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A PLAN DEVELOPMENT PROCESS  
for  
SOLID AND HAZARDOUS WASTE MANAGEMENT  
in the  
MANAWATU-WANGANUI REGION

A thesis presented in partial fulfilment  
of the requirements for the degree of  
Master of Philosophy  
at Massey University

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## **Abstract**

This thesis uses elements of the strategic and integrated planning process models to develop a planning process for solid and hazardous waste management for use by a New Zealand regional council.

The desired plan outcomes are that: solid and hazardous waste are managed in such a way and at such a rate that the effects on the environment are mitigated and remedied and detrimental effects on the environment are minimised. This outcome should be achieved at a cost which is socially and economically sustainable by the regional community. The scope of the regional plan will also be restricted/ defined by the roles and mechanisms available to regional councils in New Zealand.

The philosophy for solid and hazardous waste management is dynamic. The information and technology are generally available. However, action to prevent and mitigate the effects of bad waste management practices relies primarily on planned and coordinated behavioural change. Political will is therefore very important. The plan process chosen reflects the clear ends desired by the plan and the uncertainty over the means needed to achieve that end.

Another problem discovered in the course of this research was the lack of integration between planning theory and planning practice. This thesis attempts to bridge that gap by using 'everyday' language.

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<b>TABLE OF CONTENTS</b>	<b>Page</b>
Title Page	
Abstract	i
Acknowledgements	ii
Table of Contents	iii
List of Annexes	vi
List of Figures	vi
List of Tables	vii
List of Plates	vii
Glossary	viii
Acronyms	xi
 <b>Chapter One - Introduction</b>	 <b>1</b>
1.1 Introduction	1
1.1.1 Goal	1
1.1.2 Objective	1
1.1.3 Reasons	1
1.2 Methodology	3
 <b>Chapter Two - Setting the Scene</b>	 <b>6</b>
2.1 The nature of the problem	6
2.1.1 Overseas Solid and Hazardous Waste Management Plans.	6
2.1.2 The nature of the problem in New Zealand	7
2.2 Definitions: of hazardous and solid waste	10
2.3 Scale of the problem	12
2.4 Possible techniques for waste management	15
2.5 Previous and present rules and their institutional context	19
2.6 Summary	27
2.7 Conclusions	28

**Chapter Three - Towards a Planning Process**

30

3.0	Introduction	30
3.1	Substantive issues	30
3.2	Plan Type	36
3.2.1	Plan type in theory	40
3.2.2	Incremental Planning	41
3.2.3	Comprehensive Planning	42
3.2.3	Technical Rationality	44
3.2.5	Strategic Planning	46
3.2.6	Interactive Planning	49
3.2.7	Integrated Planning	51
3.2.8	Summary	53
3.2.9	Conclusions	54
3.3	The Politics of Planning	55
3.3.1	Conclusions	61
3.4	Plan Content	61
3.4.1	Plan content parameters	62
3.4.2	Definitions	65
3.4.3	Measurements and evaluation	65
3.4.4	Implementation techniques	67
3.4.5	Methodology	70
3.4.6	Conclusions	72
3.5	Other New Zealand Solid and Hazardous Waste Management Plans	72
3.5.1	Taranaki Regional Council	74
3.5.2	Northland Regional Council	75
3.5.3	Canterbury Regional Council	76
3.5.4	Conclusions	78
3.6	Conclusions	79

**Chapter Four - The Planning Process**

	81
4.1 Purpose Ends and Means	81
4.1.1 Ends	81
4.1.2 Means	82
4.2 Developing a Planning Process	83
4.2.1 Requirements of the Resource Management Act 1991	83
4.2.2 Additional desirable features	84
4.3 Process	87
4.3.1 Background	87
4.3.2 Education	89
4.3.3 Discussion Document	90
4.3.4 Consultation	91
4.3.5 Proposed Plan	93
4.3.6 Consultation	94
4.3.7 Plan	94
4.4 Conclusions	95

**Chapter Five - The Plan**

	96
5.1 The Plan	96
5.1.1 Background of Plan	98
5.1.2 Issues	99
5.1.3 Implementation Techniques	99
5.1.4 Policy Framework	99
5.1.5 Annexes	100
5.2 Conclusion	100

**Chapter Six - Conclusions and Implications for  
Future Research**

**LIST OF ANNEXES**

Annex A - Uses of Hazardous Substances	106
Annex B - Acts with a Pollution or Hazardous Substance Component	108
Annex C - Agencies with responsibility for disposal	109
Annex D - Section 35 of RM Act 1991 and Use of Environmental Impact Assessment	110
Annex E - Checklist of Items to include in the Plan	114
Bibliography	117

**LIST OF FIGURES**

## Figure

1	Population Density 1991. Manawatu-Wanganui Region	facing 6
2	Map of Waste Disposal sites in the Region	facing 19
3	Life-cycle of Hazardous Substances - agencies involved	facing 22
4	Consideration of the use of various instruments in legislative development	23
5	Incorrect residue disposal - effect on air, water and ground	facing 33
6	Resource Management Act 1991 Policy and Plan Hierarchy	37
7	Schematic representation of Planning Strategies, from Cartwright 1987.	39
8	Procedural Plan Process Development, modified from Yiftachel 1989.	facing 41
9	Methods available to carry out functions.	70
10	Process for preparation of Manawatu-Wanganui Regional Solid and Hazardous Waste Management Plan.	86

11	Risk - identification, estimation, evaluation and control, from O'Riordon.	facing 89
12	Likely construction of a Solid and Hazardous Waste Management Plan.	97

## LIST OF TABLES

### Table

1	A comparison of planning process and content for three regional council Solid and Hazardous Waste Management Plans.	78
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## LIST OF PLATES

### Plate

1	Changing product process management to reduce the amount of waste - cleaning products and butterfat.	11
2	Potential for reuse	12
3	Provision for recycling	13
4	Recovery of resources	14
5	Typical refuse disposal site within the region	20
6	Further typical refuse disposal site within the region	20
7	Low temperature burning at a tip in the region	33
8	Leachate draining to surface water at a tip in the region	34
9	Groundwater at a higher level than the base of the tip i.e. groundwater intrusion is inevitable	35

## GLOSSARY

Cleaner production	the conceptual and procedural approach to production that demands that all phases of the life-cycle of a product or of a process should be addressed with the objective of prevention or minimisation of short and long-term risks to humans and to the environment.
Co-disposal	the disposal of appropriate hazardous wastes by mixing them, in an informed and predetermined manner, with municipal refuse, so as to use the attenuation and biochemical processes operating within a landfill, to reduce the environmental impact from the mixed waste to an insignificant level
Dump	an uncontrolled disposal site where no attention is given to safety or environmental factors.
Hazardous waste	any solid, liquid, semi solid, contained gas (or any combination thereof) waste material which because of its quantity, concentration, or chemical characteristics poses a substantial present or potential danger to human or animal life or to the environment. Such wastes may be reactive, flammable, corrosive, toxic, pathogenic, carcinogenic, mutagenic, bio concentrative, radioactive or persistent in nature
Incineration	incineration is an engineered process which uses controlled flame combustion for the thermal degradation of waste materials. The process is applicable to most organic and/or combustible wastes. It is not generally applicable to the

treatment of metal-containing wastes.

Intractable wastes	those hazardous wastes for which there are no currently available, environmentally acceptable means of disposal.
Land disposal	the practice of depositing waste on a specific site where it may degrade over time.
Leachate	liquid emanating from a land disposal site that contains dissolved, suspended and/or microbial contaminants from the solid waste.
Mixed tipping	the practice of depositing a range of waste materials, which may include hazardous materials, in an unmanaged and uncontrolled manner.
PCB	Polychlorinated biphenyls; widely used as insulating fluid in the electrical industry, and contaminants of concern because they are toxic, bio-accumulative, and do not readily biodegrade.
PCP	pentaclorophenols; widely used in the timber industry as a antisapstain timber treatment.
Resource recovery	usually involves the recovery of the useful elements of the resource e.g garden waste is made into compost, or energy, via incineration of materials to get heat, or electric power through heat.
Reuse	reuse the item in its existing form without reconstitution or change for the same or another purpose e.g. milk bottles get reused a number of times.

Recycle	reconstitute or reprocess the material to make a similar commodity e.g. broken bottle glass is made back into glass containers again and scrap metal made into ingots.
Toxic substance	any substance producing a harmful effect on living organisms by physical contact, ingestion or inhalation.
Tip	see dump
Waste	unavailable materials for which there is currently or no near future economic demand and for which treatment and/or disposal may be required.



## ACRONYMS

AEAM	Adaptive Environmental Assessment Management Technique
EIA	Environmental Impact Assessment
HMIP	Her Majesty's Inspectorate of Pollution
MfE	Ministry for the Environment
MWD	Ministry of Works and Development
OECD	Organisation for Economic and Community Development
PHS	Pollution and Hazardous Substances
SoE	State of the Environment
US EPA	United States Environmental Protection Agency

## CHAPTER ONE

### 1.1 INTRODUCTION

#### 1.1.1 Goal

The goal of this thesis is **'to develop a planning process that culminates in the development of a plan for the management of solid and hazardous waste in a New Zealand Region'**.

#### 1.1.2 Objectives

The objective of this thesis is to develop a planning process to enable a regional council in New Zealand to fulfil its responsibilities under the Resource Management Act 1991 (hereafter referred to as the "RM Act") in developing solid and hazardous waste management policy and a regional solid and hazardous waste management plan. The process designed will be tested for an application in the Manawatu-Wanganui Region.

#### 1.1.3 Reasons

New Zealand regional councils have been given the mandate for hazardous waste management by the RM Act 1991 in Sections 5 and 30.

Section 5 states;

"(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way or at a rate, which enables people and communities to provide for their social, economic and cultural

wellbeing and for their health and safety while -

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.

Section 30(1) (c) states;

"The control of the use of land for the purpose of -

- (v) The prevention or mitigation of any adverse effects of the storage, use, disposal and transportation of hazardous substances"

The proposed planning framework will facilitate the management of wastes in an environmentally acceptable way. 85% of New Zealanders (Gold and Webster 1990) are seen to be concerned with waste management. At present, information on the type, amount, and trends in waste production are lacking and waste disposal practices are unacceptable. At present there is no plan or strategy in place that will change current practice to one that is more environmentally and socially acceptable.

The recent changes in local government structure and legislation have produced a climate in which policy and plans can be coherently developed and implemented. For example, in the area that constitutes the Manawatu-Wanganui Region, in the early 1980's, local government structure meant that management of solid and hazardous waste, was carried out by 39 county, borough and city councils. This has been reduced to part or all of ten territorial local authorities. Prior to 1991 the legislation was spread over 44 Acts. While many of those with a minor focus on pollution and hazardous substances still exist, the RM Act provides a major focus and requirement for action.

The Manawatu-Wanganui Region was chosen as a case study to illustrate the problem, and to test and develop the process because it is an example of a typical provincial region in its management of solid and hazardous substances. Therefore, the way issues are managed by Manawatu-Wanganui Regional Council could have application in other provincial regions. The nature of regional council operation enables them to be cooperative, rather than each council developing and executing plans independently. Hence reliance is placed on cooperation between authorities in sharing expertise and experience. This approach makes available a larger pool of knowledge than any one council could afford to have 'in-house'.

This thesis uses currently available knowledge rather than original research. This is because the problems relating to hazardous waste management are not problems due to a lack of information or technology, rather, it is a matter of bridging the gap between knowledge and applied practice.

## 1.2 METHODOLOGY

To achieve the objectives, a series of elements which form the stepping stones of plan development require analysis. They are:

1. Problem definition and identification, including highlighting information gaps. Information gaps occur both in knowledge of the scale and seriousness of the problem, and in people's perception of the problem.
2. Definition and evaluation of the institutional and legislative context. These have both changed recently and substantially, particularly in the local government context where the plan will be applied.
3. Assessment of the suitability of various theoretical plan types in comparison to the problem, and its legislative and institutional contexts.

4. Evaluation of other approaches to the problem, particularly in the New Zealand regional context.
5. Development of a suitable planning process to address the problem.
6. Development of a Regional Plan.

These elements provide the basis for the chapters of this thesis and the conclusions in each indicate how each element contributes to the design of a process. The chapter structure is therefore as follows:

**Chapter Two** identifies the parameters of the problem. It defines the terms and management techniques that will be used. It develops the legislative and institutional context. It then identifies the scope and scale of the management problem. (1,2)

**Chapter Three** is a literature review of planning theory and New Zealand plans. It considers the planning theorists views on procedural planning. It discusses plan type, the politics of planning and considers some elements of plan content. Substantive issues are also considered. It does this for the problem defined in Chapter One, and in relation to the legislation - the RM Act 1991. Finally it looks at three New Zealand examples of hazardous waste management plans. (3,4)

**Chapter Four** uses the conclusions reached by chapters two and three to develop a suitable plan process. This incorporates all the legally required elements and the desirable elements from an institutional and pragmatic perspective. Each step of the resulting plan process is explained. (5)

**Chapter Five** develops the initial stages of the plan and discusses the stages that would follow, depending on the results of the surveys and public participation process. (6)

**Chapter Six** discusses the conclusions reached in the preceding chapters and

their contribution to planning theory. It also contributes ideas for areas of future research in planning theory.

One conclusion reached by this thesis, is that communication between planning theorists and planning practitioners is not always occurring. To reduce this problem, the use of esoteric and 'jargon' terms in this thesis has been kept to a minimum.



