MfE Environmental Indicators Programme. The purpose of this programme is to develop and use indicators to measure and report how well the New Zealand environment is looked after.

The MfE's specific objective is the systematic measurement of the performance of its environmental policies and legislation, to better prioritise policy, improve decision making and report on the state of New Zealand's environmental assets. To this end, indicators are being developed in the following areas:

- air;

- biodiversity;
- energy;
- fresh Water;
- land;
- marine environment;
- ozone and climate change;
- transport; and
- waste, hazardous substances and toxic contaminants.