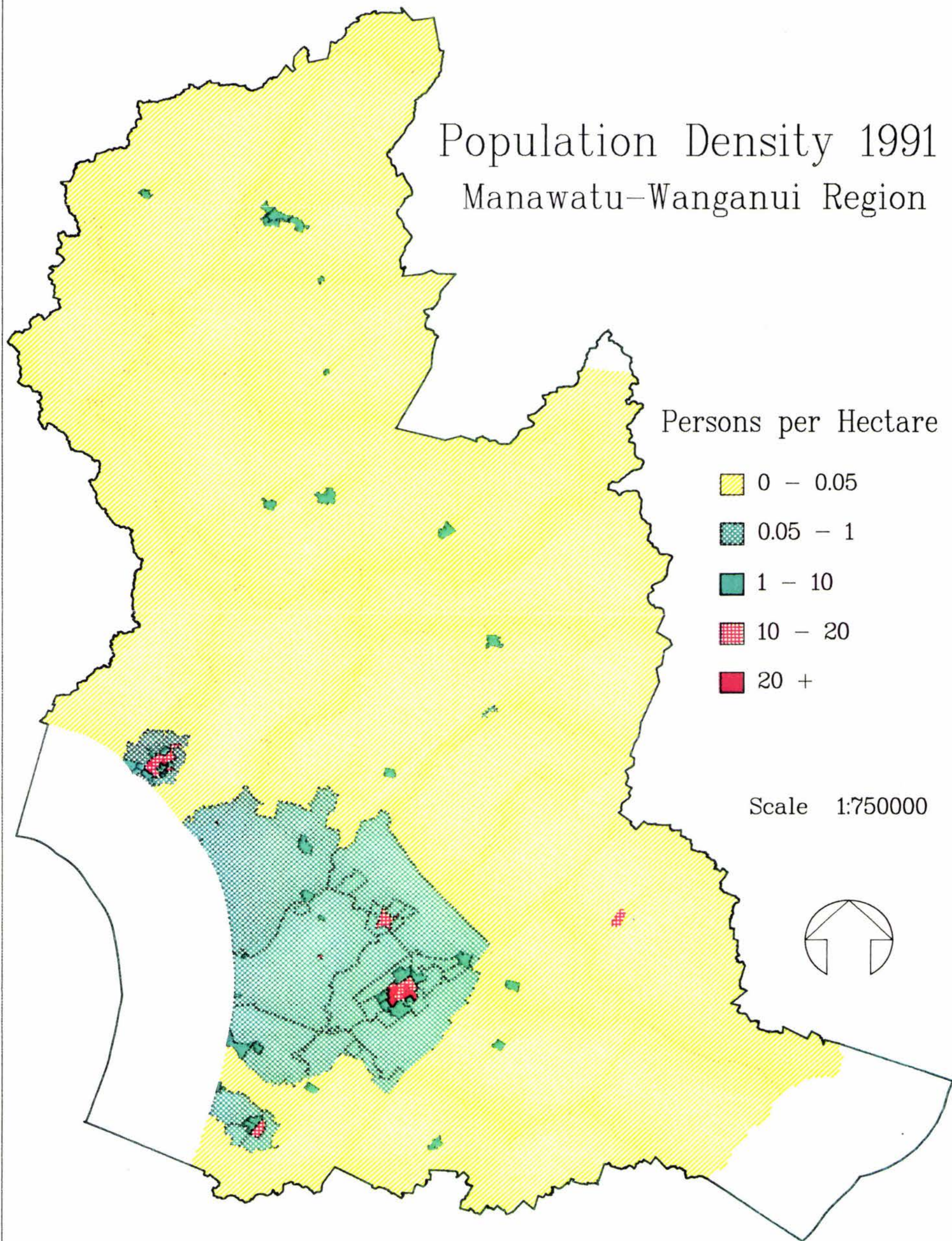
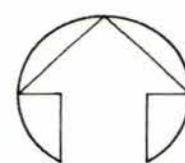
Figure 1

# Population Density 1991 Manawatu-Wanganui Region

Persons per Hectare

- 0 - 0.05
- 0.05 - 1
- 1 - 10
- 10 - 20
- 20 +

Scale 1:750000





## **CHAPTER TWO**

Chapter Two is concerned with setting the parameters for the study area. After introducing the nature of the problem it provides definitions of solid and hazardous waste and it identifies the areas where lack of knowledge creates an impediment to plan development. It then goes on to describe the techniques available for managing wastes. Finally it discusses the framework within which regional hazardous waste management is carried out - institutional and legislative.

### **2.1 THE NATURE OF THE PROBLEM**

#### **2.1.1 Overseas Solid and Hazardous Waste Management Plans**

These have been used in the literature review for this thesis to a very limited extent, for comparison with New Zealand approaches. The limited use of overseas examples is because generally the problems faced and dealt with by overseas literature are very different from those faced by Manawatu-Wanganui Regional Council. The biggest difference is in population density. Hazardous waste production and therefore disposal need is almost directly linked to population. New Zealand regions have much lower population densities. For example Manawatu-Wanganui Region has a total population of 220,000 in a region of 27,000km<sup>2</sup>. Figure 1 shows the population density of the region.

Most overseas' examples are dealing with population densities that are significantly greater. An extreme example although of a comparable area, is the Netherlands, with a population of 14 million.

Generally most overseas' plans also have detailed legislation and associated regulations, and the cost structure associated with waste management is incomparably different. For example, Island County and Skagitt County, Washington State, USA have disposal charges of US \$95/tonne. Provincial New Zealand disposal charges are in the order of NZ \$10/tonne, where costs



have been identified. This difference in the cost of disposal (true or otherwise) skews the choice of disposal options available. If a New Zealand region introduced a charging regime that was similar to the United States cost structure in nature, major and unacceptable regional distortions would occur as people sought to avoid the charges. A sudden change to reflect the true cost of treatment would cause a major negative community reaction which would be seen as politically unacceptable.

This means that the substantive plan type, issues and plan content are so significantly different as to make most overseas plans irrelevant as they cannot be suitably modified for use in the New Zealand context at present.

Another difference is that most New Zealand regions, like Manawatu-Wanganui, have a predominantly provincial pastoral and service sector economy, with very low industrial component. This again contrasts strongly with many overseas plans, where industrial input of hazardous substances contributes substantially to the waste stream. It also contrasts strongly with the cost of disposal faced by many overseas' examples. Cost of disposal to land is comparatively very high, so other disposal methods become much more viable than they do in the New Zealand.

### **2.1.2 The nature of the problem in New Zealand**

Hazardous substances have been used and disposed of in New Zealand for at least the last fifty years. Disposal methods have been primitive and are now considered to be unacceptable to both human and environmental health (Dept of Health 1983). The nature and number of hazardous substances that are used and disposed of, is making their management increasingly complex. At the same time public awareness and concern about the state of the environment and how pollutants are managed is increasing (Colmar Brunton, 1989/1990).

There is much literature available on 'how to' minimise the effects of hazardous substances on the environment. In the Manawatu-Wanganui Region there are 54 tips, most of which have been in place for upwards of 50 years.

These facilities are often inadequate for the total range of wastes generated and often lack controls over the disposal of hazardous wastes. There are ineffective management practices that allow considerable potential for environmental contamination. Only two of these facilities has a leachate control system. None of them meet the New Zealand standards for landfill construction and operation. This concern, reflected by Principal Inspectors of Health (Commission for the Environment, 1984, pg.61) as "a general apathy by a number of small local authorities to come to terms with hazardous waste disposal or even to make provision for any problem that may occur", remains valid in 1991.

Disposal is the final method by which hazardous substances can be managed. Prior to disposal a number of other techniques should be considered. These include: cleaner production (process change to reduce or remove the need for hazardous substances); reuse; recycling; and resource recovery.

A lot of time and energy has been spent in New Zealand defining and redefining responsibility for various aspects of hazardous waste management, (ibid, pg. 69) but in Manawatu-Wanganui Region, few initiatives have resulted in significant changes to reflect those definitions.

The areas identified by the Commission for the Environment, (1984,pg.70) as requiring attention, that still have not been addressed adequately, by any level of government are:

- a. Hazardous wastes that are presently stored;
- b. Hazardous wastes that originate in spillage emergencies; and
- c. Hazardous wastes that are being or will be generated continuously by industry.

The problems and technical solutions associated with stored and spilled hazardous waste are well understood. The process of waste generation within industry, and how this can be avoided, is not.



To change behaviour a specific pathway is usually followed. This involves; raising awareness about the cost of old practices and the benefits of new practice, providing information and/or providing technology (Anderson, 1957). Information and technology is available. Awareness was raised some time ago as a result of overseas experiences which received worldwide media attention, for example, Love canal<sup>1</sup> in USA, and Minamata<sup>2</sup> in Japan. But the final step in the chain, behavioural change, has not occurred. For some reason, despite understanding the problem and what needs to be done to ameliorate it, the organisations and individuals who dispose of waste have not changed their behaviour.

What does it take to move current practice to a position where currently technology and knowledge are used? How does one overcome "institutional ossification and political ineptitude" (Barrett, 1991, pers com). These are the questions that the planning process and the plan will address and attempt to overcome. Inertia, or lack of political will, is a widespread problem. Jared Diamond considers that "the most important missing ingredient for dealing with our environmental problems is simply political will".

As stated in the introduction, the regional councils in New Zealand have been provided with a mandate for hazardous waste management by the RM Act 1991, Section 5 and Section 30(1) (c). This mandate is a significant shift in emphasis and focus from previous legislation and requires a new planning style to meet its requirements. Any plan needs to be developed taking into account specific institutional, ecological and social contexts in New Zealand regions such as Manawatu-Wanganui. This chapter focuses on defining the problem, the institutional context and the legislative framework. It also identifies areas where more information is needed.

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<sup>1</sup> A dumping ground for a mixture of chemicals. It produced toxic fumes and leachate which caused cancer and abnormal births in the surrounding population.

<sup>2</sup> Mercury poisoning from industrial discharge of mercury to the sea resulting in severe mental and physical disabilities in fish-eating population of the Minamata Bay area.

## 2.2 DEFINITIONS: OF HAZARDOUS AND OF SOLID WASTE

Hazardous waste has many definitions, but no one standard definition has been accepted internationally (by OECD for example) or nationally (it is not defined in the RM Act 1991) (Ministry for the Environment (MfE) 1987)).

The definition used in this thesis is one developed by the now defunct Ministry of Works and Development, and the Commission for the Environment over the period 1984 - 1986. It is that

"A hazardous waste is any solid, liquid, semi solid, contained gas (or any combination thereof) waste material which because of its quantity, concentration, or chemical characteristics poses a substantial present or potential danger to human or animal life or to the environment. Such wastes may be reactive, flammable, corrosive, toxic, pathogenic, carcinogenic, mutagenic, bio concentrative, radioactive or persistent in nature".

This definition is preferred to of others because it encompasses a wider range of hazardous wastes than many alternative definitions examined. It allows focus on the broader issue of hazardous waste than a definition that only encompasses the truly intractable wastes (which are relatively uncommon).

As the number of types of hazardous wastes is large and ever increasing, it is important to limit the definition to the **scope of the effects that are to be avoided**, rather than trying to define the wastes per se. Also, there is no clearly defined point at which waste becomes hazardous. "Waste production should be viewed as a continuum from harmless to highly dangerous and waste does not become hazardous at one clear cut-off point" (MfE, 1987 pg.26) Hazardous substances are used in a very wide variety of applications. Details of these applications can be found at Annex A (MfE, 1988b pg.62).

"The danger from hazardous waste comes less from its acute hazard than from its longer term contamination potential. Also because of its "worthless" nature,



waste is more likely to be illegally dumped by generators or transporters" (Simpson, 1991).

Hazardous wastes cannot easily be separated from other wastes. Therefore dealing with controls over hazardous waste is intertwined with controls over all waste. Because this is so, the five "R's" (Reduce, Reuse, Recycle, Recover, Residual) of waste management apply equally well in dealing with hazardous waste as they do with the general waste stream. Plates 1 to 4 show aspects of the five 'R's' in this Region.

**Plate 1:** Changing product process management is required to reduce the amount of waste - cleaning products and butterfat in this case.



This plan is restricted to dealing with solid and hazardous waste. The distinction between solid and liquid waste is somewhat arbitrary. The distinction is made based on common disposal method. If the product is likely to be disposed of via tips or landfills it is called solid waste. If the common disposal technique is via the sewage system, it is classified as liquid waste.

**Plate 2:** Potential for reuse of cleaning chemicals, instead of flushing them to a stream.



### 2.3 SCALE OF THE PROBLEM

Although waste surveys were carried out throughout the country in the period 1985 - 1986, standardised techniques were not used (Bailey, 1991 pg.35). The intention of the waste surveys was to establish baseline data on the amount and type of hazardous waste produced in New Zealand. However, the lack of standardisation has had two effects: firstly, the scale of the problem is still



**Plate 3:** Provision for recycling encourages the practice.



relatively unknown, because baseline data cannot be compared from area to area and because different measurement criteria and different product groupings were used in different areas that make up the region; secondly, baseline data is not accurate enough to compare with current data if another survey were to be carried out, so trends cannot be accurately established.

The error factor for the results is high, and as a result, accurate assessment is not possible. The criteria for waste surveys were not fully met. The scale of the problem in terms of quantity of waste, type of waste or present disposal measures, is still not well defined or understood at an institutional level (MfE, 1988a, pg.44).

What constitutes hazardous wastes is not well understood at an individual level. People tend to think of hazardous wastes as the discarded products resulting from the nuclear and chemical industry - not the oil or the paint thinners that are tipped down the stormwater drain.

Plate 4: Recovery of resources.



Pollution and Hazardous Substance (PHS) problems can be considered in the following categories:

- a. **human physical ill-health and injury**, such as poisonings, burns, and diseases resulting from exposure to hazardous substances or pollution;
- b. **social and mental stress** resulting from perceptions of risk or from what are perceived to be negative effects of PHS activities, and from conflicts arising from PHS activities;
- c. **Treaty of Waitangi partnership failure**, e.g. as a result of pollution of natural waters;
- d. **property damage and other economic costs** such as those resulting from fires and explosions;
- e. **environmental degradation**, for example the pollution of the Manukau



Harbour and the depletion of the ozone layer; and

- f. **resource depletion**, as has arisen with reduced recycling of used oil and lead batteries in New Zealand. (MfE, 1988b pg.32).

What is known is that there are:

- a. limited quantities of very high risk hazardous wastes produced or used in this Region " Some wastes will have to be dealt with on a national level, particularly in the provision of disposal facilities or alternative methods for disposal, e.g. export for destruction" (MfE, 1987 pg.5); and
- b. relatively large quantities of hazardous wastes that should have managed and controlled disposal, but for which controlled disposal is not occurring at present. These are predominantly oil, oil derivatives, metals and metal oxides.

As the high risk hazardous waste cannot be dealt with at a regional level, and the planning process developed is for waste management at a regional level, these wastes will not be included from now on, except to say that national solutions need to be found for them.

## 2.4 POSSIBLE TECHNIQUES FOR WASTE MANAGEMENT

'Clean Production' alternatives should be considered first. These aim to reduce or remove hazardous substances from the production process, thereby reducing the amount that will have to be disposed of. This involves a complete change in thinking about waste for many people. The processes involved in changing production systems mean that for the intermediate term, hazardous waste will continue to be produced. It is therefore, a medium term goal.

For existing wastes, and until clean production is generally used, waste treatment possibilities for hazardous wastes include: incineration, co-disposal,

storage and recycling/reuse (Bailey, 1991).

Although a regional Hazardous Waste Management Plan needs to focus immediately on treating the hazardous waste that has been produced, the longer term aim must be to reduce the amount that is produced, through use of clean production techniques. The process of instilling clean production ethics and practices in industry will depend primarily on education for two reasons. One is that problems arise from collective quantities of waste - arising from numerous small generators. The other is that "corporate leaders and their employees do not know, accurately, the sources or the quantities of wastes and emissions they are presently producing. Consequently, they do not know how much their wastes are costing them in direct and indirect costs. Therefore, they are not motivated to seek ways of reducing the wastes" (Huisinigh, 1991).

Sophisticated waste treatment technology exists. Currently there are two recognised major types - co-disposal and incineration.

The objective of a correctly designed and operated co-disposal landfill is to contain the treatment and degradation of waste to that specific site. It is also managed so that the absorption capacity of the non-hazardous material in the landfill is not exceeded and so that non-compatible wastes are kept separate. Then the naturally occurring chemical, biological, and physical processes stabilise the wastes. This process assumes knowledge of total volume of waste and of the chemical composition and volume of hazardous wastes to be co-disposed.

Incineration is an engineering process that uses controlled flame combustion for the thermal degradation of waste materials. The process is applicable to most organic and/or combustible wastes. It is not generally applicable to the treatment of metal-containing wastes. Metals cannot be destroyed by this (or any other ) process, and will simply undergo changes in physical and/or chemical form. Highly explosive materials and most radioactive wastes are also not suitable for disposal by incineration. This process has a high initial set-up cost and there are consumer concerns about emissions (New Scientist



8 June 1991 pg.29 Australia, Tony Lindsay 22 August 1991). Incineration is generally used where a lack of additional landfill space is deemed available to dispose of the waste. This is not the major concern in most New Zealand regions. Here it is a concern about environmental quality, not lack of space. Therefore discussion on appropriate technology for the disposal of **most** hazardous substances will be restricted to co-disposal technology.

For example, in the Manawatu-Wanganui Region almost all hazardous waste is treated by disposing to land with other waste. The term used for this type of disposal is **mixed tipping**. In most cases it is an uncontrolled process. The exception to land disposal is a small amount of bio-medical waste, which is medium-temperature incinerated. This disposal ratio and type is common to most of New Zealand. Although the management is not adequate, this approach in terms of ratio of disposal method is supported by the MfE Working Party August 1987, who believed that the management of hazardous wastes should not be isolated from the main waste stream.

Well controlled land disposal (managed co-disposal) is a recognised and accepted method of safely disposing of most hazardous waste ( Commission for the Environment, 1984, pg.71, MfE,1987 pg.4 & 26, MfE, 1988a pg 41, US EPA & HMIP). Managed Co-disposal is defined as

"the disposal of appropriate hazardous wastes by mixing them, in an informed and predetermined manner, with municipal refuse, to use the attenuation and biochemical processes operating within a landfill, to reduce the environmental impact from the mixed waste to an insignificant level" (Centre for Advanced Engineering, 1991).

"Co-disposal involves the conscious controlled disposal of hazardous wastes with domestic and other similar wastes within a municipal landfill. The central objective is the maintenance of a balanced input of wastes to ensure that the attenuation processes are not overwhelmed. The important concepts promoted in these two statements are the necessity for **controlled** and **balanced** co-disposal techniques. There have been many practices around the world,

broadly termed co-disposal, which have been characterised by a lack of application of these basic tenets, that have brought co-disposal into considerable disrepute" (Centre for Advanced Engineering, 1991).

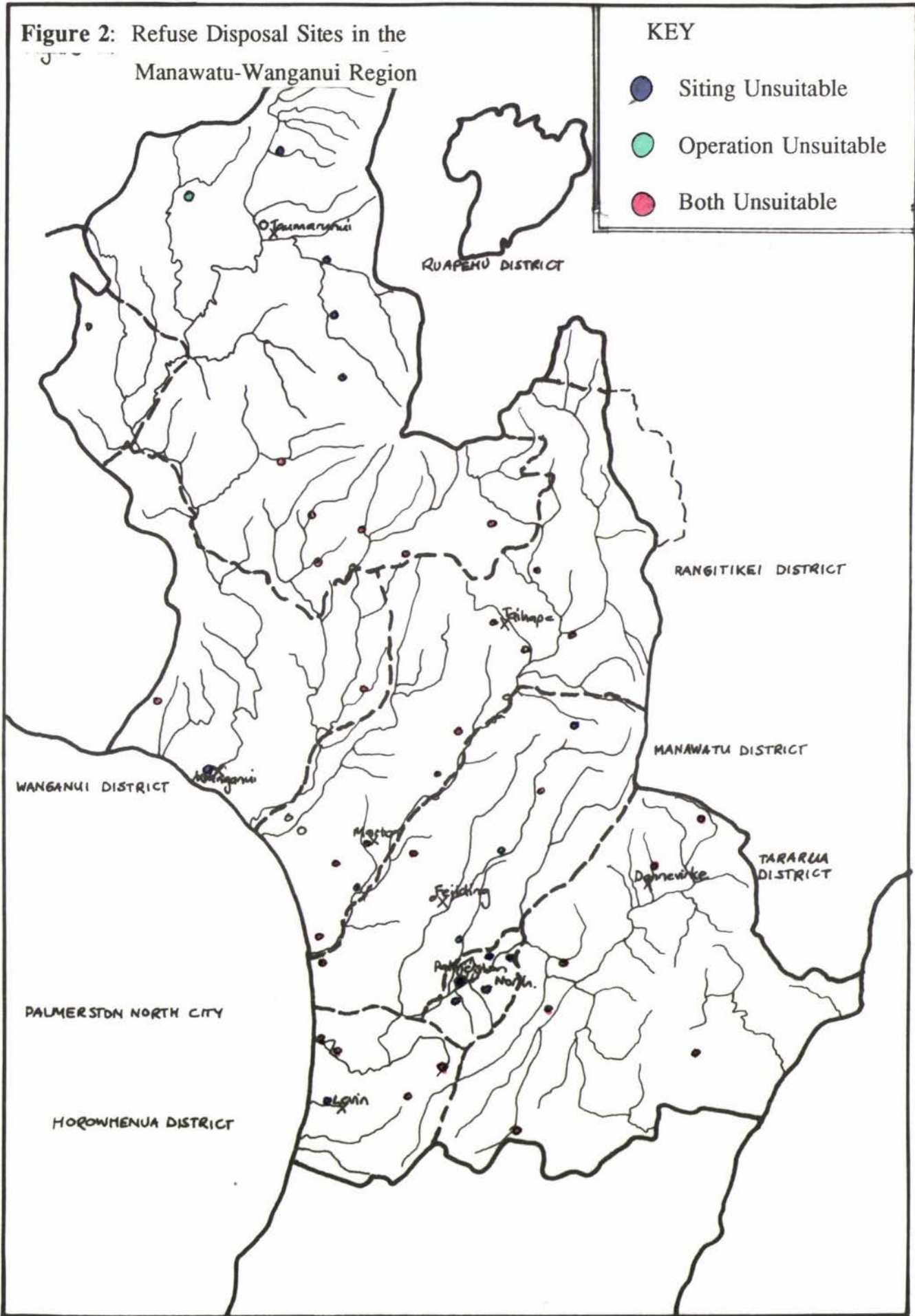
Correct operation of a co-disposal landfill site requires that certain criteria must be met. Landfills must be supervised and access controlled. The person disposing of the waste must know what it is they are disposing. The landfill manager needs to be able to assess total waste volume to calculate co-disposal capacity and have sufficient understanding of the nature of each waste, impurities, by-products and degradation products and the potential effects of these substances on health and the environment. The landfill manager must have sufficient understanding of waste chemistry to correctly co-dispose of what is entering the site.

The type of land based disposal occurring in most New Zealand regions is not well controlled. For example, in the Manawatu-Wanganui Region the base facilities are inappropriately designed and sited for receiving hazardous waste, as most them are not lined to prevent permeation of leachate to groundwater, and leachate is not controlled to prevent its entry to surface or groundwater; i.e. none of the landfills in this Region meet the MWD recommended criteria. Current methods of disposal management range from totally uncontrolled disposal where type, amount and placement of waste is uncontrolled (approximately 30 sites of 54), to conditions where access is controlled. At some of these latter sites an attempt is made to site hazardous wastes so that they will not escape from the landfill - although the landfill is not lined to definitely prevent this occurring.

Land disposal of hazardous wastes can be an economically, technically and environmentally sound management approach, but it requires considerable knowledge about the wastes, landfill processes and frequently an engineered design to control pollutants. Co-disposal is an example of a potentially adequate technology being in disrepute because of public perceptions based on historical mismanagement (Centre for Advanced Engineering, 1991). It may be possible to turn this around if guarantees of environmental safety and



Figure 2: Refuse Disposal Sites in the  
Manawatu-Wanganui Region



control are established early in the process. A landfill is a bio-reactor and must be treated as carefully as any vat of cheese or beer. As long as the biological process is enhanced and respected, treatment will progress. If the landfill is overloaded or fed non-compatible or toxic waste, it will soon become a dump (Simpson, 1991).

If land treatment and disposal is to be used as a management option in New Zealand, the benefits and risks must be publicly reviewed and debated. The assurance that proper land management of waste is not equivalent to dumping must be made very clear, and mechanisms for monitoring and control must be put in place. In addition, issues of containment, odours, control of precipitation and introduced liquids, closure and post closure need to be addressed (Simpson, 1991).

Figure 2 shows the distribution and standard of landfills in the Manawatu-Wanganui Region. When this is compared to the population map facing page 6, a negative correlation of population density compared to the number of landfills can be seen. Plates 5 and 6 show the typical standard of tips in the region.

Even when co-disposal is operating satisfactorily, there will be some categories of waste for which co-disposal is not a technically acceptable option. These wastes will be identified and disposed of in the most technically acceptable fashion. At the moment, because New Zealand does not have highly sophisticated incineration facilities, this can mean international assistance is required e.g. for Polychlorinated biphenyls (PCB's).

## **2.5 PREVIOUS AND PRESENT RULES AND THEIR INSTITUTIONAL CONTEXTS**

Legislative changes, Central Government restructuring and Local Government reform over the last seven years has had an effect on the management of



**Plate 5:** Typical refuse disposal site within the Region



**Plate 6:** Further typical refuse disposal site within the region



pollution and hazardous substances. The changes that have occurred, and their impact, are discussed in this section.

Historically, New Zealand legislation regarding pollution and hazardous substances has been fragmented, inconsistent and deficient (MfE, 1988b pg.23). Consequently, the control of the effects of storage, use, disposal and transportation of hazardous substances has also been fragmented (MfE, 1987 pg.10).

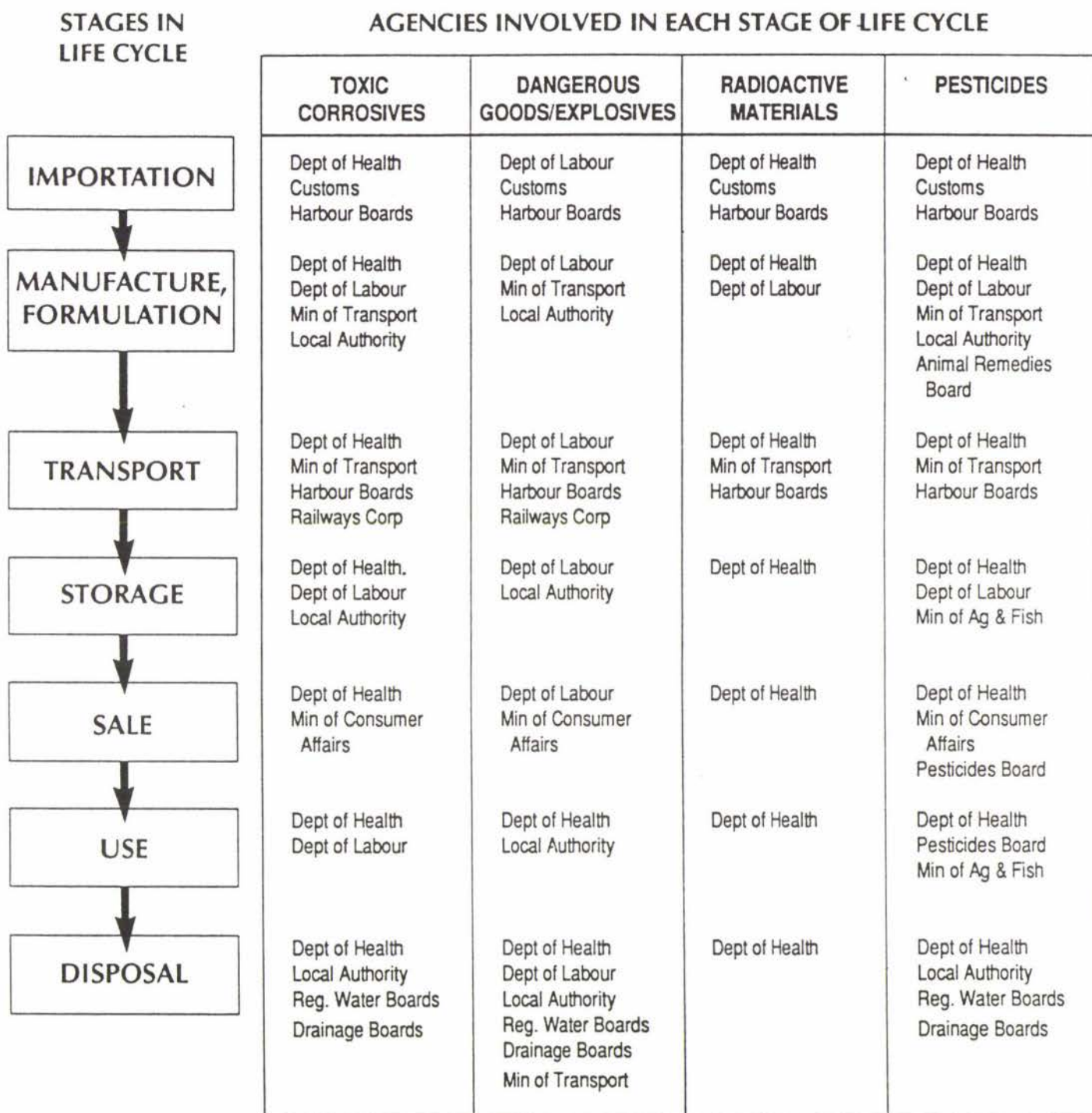
Legislation and administrative structures to deal with the adverse effects of the storage, use, disposal, or transportation of hazardous substances have been developed over a fairly lengthy period. Prior to the RM Act 1991 there were a large number of pieces of legislation that dealt in some way with managing pollution or hazardous substances (PHS). These can be considered as five basic groups, (the complete list of Acts is at Annex B). They cover:

- a. control of hazardous substances (six Acts);
- b. control of pollution (four Acts);
- c. specific activities with a significant PHS content (four Acts)
- d. management of PHS activities (nine Acts); and
- e. minor application to PHS activities (21 Acts) (MfE, 1988b pg 9 and 35).

The need to consolidate legislation because of current confusion, is highlighted by MfE in a 1988b report. "The responsibilities of the various groups involved in the management of hazardous wastes is at present not well defined and the various responsibilities of central, regional, and local government and industry need to be clearly defined and coordinated". The plethora of legislation covering waste management contributes to this confusion. Having this number involved creates major problems for keeping track of the passage of hazardous substances from cradle to grave. These problems arise for both the producer/ user/ disposer and for the bodies trying to control misuse, accidents and disposal.



**Fig. 3: Life cycle of hazardous substances**  
**Agencies currently involved**



**Note:** Some agencies are involved in the following activities throughout the life cycle of hazardous substances.

- 1 INFORMATION / DATA COLLECTION / RESEARCH: MfE, MAF, NPHCIC (Poisonous and Hazardous Chemicals), SANZ, ACC, MoT, DoL, DoH, DSIR,
- 2 EMERGENCY RESPONSE: Fire Service, Police, Civil Defence, Ambulance, DoH, MoT, DoL, LAs, RWBs.
- 3 PLANNING: MfE, LAs, Reg Auths.
- 4 Appeal and adjudication: Courts, Planning Tribunal, Waitangi Tribunal.
- 5 Internal Controls: Manufacturers, distributors, transporters and users of hazardous substances.

The report also identified the reluctance by local authorities to accept responsibility for the management of these wastes because of the cost involved.

Many of the pollution and hazardous substance acts were developed and administered by Central Government when Central Government had a strong regional and local presence. Eleven different Central Government agencies were involved in various aspects of Pollution and Hazardous Substance control (MfE, 1987 pg.16, MfE, 1988a pg.46, MfE, 1988b pg 9 2.4). An idea of the complexity caused by having 44 pieces of legislation and 11 different authorities involved can be gained by referring to Figure 3.

The changes of philosophy regarding Governments role to one of central policy maker only, which occurred over the 1980's, meant that the administrative structures to carry out many of these Acts became less effectual as legislation no longer matched (MfE, 1988a). Also, some Central Government responsibilities were devolved to local government. In the late 1980's, local government reorganisation meant that the gap between legislation and organisational structure made planning for and controlling hazardous substances increasingly difficult, despite efforts by the Health Department and MWD to provide incentives and guidelines.

New Acts had been introduced to deal with different threats as they arose e.g. pesticides and toxic substances are dealt with more recently than explosives (MfE, 1988a pg.12). Introduction of Acts that deal with the use of groups of hazardous substances on a generic basis, rather than the **effects of hazardous substances** on the environment in a holistic sense, could not pro-actively deal with hazardous substances as they arose.

The urgent need for legislation that deal with preventive integrated pollution control was identified by MfE, in 1988b (pg.23). Consequently, the focus of Sections 30 and 31 of the RM Act 1991 constitutes a major step forward. They deal with a chain of events: storage, use, transportation and disposal. The Act aims to meet several objectives:



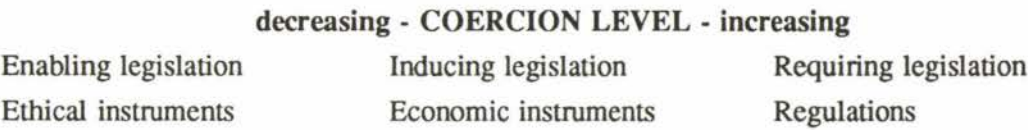
- a. protection of the health and safety of people;
- b. protection of the environment;
- c. meeting obligations under the Treaty of Waitangi;
- d. protection of property;
- e. sustainable use of resources;
- f. avoidance of social and mental stress;
- g. adopting an approach to management of the environment which recognises the interdependence of all its parts (i.e. an ecosystem approach); and
- h. providing for the needs of future generations. (MfE, 1988a, pg 3).

This means that the focus of effort is on the areas where there is potential for externality effects rather than an attempt to regulate whole processes. It therefore allows a dynamic response for dealing with the externality effects, rather than the stagnation of technical development that can occur with prescribed end-of-pipe regulations. It also means that limited funding resources (from taxation, user charges and rates raised upon property ownership) are accurately directed to the area of concern.

This refinement of target for regulatory activity has occurred over a lengthy period. However, the arguments for changing the focus were best developed in the period 1987 - 1989, at the time the framework for the RM Act 1991 was being developed.

The section of the RM Act 1991 that deals with pollution and hazardous substances was developed by considering the instruments available for achieving the objectives as "a continuum of increasing or decreasing coercion" (MfE, 1988a pg.5).

**Figure 4:** Consideration of the use of various instruments in legislative development



It appeared that elements from the full range of the continuum had value, and using a combination of these would achieve the objectives most successfully.

The mix decided upon was; Statutory control, which represents society's objectives regarding environmental quality; use of best practical option to allow industry to decide how it would meet the objectives in the most economic way; and reliance on ethics - encouraging industry to adopt a reasonable and responsible attitude to environmental protection and the needs of the community. (MfE, 1988a pg.17).

Central government's stance was to rely on the use of 'Best Practicable Option' in conjunction with standards. Submissions made (by local authorities in particular) after the first and second readings of the Resource Management Bill rejected the primacy accorded to Best Practicable Option' preferring it to be used as one of a series of tools. This is because Best Practical Option is usually interpreted to mean Best Practical end-of-pipe Option. Local government, responsible for regulating in this area, is not able to keep up to date with technological development in all fields, particularly large industrial processes, and therefore it cannot provide the information needed to use Best Practical Option as the prime technique. Best Practical Option (Section 108 (1)(e)) is, however, used informally quite frequently. This stance was upheld by the Select Committee.

In developing the RM Act 1991, not only were the best methods for meeting the objectives identified, but the need for Government interaction into the process, and the level at which that interaction should occur were also defined. The factors taken into consideration were:

- a. sovereignty issues;
- b. community of interest;
- c. competence and efficiency;
- d. equity; and
- e. consistency (MfE, 1988b pg.15).

It was considered that Central Government should be responsible for all but community of interest. Regional Councils were identified as having a primary role in resource management, particularly in the planning and regulatory context. District Councils were to continue their existing service provision functions.

It was considered that the new Act should cover the following areas of PHS activity:

- a. hazardous substances;
- b. pollution control;
- c. waste management;
- d. occupational safety and health;
- e. consent granting; and
- f. PHS policy (MfE, 1988b).

Under legislation prior to the development of the RM Act 1991, no agency had a clear statutory responsibility to ensure that wastes were disposed of in a safe manner (MfE, 1988b pg.43). Organisations which have responsibilities for Pollution and Hazardous Substance control are detailed at Annex C.

The RM Act 1991 changes this position. It provides new responsibilities to regional and district councils. Regional Councils now have responsibility to **develop plans**. Section 65, **Preparation and change of other regional plans** asks the Regional Council to:

"(3) consider the desirability of preparing a regional plan whenever any of the following circumstances or considerations arise or are likely to arise:

(c) Any threat from natural hazards or any actual or potential adverse effects of the storage, use, disposal or transportation of hazardous substances that may be avoided or mitigated: and



(h)Any use of land or water that has actual or potential adverse effects on soil conservation or air quality or water quality:".

District Council "shall **implement rules**" (Section 31).

The recommendation for change was that the RM Act 1991 should deal with the PHS function in the following way: "Transfer all major pollution control functions to regional authorities which will be responsible for coordinating a multi-media, "best practicable environmental option" approach to pollution control and monitoring. Extend the concept of scheduled processes to include all those whose wastes pose the greatest potential threat to the environment or that are technically the most difficult to control. This would strengthen control of discharges to water, the treatment of solid and liquid waste disposal to land, emergency procedures and the control of environmental noise. Local authorities would control all non-scheduled processes, and Central Government would continue in a policy/advisory role (MfE 1988b pg.25).

This approach was considered to fulfil the requirements that the MfE Working Party had set themselves. It was considered to:

- a. coordinate pollution control functions in an effective way;
- b. devolve responsibilities for pollution control to regional and local levels;
- c. maintain a source of technical expertise within each region;
- d. restrict central government's involvement to policy/ advisory/ coordinating/ appeal functions (MfE, 1988a appendix 4 pg 5)

In an ideal world this devolutionary approach to pollution control should work. However, experience in the Netherlands is that the effectiveness of national policy succeeds or fails with the dedication of lower authorities, therefore mutual consultation and deliberation is absolutely essential (Baas, et al, 1991). It is unclear at this early stage in the implementation of the new legislation whether the regional and local authorities were involved in the development of the Act in such a way that this 'ownership' and dedication to success of policy is real.

## 2.6 SUMMARY

A number of important considerations for development of the planning framework have arisen from the discussion in this chapter. These main points, which encompass elements relating to the institutional and legal context that the process is developed, and the type of problem being faced, are listed below.

1. Hazardous waste disposal is at present detrimental to human and environmental health. The risks relate primarily to chronic effects.
2. The existing status of hazardous waste management is known to be unsatisfactory. The dimensions of the problem are not clearly understood nationally, regionally or locally.
3. The three structures of government in New Zealand, central, regional and territorial, each have different roles and mechanisms with which to influence waste production and disposal. The regional role is to minimise the environmental impacts of the storage, use, treatment and disposal of hazardous substances.
4. The RM Act 1991 requires that the issues of hazardous waste management is dealt with in an integrated manner.
5. The desired outcome, which is to prevent damage to the environment while managing hazardous waste, is not in dispute i.e. there is no major public conflict about the desired outcome.
6. Factors preventing the achievement of the desired outcome are considered to be:
  - a. Lack of knowledge in the community in that the activity or disposal practice causes problems and the identification of who is responsible for coordination and control.  
problems.

- b. Lack of motivation to pay for safe or correct disposal by; producers, consumers or third parties ( unwillingness to internalise the cost).
- c. Lack of technical capability to dispose of the waste safely.

All these areas need to be covered by the plan to enable the desired outcome to be reached.

- 7. The plan deals with a hazard that is a result of human activity - it is not a naturally occurring event. It is therefore also closely linked to population density.
- 8. The purpose of the plan is to stabilise uncontrolled outcomes (or externalities) of private investment decisions.
- 9. The plan will use both incentives, enabling people to do the 'right thing' for the environment and disincentives such as fines.

## **2.7 CONCLUSION**

The institutional and legislative context for solid and hazardous waste management has recently been improved with the enactment of the Resource Management Act 1991 and the reform of Local Government. These two reforms, coupled with a strengthening in public attitude regarding hazardous waste, mean that the political will required to ensure a plan is implemented is much more likely to be found.



## **CHAPTER 3**

### **PLANNING FOR HAZARDOUS WASTE MANAGEMENT**

#### **TOWARDS A PLANNING PROCESS**

##### **3.0 INTRODUCTION**

This chapter is concerned with the search for a suitable procedural planning process. A number of procedural models developed in planning and business schools are discussed (3.2). The applicability of these models is then considered, given the legislative requirements and type of problem faced. The analysis is conducted so that two elements, namely the substantive issues (3.1) and the politics (3.3), which are important to this issue may be included in the process. The selected process needs to ensure that options for dealing with these issues are not restricted or foreclosed by that procedural choice. The chapter then discusses some of the considerations for plan content (3.4). It closes with an assessment of three New Zealand plan processes for hazardous waste management (3.5).

##### **3.1 SUBSTANTIVE ISSUES**

Before deciding on which plan type to use and what the plan will contain, the substantive issues of hazardous waste at a regional level in New Zealand need to be identified.

"Current planning theory ends up choosing now from among present options, what is best for the future. This, in reality, closes off future options" (Birkeland-Corro, 1988). In the field of hazardous waste management, this statement has some validity.

Nationally by accepting production of hazardous chemicals through product



processes and in products, we do not address the substantive issue of clean production. This is defined as "The conceptual and procedural approach to production that demands that all phases of the life-cycle of a product or of a process should be addressed with the objective of prevention or minimisation of short or long-term risks to humans and the environment" (Huisinigh, 1991). Finally, waste reduction depends on looking at waste in a different way, not as something that inevitably must be treated as disposed of, but for what it really is - a loss of valuable process materials, the reduction of which can have significant economic benefits (Hunt, 1991).

By choosing co-disposal as the accepted technique for the treatment of most waste, future options that would be available if the hazardous wastes were stored unmixed are closed off (e.g. that a technique for reusing, recycling or recovering the waste may be economically found).

By choosing centralisation (one or two disposal sites per region) over decentralisation, future options for community responsibility and control for dealing with their own wastes are limited. Waste continues to be taken 'away'. Waste production and disposal does not have to be addressed so readily when it is not piling up on your doorstep.

A procedural approach to planning allows consideration of a set of issues in the context of a plan process. This has advantages in that an ordered, phased process of planning development occurs. It can also have disadvantages. If the issues being addressed by the plan are not seen in their wider context, some of the 'big picture' issues may be missed and the substantive issues that relate to these are not considered or addressed.

The problems associated with immediately taking a procedural approach are that "in lieu of a problem solving system, we have a system suited for choosing among given alternatives" (Hunt, 1991) and an incremental approach to planning occurs. In the case of control of the use, transportation, storage and disposal of hazardous wastes by regional and local government, if the substantive issues of the cost of market externalities are not considered before

developing the procedural part of the plan, the procedural techniques chosen may set in train a process which forecloses other options. Cartwright (1987) also observes this difficulty, "Incremental decisions may push policy imperceptibly in a particular direction". In the case of solid and hazardous waste, procedural plan development only, may foreclose such options as those of internalising the cost of disposal to the producers of waste. The plan process must be able to respond to the issue agenda and changes to it. Front-end flexibility is an essential planning feature to look for in choosing plan type.

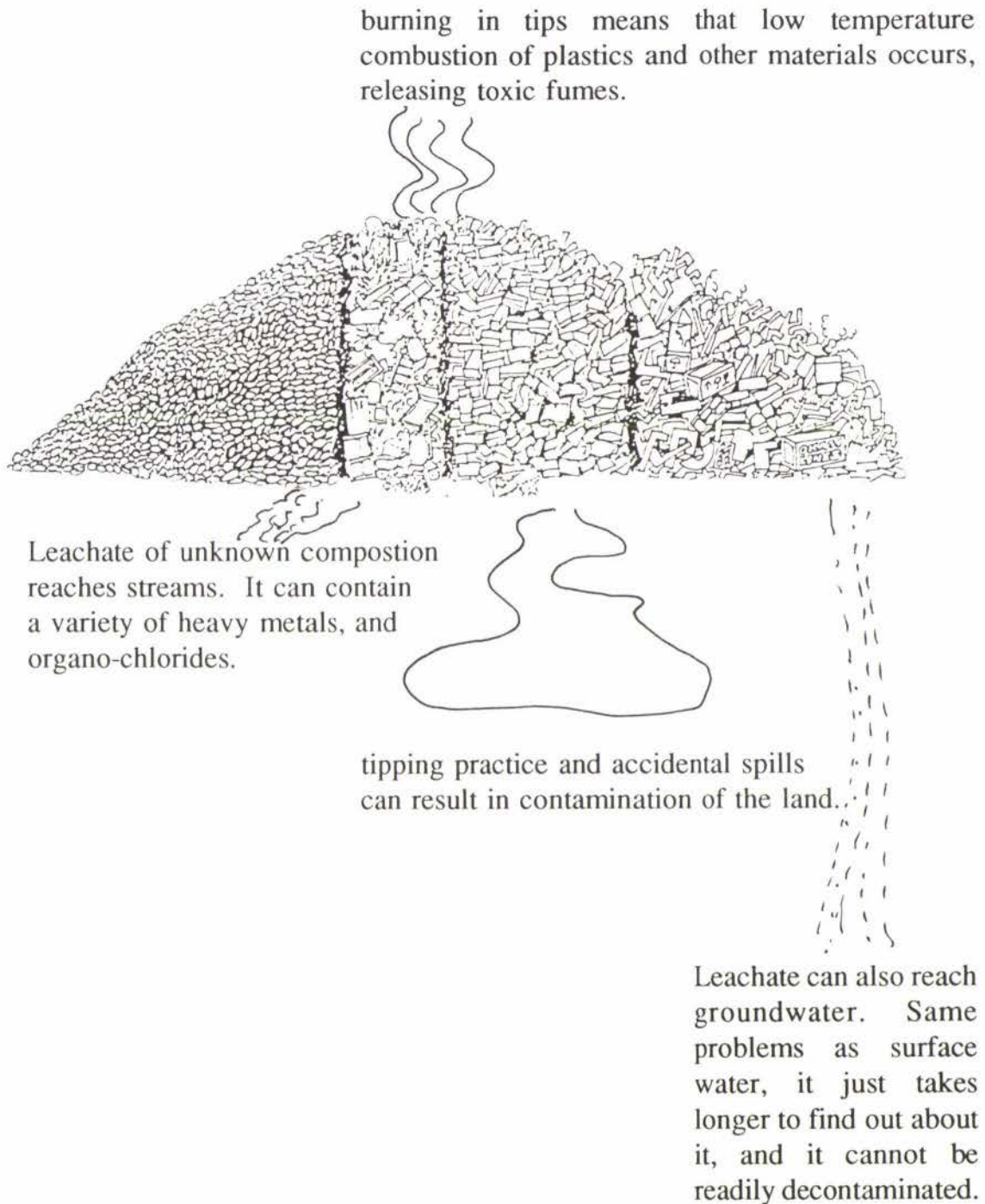
The other problem inherent in not addressing substantive issues is that "Incrementalism obscures the cumulative effect of decision, while postponing and exacerbating conflict over resources. Creative options are becoming increasingly limited" (Birkeland-Corro, 1988). Control of the use, transportation, storage and disposal of hazardous wastes by regional and local government is an example of the private costs of certain resource use being externalised.

There is a public cost in planning for the management of these wastes, in regulation, education, information provision, in service delivery in provision of actual disposal facilities and in the effect of these measures on environmental health.

It is Birkeland-Corro's contention that "The fulcrum of environmental conflict today, is the diversion of undervalued public resources to private interests and the externalisation of the private cost of development. This is the cause of increasingly inequitable resource distribution and long term inefficiency in resource consumption." This is otherwise stated by Baas et al as "the situation that private producers do not usually consider the environmental costs, when calculating the costs of production, and that the current economic-political system does not count the intrinsic value of the environment as such, can be considered as both a government and a market failure. The root cause for the situation is that the private producers do not usually count the environmental costs, is, that the environment, as a scarce good, has different alternative functions. Different competing functions have not been adequately priced and



**Figure 5: Incorrect Residue Disposal - effects on air, water and land.**



the opportunity costs of alternative uses have not been incorporated into governmental or industrial costs of production. The result is that the use of the environment as a scarce good is unbalanced".

Figure 5 shows diagrammatically the externality effects on the three environmental media; air, water and land by a typical tip. Plates 7 to 9 show this photographically within the region.

**Plate 7** Low temperature burning at a tip within the region.



The treatment of used oil can be used as an example of a hazardous waste disposal problem which illustrates the validity of Birkeland-Corro's contention. 70 million litres of oil is sold in New Zealand per year for use (Fraser 1990). It is at this point the private sellers of oil are permitted by New Zealand law to relinquish responsibility for their product. The costs associated with the product are externalised. 40 million litres are used up either within the production cycle or the oil is recycled. 30 million litres is unaccounted for.

There is a public cost in finding out where the unaccounted oil has been disposed to, regulating disposers and disposal facilities and in ameliorating the



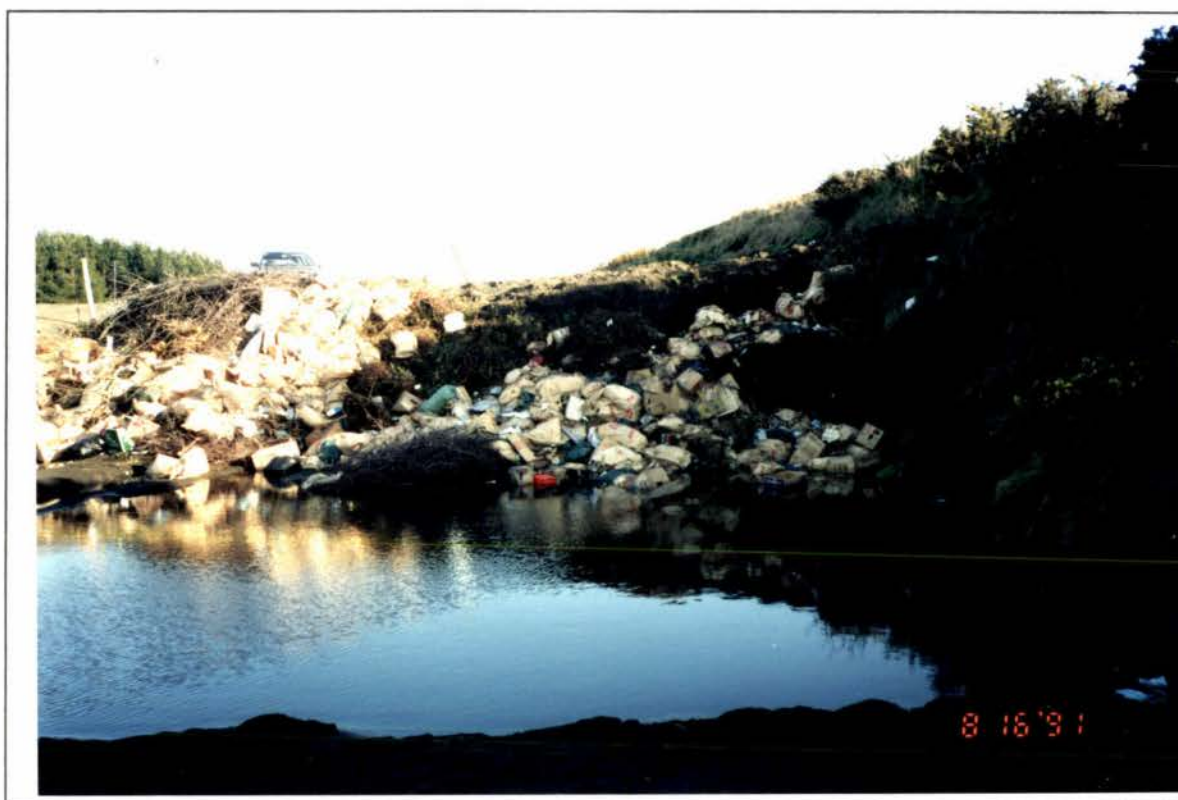
**Plate 8:** Leachate draining to surface water at a tip in the region.



environmental damage resulting from incorrect disposal. There is no direct cost and little indirect (producers have a small input to funding of regulatory authorities via rates) to the producers of the product who reap all the profits from its sale. A hazardous waste management plan that only addresses how to regulate and successfully dispose of wastes such as oil and mitigate the environmental damage it causes, will not have dealt with the substantive issues of waste disposal at all. Why should those who profit from a resource be allowed to externalise disposal costs? Why should a resource cause a cost by being dumped when for oil, it can be reused (through recycling)?

Birkeland-Corro goes on to say "like its legal counterpart, the planning system deals with planning issues as if they are still only concerned individuals separable interests of immediate parties. Even more recent inventions such as the 'polluter pays' principle and the 'transferable pollution rights' legitimise injury to public health". They "amortise a private party's right to pollute on the basis of implied consent by the public to the social contract".

**Plate 9:** Groundwater at a higher level than the base of the tip i.e. groundwater intrusion is inevitable.



A regional council is an organisation responsible for promoting the sustainable management of natural and physical resources (Section 5, RM Act 1991).

Therefore 'balancing' the good and the bad must be avoided, because this leads to incremental diminution and or degradation of the public estate the regional council is responsible for managing. To deal effectively with these substantive issues involves an approach which considers and addresses them, rather than restricting itself to "fixing the problem". It needs to consider the costs and benefits of resource disposal, where those costs fall and whether there is an equitable distribution. It needs to consider how it will manage future options. It needs to address resource use conflict and deal with the causes of the conflict. This can be done by using problem solving techniques. Dispute management will also be needed for cases and controversies where there are vested interests and set positions.

The regional council needs to **consider** these issues even if the legislative or



institutional framework to **address** them is not available.

Once the major substantive issues have been discussed and a strategy for dealing with them has been developed, the most appropriate plan type must be considered.

### 3.2 PLAN TYPE

The type of plan generated depends on the type of organisation and the institutional context. For example a single purpose organisation will normally develop a single purpose plan, and multipurpose organisations develop a multipurpose plan.

The plan required for solid and hazardous waste management in a regional council deal with a single issue, but for a multipurpose organisation with multipurpose objectives for the regional plan (RM Act 1991). Hazardous waste is one element of a whole raft of issues a regional council must address. These are addressed in the context of National Policy Statements and Regional Policy Statements. The hierarchy is shown at Figure 6.

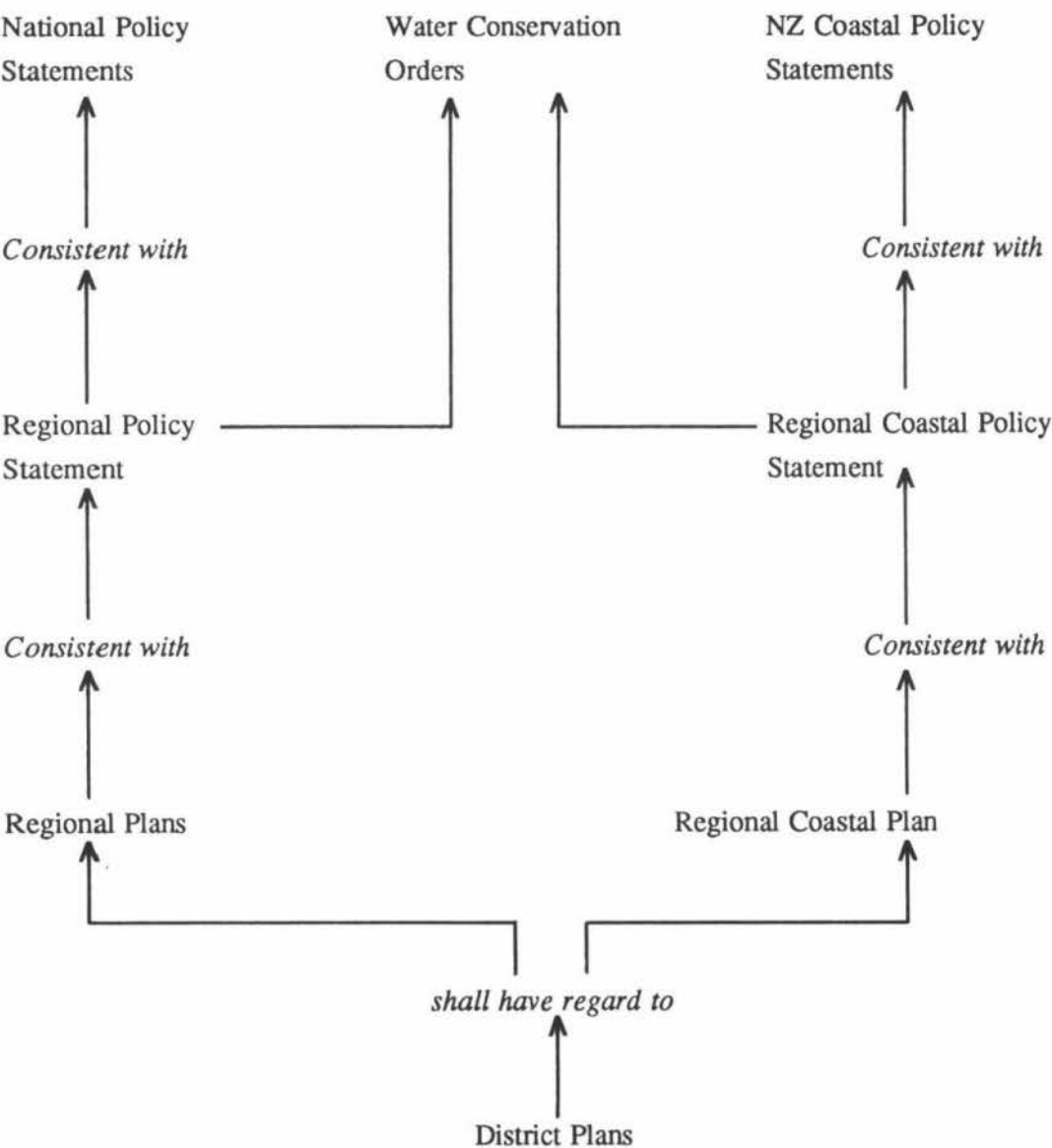
The institutional context will also influence the type of plan generated. Regional Councils are one of several organisations responsible for some element of waste management. How and where the responsibilities of other organisations interlink will affect which plan type will be effective in achieving the objectives.

The major focus in developing this plan, needs to be on the **means** or the strategic process, rather than the **end**. The desired end from the regional council's perspective has been well defined both internally and through public support for the desired outcome, evident by the recent passage of the RM Act 1991 supported by all the major New Zealand political parties. This evidence is also shown in the survey carried out in 1990 on New Zealanders attitudes (Gold and Webster 1990).



Many of the sub-problems of hazardous waste management are not at issue either. Problems associated with existing processes are recognised, the solutions are recognised and the methods of reaching the solution are understood. There is no conflict over **what** should be done or **that** it should be done.

**Figure 6:** Resource Management Act 1991 Policy and Plan Hierarchy



The problem is that waste disposal practice has not changed to match available technology and knowledge. As other factors; information, awareness or technology, are not limiting, the problem comes down to a difficulty in overcoming inertia. Rather than waiting for the 'best' solution to appear, as truly optimum solutions are very unlikely, it is important to **start**. In starting, a condition of pareto optima needs to be sought. Pareto optima is achieved by undertaking "enough analysis and evaluation to identify courses of action that are unambiguous improvements and implement them; then go back, analyse and evaluate again until you can identify another improvement and implement that; and so on" (Cartwright, 1987 pg 95). Therefore, the plan type chosen must be one that focuses on means, rather than achieving a perfect end.

For the plan to be successful in dealing with the treatment of hazardous waste ( a problem that is created by all people) all the people involved in creating the hazard need to feel that they are actively participating in implementing the plan. Hence a key element to consider in deciding on a plan type is to ensure it is interactive.

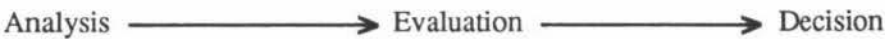
The nature of the problem will also affect the type of plan that is developed to deal with it. If the problem type is defined, then the type of strategy can be matched effectively to the problem. It is understood that "only in the case of simple problems can planning be expected to yield an optimum solution" (Cartwright, 1987). Consequently, local government's challenge is to keep the focus on what is important for the long-term best interest of the community and to keep the debate open and constructive (Guerra 1991).

According to Cartwright's definition of problems, hazardous waste management in the Manawatu-Wanganui Region is a compound problem in that "individual parts are understood in detail, but the relationships among them and the potential impact of additional factors cannot be anticipated". It is "a collection of simple problems loosely connected and possibly open-ended". In this case, the best that can be achieved is to find answers to parts of the problem, rather than answers to the total problem. Sub-optimum solutions are the best that can be achieved for this problem type. The next consideration,

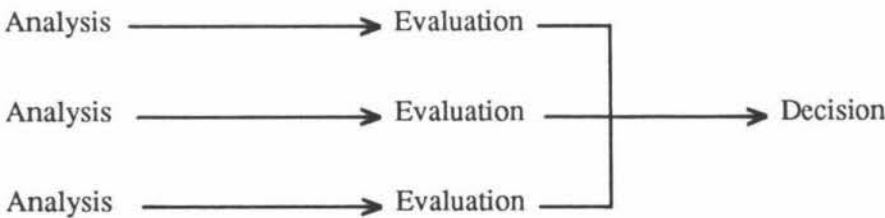
having decided what the problem type is, is whether plan development should precede implementation, or occur concurrently. Rational comprehensive planning, with its emphasis on completing all analysis prior to plan implementation has not worked particularly well in practice, mainly because of the inflexibility inherent in development prior to execution does not take account of the evolution of thought and behavioral norms. This is especially true in the field of waste management, where very dynamic philosophy, issue, and technology bases are combined.

Figure 7: Schematic representation of planning strategies, from Cartwright 1987.

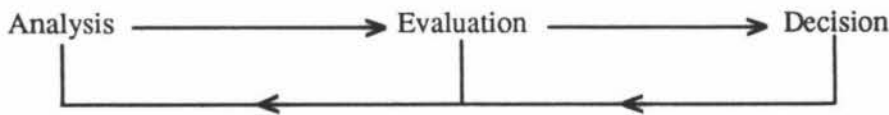
1. Bureaucratic planning for Simple Problems



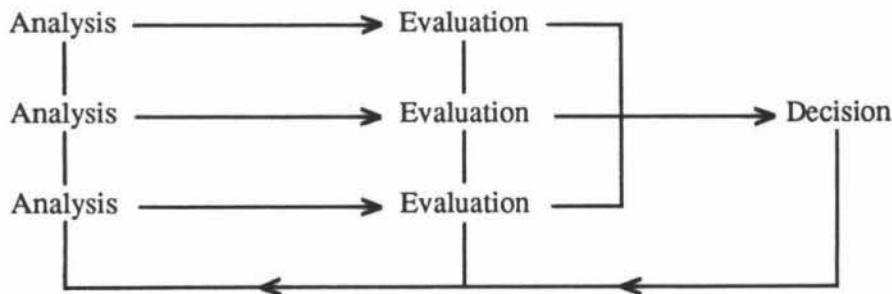
2. Incremental Planning for Compound Problems



3. Adaptive Planning for Complex Problems



4. Process Planning for Meta-Problems





Cartwright suggests that the art of planning lies in judging what is possible and knowing how to achieve it. It goes on to say that planning is a fluid process "planning is no longer something we can 'complete' then implement. Instead planning and implementation are intertwined; planning has become a continuous process of monitoring the effect of implementation and suggesting adjustments". A "strategy that is rigidly linear or sequential in character has only limited applicability" and "some problems require strategies that entail a succession of ameliorating actions rather than a single solution". Can these recommendations to treat compound problems incrementally be reconciled with the need to avoid narrowing down options at substantive level? Is it possible to identify a desired result that can be reached in an incremental manner? If the overall outcome will not change during the plan development and implementation, it should be possible to use measures that focus on intermediate goals and means.

### 3.2.1 Plan Type in Theory

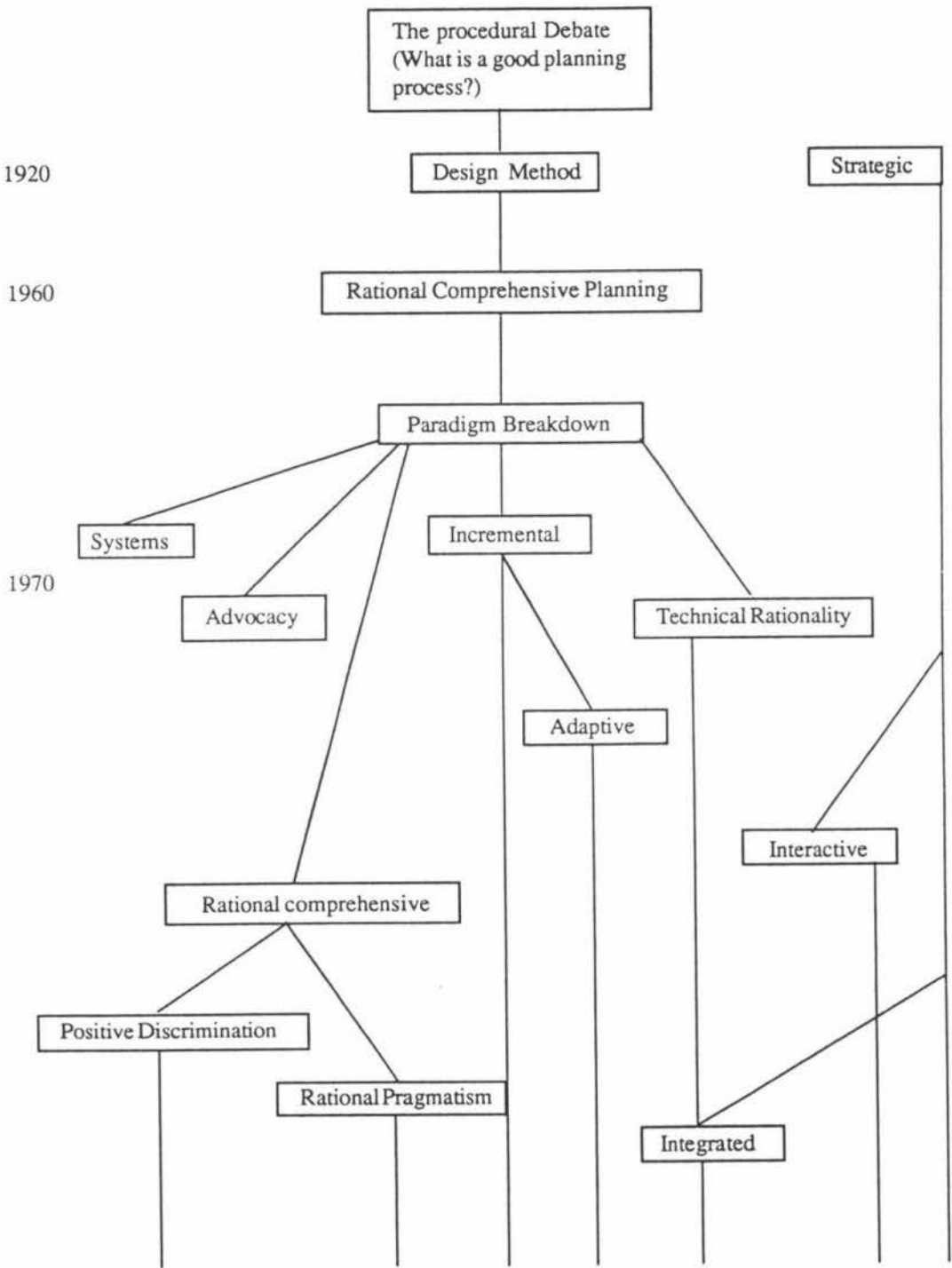
There are a number of planning schools of thought that have developed distinctive characteristics over time. Dialogue between the two major homes of planning theory, especially during the 1980's, means that the contrasts between the characteristics of the different schools has diminished. For example, both 'strategic' and 'comprehensive' planning schools recognise the need for public input to the process, although they differ on the scale and scope of input into the resulting plan.

Pragmatism also suggests that what are useful elements of each plan should be used. Every planning process should be tailored to fit the specific situation (Bryson and Roering 1988) and will therefore be a hybrid. It is a matter of identifying the useful elements of each plan type to construct that hybrid.

There are useful features that can be drawn from many different areas of planning theory, just as there are features of each group that have either been shown to be ineffective or inappropriate for the particular application. Provided their shortcomings are understood, it is possible to separate out the

Figure 8

The Procedural Planning Process Development



features of each plan type that will be relevant to developing a Solid and Hazardous Waste Management Plan.

Elements of these varying schools are discussed, and the processes they have to offer in developing a plan for the Manawatu-Wanganui Regional Council Solid and Hazardous Waste Management Plan are outlined.

Firstly those plan types that have developed in the planning realm are considered, then those which have developed within corporate structures, then the hybrids which have developed from both. These are illustrated in Figure 8.

### 3.2.2 Incremental Planning

The most elemental and 'knee-jerk' type of planning is often known as incremental planning. As a problem or part of a problem becomes obvious an attempt is made to solve that portion of the problem that can be identified. Sequentially other problems may appear as a result of the solution to the first problem or independently.

Disadvantages of using an incremental approach are that the overall problem may cost more to try to deal with when it is dealt with as a series of unrelated parts. By trying to find a solution for a problem without having a clear idea of what outcome is desired (what you want to accomplish) can result in becoming committed to a certain track which may be tangential to the truly desirable aim. It may also make it impossible to change tack as new options turn up.

Incremental planning can result in accidentally closing off options.

Advantages of incremental planning are that **something** is done which improves the situation at least in the short-term. This can be better than the paralysis that accompanies some comprehensive planning approaches. Provided the disadvantages of the very primitive form of incremental planning



are avoided (i.e. where no assessment of the 'big picture' occurs or no assessment of the overall desired outcome is attempted) incremental planning has its uses.

Incremental planning has a slightly more sophisticated relation; 'adaptive planning'. Cartwright describes adaptive planning in the following way "...do enough analysis and evaluation to identify courses of action that are unambiguous improvements (pareto optima) and implement them; then go back, analyse and evaluate again until you can identify another improvement and implement that; and so on'. The process is one of making "successive approximations to solving a problem.'

This planning style is very useful, **if consideration is had of the substantive issues the plan is unable to deal with directly**, so that they enter the framework of consideration for unambiguous improvements.

Both incremental and adaptive planning avoid the problem of having process that must be 'completed' and then implemented. Instead, planning and implementation are intertwined; planning has become a continuous process of monitoring the effects of implementation and suggesting adjustments. (Cartwright, 1987)

Neither incremental nor adaptive planning really provide a suitable process for a Solid and Hazardous Waste Management Plan. This is because they identify intermediate ends and deal with them well, but do not, by nature, focus on a major desired outcome. Essentially they are both concentrating on ends-within-means rather than on identifying ends per se. For waste management an end has been identified, therefore what is needed is the means to achieve that end.

For this reason the process design for each of these planning process types are not suited to this plan.

### 3.2.3 Comprehensive Planning

In an attempt to produce the multi-faceted, concerted, far-sighted action that

will solve all the problems 'comprehensive planning' was developed. Unfortunately, while the objectives were defined, the data was being collected, the results analysed, the implications of various courses of action studied, the people consulted, the sequence of action decided on, time passes and the problem changes in size or scope.

Lang considers that rational comprehensive planning "works best when uncertainty is least; the problem, opportunity or need is well defined; strong consensus exists on what should be done (ends) and how to go about it (means); the effects of taking alternative courses of action are known or at least knowable; and the implementing agency has a high degree of control over the planned action".

The hazardous waste management problem meets some of these requirements quite well. Divergences occur on suitable means for achieving the ends and that the implementing agency does not have a high degree of control over the planned action. The Manawatu-Wanganui Regional Council has **some** control over implementation, but control is applied mainly when implementation is occurring either incorrectly or inadequately. It is not particularly easy to control implementation in a proactive fashion, partly because of reliance on regulation to remedy effects. The other major reason is that preventative action, for a wide array of activities, is not dramatic. It does not involve the high technology excitement that oil-fire capping or triple by-pass surgery or in-vitro fertilisation provide. It demands attention to detail. It involves a number of small costs to prevent a large cost. It is about as exciting as insurance, and can be as difficult to quantify the benefits. It is therefore difficult to fund because it is difficult to show results for, as the results can only be defined as the accidents that did **not** happen, the product that was **not** wasted and the public ire that was **not** engendered.

A major disadvantage with comprehensive planning is that the plan is drawn up before it is implemented. This does not get around the problem of inertia. Through the United Councils, comprehensive solid waste management plans were developed, and never implemented. Because there is no action at the

time of plan development, it is easy to lose the enthusiasm generated by the consultation process. Implementation becomes divorced from input.

Another characteristic of comprehensive planning is that it is linear or sequential. It is developed, then it is applied. Potential for adaptation because of new information, needs, goals or problems is limited. It does not produce a living, dynamic, adaptable document. Given the nature of philosophical shifts currently inherent in waste management, this characteristic would make comprehensive planning unsuitable.

Finally, comprehensive planning takes a lot of time and effort in researching all the implications of prepared course of action. By developing a solid and hazardous waste management plan which is a focused problem, comprehensive planning may provide an all encompassing framework when that is not actually required.

### **3.2.4 Technical rationality**

It is widely considered that the problem of hazardous waste treatment can be solved or alleviated considerably, given enough resources. This is a feature of the planning perspective known as technical rationality. Lang (1986), discusses the characteristics of technical rationality and arrives at the conclusion that although the approach has benefits, it also has problems and limitations.

Characteristics of technical rationality include:

1. The definition of 'problems' abstracted from the world around us, with the implicit assumption that problems can be 'solved'.
2. Reductionism - paring down problems until they become manageable, based on the twin assumption that complex systems can be understood in terms of a few variables abstracted from their context and that problems studied in sub-compartments can be recombined into a



sufficient understanding of the original larger problem.

3. Reliance on data and models as modes of inquiry.
4. A linear view of time, and of cause-effect relationships.
5. Objectivity - assuming fact can be separated from value, that the analyst is an unbiased observer outside the system being studied, and that personal bias can be consciously controlled.
6. Quantification of information, based on the belief that numbers enhance objectivity, more accurately depict reality and are necessary for rational social discourse.
7. Optimisation - the search for a single best solution.
8. Disregard for the individual, a consequence of reductionism, quantification and objectivity.

Initially a process based on technical rationality could work well. It can be a fast and relatively inexpensive process. It does have one major weakness, which, if exposed, would ruin the credibility and ability to implement the plan. The weakness is that it does not take into account perceptions of the problem and possible solutions which are identified by people other than the planners. A Solid and Hazardous Waste Management Plan will rely heavily on public acceptance of the plan. In fact it goes further. For the plan to be truly effective it needs active public participation in its implementation. Disenfranchising the very people the plan is designed for would make the plan an expensive academic exercise, and fail in its purpose. Further, the requirements for consultation in the RM Act 1991 would make such a process illegal.

### 3.2.5 Strategic Planning

The generic plan type which focuses on specific issues is commonly called strategic planning.

Strategic planning is a form of planning used and developed in the private sector. Its focus tends to be on the **organisation's** action or reaction to a problem "on the achievement of the best fit between an organisation and its environment" (Bryson and Roering 1988). It requires some adaptation to fit the needs of a public sector organisation because power is generally shared in most public situations; "no one person, group or organisation is 'in charge', and co-operation and negotiation with others is often necessary in order for people, groups and organisations to achieve their ends" (ibid).

Because strategic planning considers the organisation in a context of resources and constraints presented by an organisation's environment, it allows the organisation to carry out "more focused planning and improves its ability to understand the relative risks associated with alternative courses of action." (Kaufman and Jacobs 1988). It also incorporates the idea of competitive advantage. Strategic planning is supposed to encourage an honest assessment of a communities' capacity to act, seeking to maximise strengths and minimise weaknesses in the context of opportunities and threats."

There are several characteristics that typify strategic planning. It devises clearly expressed mission statements that explicitly take account of activities in both the internal and external environment of the organisation. These consider the organisation's mandate. The mission is deliberately focused and selective. It then guides subsequent planning and implementation and describes how the organisation would look if it successfully implemented its strategies and achieved its full potential (Bryson and Roering 1988). Strategic plans attempt to anticipate future conditions and provide a range of possible responses - they are flexible, adaptive and dynamic. They also attempt to be proactive and attempt to create the future rather than merely planning for it. Allocation of resources is an integral part of strategic planning (Lang, 1986).

Lang also contends that intuition and judgement are highly valued in strategic planning. This is not a perspective noted by other writers on strategic planning such as Kaufman and Jacobs. They consider that the danger of using strategic planning which has been developed for private sector organisations is that they can be "too narrowly based, reflect too much of a business community agenda.... and seriously underestimate the problem of implementing priority actions in the decentralised, pluralistic decision making system of the public sector" (Kaufman and Jacobs 1988).

Strategic planning systems are applicable to public sector organisations for, regardless of the nature of the particular organisations, it makes sense to coordinate decision making across all levels and functions and to concentrate on whether the organisation is implementing its strategies and accomplishing its mission.

In the public sector the organisation is unlikely to meet all of the following criteria:

- be substantially comprehensive;
- be formally rational in decision making;
- have tight control;
- have clear mission;
- have clear goals and objectives;
- have centralised authority;
- have clear performance indicators; and
- have information available about actual performance available at a reasonable cost.

Therefore public sector strategic planning systems are likely to focus on a decision making process in which politics plays a major role, and which control something other than the direct project outcomes.

Wechsler and Backoff (1987) identify strategy in a public organisation in terms of a number of dimensions. These enable the focus of a plan to be a lot more specific than the identifying features of strategic planning as a plan type do.



This enables further definition for plan development type still based on the strategic framework. These dimensions address the **context** within which a plan is developed rather than just the **process** (focusing on systematic analysis, comprehensive planning and strategy formulation and purposeful choice by strategic managers and planners). They consider the eight dimensions of strategy, enable strategic planning to be applied more successfully to public sector organisations. These dimensions will be discussed later relative to hazardous waste management by a Regional Council, in the plan development phase of this thesis.

<u>Strength of external influence</u>	the extent to which external demands and pressures influence the strategy of an agency.
<u>Strategy impetus</u>	is this active or reactive? Are strategies developed to anticipate situations or are strategies in a responsive mode?
<u>Strategy orientation</u>	is this political, organisational or policy?
<u>Attitude towards change</u>	is the strategy designed to produce a fundamental change or maintain the status quo?
<u>Scope of strategy</u>	range of concerns addressed by the strategy, are these comprehensive or limited in scope?
<u>Level of activity</u>	what amount of attention is given to achieving strategic objectives.
<u>Target of strategy</u>	internal or external?
<u>Locus of control</u>	the balance between external (political, legal economic) demands and pressures and internal (organisational) intentions and

capacities.

It becomes readily apparent that "when clear and widely shared organisational objectives, substantial capacity for performance, extensive amounts of discretion, and adequate resources are found in opposition to a weak or divided external influence field [or the external influence field coincides] an agency's pattern of strategy is likely to coincide with its intentions and plans" (Wechsler and Backoff 1987 p.41).

Strategic planning, with its focus on outcomes, its recognition of factors affecting plan development that fall outside the sphere of technical rationality and its selective nature (the 'solution' to the problem does not become more unwieldy than the problem itself!) is a major advance on the other plan types discussed so far.

It still has limitations. These arise when it is applied to situations where a consensus is required or where implementation requires acceptance by a variety of people (often because behavioral changes are required). To accommodate these needs Lang addresses this problem, first by introducing to the planning process what he call 'interactive planning' and then by taking a multiple perspective to develop a process called 'integrated planning'. This involves the melding of the two major planning schools to produce a better process.

### **3.2.6 Interactive planning**

This is a recently developed plan type that draws on both planning and business planning theory. What differentiates it from other plan types discussed so far is the timing of interaction. The major premise of interactive planning is that interaction must occur at the **analysis** stage of plan development and not be left to occur only at the **synthesis** stage, where emphasis shifts to chopping down variety to a few options, making compromises, accommodating competing views and searching for an appropriate course of action (Lang 1986).

Lang considers that an integrated approach to the analysis begins by clarifying the issues through interaction with **all concerned parties**. This includes exploring the nature of the conflict which, if due to lack of information or a misunderstanding over data interpretation, will require a different approach than if the conflict is rooted in differences in values and priorities. It then directs the data search and analysis accordingly. This interactive approach from early or in the process poses a major dilemma in my view. Lang considers that the interactive planning itself must be approached strategically; i.e. it must be focused and selective".

It is difficult to understand how that would be possible. At the analysis stage the planner often has no clear idea of the direction to be taken themselves and is therefore cannot determine **how** to focus, or on what criteria to be selective, and would not be able to provide reasons (rational or otherwise) for making those choices. Personal experience within regional New Zealand planning indicates few people are interested or adapted to using the 'blue sky' no-basis-for-comparison approach for providing their input. They prefer to compare their ideas with an existing framework - either negatively or positively. This is especially the case in such planning documents as the Regional Policy Statement, a non-specific regional policy framework. Once the level of detail in Regional Plans is reached and developed, input at earlier stages of plan development becomes more possible and readily available. Most people really only become interested in an issue if they can comprehend how it will affect them. The waste management plan will affect, to some extent, **all**, the people of the region.

Lang considers that interaction is needed in both the synthesis and the analysis stages of resource planning, if the result is to be a plan that addresses key needs and issues, attracts support and can be implemented". While interaction is definitely needed and can be incorporated into the synthesis stages, New Zealand planners contend that it is very difficult to move forward if an effort is made to include major levels of interaction at the analysis stage. This is because people are wary of contributing time, energy and effort to intangible things. It is also possible that the plan will be captured by extreme viewpoints

which may distort later plan development (especially if those with extreme views later lose interest). This is not to say that input at the analysis stage is impossible or unworkable. Just that it can be extremely difficult to handle effectively and its nature makes input difficult to focus.

Using interactive planning techniques assumes that an interactive style with open participative processes will lead to better decisions. Its success is measured by "the extent to which balance can be achieved among contending interests and agreement reached on action to be taken". Lang contrasts that objective with the objective of conventional planning where "success is measured by the extent to which the objectives of the plan are achieved".

Inertia has already been identified as the overriding reason for hazardous waste management not occurring more effectively than it does now. The cycle of; information - feedback, consultation, collaboration and negotiation are not necessarily going to provide the impetus to overcome that inertia. Also 'balance', as already considered in the substantive issues section, is not a desirable option (if balance is defined as trading off human convenience and use against environmental quality) because of the danger of incremental balancing always moving in one direction. In external issues, some of the contending interests do not have adequate resource of voice or value (habitat, spiritual values etc.) to compete for the 'balance'. Therefore the objectives of a conventional plan may be more appropriate.

Interactive planning may look to be a sophisticated technique for ensuring that the various dimensions of a resources use (economic, socio-cultural, environmental, etc) are considered, and as different disciplines make their inputs. But in practical terms it would be a difficult technique to apply while still maintaining a sense of direction and forward momentum.

### **3.2.7 Integrated Planning**

Integrated planning is another process that attempts to overcome the weaknesses evident in earlier planning processes, particularly in public



participation and input by explicitly including those elements. It builds on the framework of technical rationality, but includes three additional perspectives in plan development. Besides the technical perspective, the organisational, political and personal perspectives are included.

Ideally, a technical perspective provides a sound base of information and analysis; an organisational perspective uncovers institutional barriers and opportunities as well as bringing in various collective viewpoints (those of citizens groups for example); a political perspective tunes into the needs of key decision makers and a personal perspective alerts us to the individual actors and their motivation (Lang 1986). Lang differentiates integrated planning from strategic planning because strategic planning tends to be more technical than interactive. It is also distinguished from comprehensive planning, which attempts to be rational and all-encompassing. Comprehensive planning "produce plans that are long in coming, exceedingly broad in scope, overly technical in orientation and often incapable of securing the agreement of the many interests involved" (ibid).

The use of the Integrated Planning model in many respects is merely formalising and normalising what pragmatic planners do now. But skills to make the transition from rational to integrated planning are needed because of the greater use of interaction. This plan type is an amalgam of many of the best points of its predecessors.

Promoters of integrative planning see it as "an innovative way of doing planning - strategically, interactively and open to a multiplicity of perspectives - with the mix of these decisions depending on the situation"(Lang 1986). However, one major impediments to its application is the planners themselves. Lang asks "to what extent can a technically oriented planner accommodate other perspectives and make the transition to a kind of planning that is strategic and pervasively interactive?"

The question is, also to what extent is it likely that the multitude of skills interactive strategic planner would require will be found in any individual?

The types of skills are almost mutually exclusive on a Myers-Briggs personality indicator basis - you need an extrovert who will listen, an innovator who is based in the present, a thinker who is tactful and diplomatic about contributions, and a person who will drive for 'ends' who can also see the value in exploring a number of options (Myers, 1990).

In some senses, Lang's description of integrated planning is a logical advancement and adaptation of several planning types, however its effective use demands a high level of skill across a number of disciplines. Because of its high reliance on the skill of the planners, they will tend to flavour the process to a large extent. We therefore enter the realms of planning as an art, unique to each structure, rather than planning as a repeatable process.

Once planning leaves the realms of 'technical process' an awareness of the impact of personalities and politics of the process is very important.

### 3.2.8 Summary

Incremental, adaptive, technical rationality, comprehensive, strategic, interactive and integrated planning have been discussed. Several of these planning theories have been discarded as being inappropriate for the process and plan required because of their area of focus, e.g. they focus on developing ends, when these are already clear.

The action inherent in incremental and adaptive planning, the goal focus of comprehensive planning, the selective focus of strategic and the community involvement and pragmatism of interactive and integrated have all highlighted important points for consideration. So too have the elements discussed at the start of this chapter - those of substantive nature and the politics associated with planning. The two theories that appear the most relevant are strategic and integrated. These will be used to develop a planning process that incorporates the most appropriate features of each of these different processes.

### 3.2.9 Conclusions

1. Substantive issues regarding techniques of waste disposal must be considered early in the planning process to ensure that options are not being foreclosed by procedural plan choice.
2. In choosing a plan type from among the options discussed, the primary considerations are:

to avoid foreclosing options for management because of a lack of understanding of aspects of the process/technology.

pragmatic consideration of the politics

3. The market system is becoming more engrained in New Zealand. Externalities of this system, such as waste management, are seldom acknowledged. However, it is the externalities of the market system which are a cost to health (if they are not dealt with) or government (if they are dealt with).
4. The nature of the management of hazardous waste problem - with its well defined "ends" but uncertain means make incremental and adaptive planning unsuitable.
5. The strong requirement for public support to implement the plan rules out technical rationality as an option.
6. The requirements of the RM Act 1991 for defining ends (section 67) and public participation (First Schedule) also rule out incremental, adaptive and technically rational planning processes.
7. The use of a plan process which reflects the position of the Solid and Hazardous Waste Management Plan in the regional council planning hierarchy and structure - of a single issue in a multipurpose organisation

- means that comprehensive planning will not be suitable. Comprehensive planning is also unsuitable because of its need for completion before adoption.
8. Elements of strategic planning, particularly the analysis of the strategy dimensions is an appropriate technique for plan development. This is because of the high level of awareness of the pragmatism of planning, particularly the politics involved.
  9. Interactive planning may work well where the planning body has a high level of control over the process, including the legislation, and where 'balance' is an appropriate goal. For this plan a more driven process is required because of the nature of the problem and the small locus of control of the organisation.
  10. Integrated planning is another procedural type that will be incorporated in development of the plan. It demands a high level of planning skill, and as a style, it has flexible proportions of strategy and interaction, determined by the planner.
  11. The active participation and support of the public is required for the plan to be implemented. Their involvement needs to be actively included from the early decision making phase, but focused on **policy** decisions rather than implementation techniques.

### 3.3 THE POLITICS OF PLANNING

This section addresses the issue of how the level and type of involvement in the planning process can critically affect the acceptability of the final plan. Although this section is called the politics of planning, the line between it and the public participation processes is somewhat blurred. It is contended that public participation is a political process (Masser, 1982). The acceptance of a plan on solid and hazardous waste management is very important because for



it to work, it requires a large number of people to cooperate with its precepts.

The political process must be accommodated in the planning process at several levels. In all cases it involves understanding those aspects of the design of a plan process that are affected by people and how they will react to involvement at various points in the plan development.

Given that "institutions are neither mechanistic or predictable, rather they are controlled by key individuals within the organisation, irrespective of their formal position" (Gilmour and Geering 1989), the reliance that is likely to be placed on integrated planning with its high level of recognition of the **personal** component of the politics of planning become increasingly visible.

There are other elements to the politics of planning beside those provided by the planner's personality/individuality. Plans and planning practice can be aided or destroyed by the timing of consultation and the methods that are used.

Planning actions are not only technical, they are also communicative in that the timing of the input and information release, the language used, and the people who are invited to be involved in the process will influence how the plan is received. The way these actions communicate, shapes attention and expectations of the organisation, the process and the resulting plan. These practical communication effects can be counterproductive for planners if they are ignored. Alternatively, if they are recognised, planners can complement their technical activities with strategies designed to open effective communication to those persons and groups affected by proposed projects and plans (Forester 1980). Forester also recognises that "critical planning practice, technically skilled and politically sensitive is an organising and democratising process" and "By anticipating the interests and commitments of affected groups, planners may build political support in addition to producing technically sound documents." Levin (1987) puts it another way, "planners frequently appear to be naive idealists appealing to the broad public interest in a society composed of a multitude of private interests."

Unless planners develop an awareness of the different groups they are to deal with and address those differences as the plan is developed, successful implementation of a plan is unlikely. Both Forester and Gilmour and Geering have suggestions for improving the likely acceptance of plans.

Forester suggests that planners need to avoid defining problems as overly technical or too complex, otherwise they will engender political passivity, dependence and ignorance. For a waste management plan, this is critically important. The reasons are that most industry-oriented waste reduction techniques available are relatively low-tech and usually involve operational changes, increased training, and improved inventory management. Most changes that individuals can make rely primarily on attitudinal changes and avoiding sloppy housekeeping, such as not switching valves over to prevent wastes going down storm water outlets. Planners "need to systematically search for design alternatives and possible political solutions through community consultation, expertise pooling and project reviews (brainstorming and collective criticism). He also suggests that as access to information and the ability to act on it are unequally distributed, the agendas of decision making are politically and selectively structured; the ability of citizens to participate effectively is unequally distributed, a way of achieving enabling rather than disabling planning practice is "by complementing technical performance with political sophistication, support building, liaison work and finally intuition and luck". Further "It is generally recognised that hazardous waste management is not a technical problem, i.e. solutions do exist given adequate resources and political will, but a social problem which requires the participation and consent or buy-in by the public to the recognition of the problem and the need to proceed with solutions" (Simpson in Centre for Advanced Engineering, 1991).

Given the high level of uncertainty in natural and social systems, one-off best solutions are unlikely. Neither can we wait "until all knowledge is perfectly available and understood" - the old method of 'do it once and do it right' is no longer possible. Gilmour and Geering suggest that for resource management issues, using the Adaptive Environmental Assessment Management Technique (AEAM) which uses workshop procedure to focus attention on the elements

of an environmental management problem and to draw all the people and organisations involved in the particular management problem into a dialogue directed at devising the most appropriate solution will get away from the traditional confrontation between developer and conservationists - that is fairly widely acknowledged as "unlikely to produce rational, efficient or widely acclaimed decisions."

Using AEAM workshop techniques allows people to see the whole 'big picture' rather than their little part. It also allows them to focus on the overall problems and gain appreciation of the other interest groups interests and concerns. Gilmour and Geering consider that although the benefits of AEAM techniques are difficult to qualify, they provide a "superior basis for informed negotiation and dispute resolution" and allow for "development of a common understanding, better communication and clarification of uncertainties.

Just as policy decisions are the domain of the politicians and how these policies are implemented is the domain of the Regional Council Chief Executive (Local Government Act 1974 and Amendments), this distinction needs to be made when asking the public for input. It is the public's domain to determine what cost they will pay to avoid what risk. **How** that goal or objective will be met, in detailed terms, is not the purpose of consultation. If people get embroiled in detail, the larger picture gets lost and argument can ensue even when the major issues are agreed upon. The focus of the debate must be on the 'big picture' issues if direction is to be found.

The other major area of consideration for the politics of plan development, is the discussion over **where** in the planning process analytical debate and procedural debate should occur.

Analytical debate deals with the "broad societal-political setting of planning, particularly its positions within the state apparatus and its impact on social relations. It is there that the major goals and distributional effects of planning are determined" (Yiftachel 1989). i.e. this is the true policy debate and the area for political debate.

Procedural debates on the other hand "take the major goal of planning as predetermined" and are therefore "occupied with maximising the fit between ends and means" (Yiftachel 1989). Procedural theories should contrive to concentrate on debating the merits of competing decision making and evaluation methods, or in other words, the translation of goals into plans. This dichotomous approach to analysis and procedure is difficult to use in practice as people provide input sequentially. This also presumes the political debate has been agreed upon prior to the procedural plan development stage. In the broadest sense (New Zealand has a capitalist free market economy with a democratic base) the argument over the production, distribution and consumption of wealth has been addressed and politics with a large 'P' has been decided. But politics with a small 'p' (the small scale local politics, in this case) public input to several phases of the plan is still part of the procedural debate.

There are two schools of thought for dealing with the political elements in procedural planning. The first, positive discrimination, is a highly politicised process where planning procedures are seen as potential instruments for affecting the outcome of political processes. The second, pragmatic rationalism, concedes that absolute rationality and comprehension are impractical and politically impossible but prefers to look at the resultant system as a rational analytical process bounded by external constraints (Yiftachel 1989). Hence, the first choice is to embrace the political elements of the process and make them work for the desired plan development. The second is to develop the plan desired and then take notice of the political constraints. For an issue such as solid and hazardous waste management, which could achieve significant political advantage, the first option certainly has benefits. If there is political ownership of the process during the development and implementation of the plan, synergies can be developed.

The challenge is to include the political element into the planning process without letting factional interests direct resources away from the major goals, or detrimentally affect the pace at which the plan is developed or implemented.



Yiftachel considers that planning will become increasingly politicised. "Recent advances in planning knowledge that have demonstrated beyond doubt that urban planning affects unevenly the allocation of societal resources, are bound to gradually erode the myth accordingly to which planners are portrayed as neutral and apolitical experts". Yiftachel further contends that "Just like lawyers or economist who are intimately involved in the formulation of public policy, planners, too, are expected to become associated with certain political ideologies. This is not only perceived here as a 'natural' process but also as a necessary and desired course of action which can ensure that planners will remain relevant in the decision making process."

Other authors, such as Bardach, see the political process "as a number of loosely interrelated games which are played out during the negotiations leading to particular outcomes. It directs us to look at the players, what they regard as their stakes, their states, their strategies and tactics, their resources for playing, the rules of play (which stipulate the conditions for winning), the rules of 'fair' play (which stipulate the boundaries beyond which lie fraud or illegitimacy), the nature of the communications (or lack of them among the players, and the degree of uncertainty among possible outcomes" (Bardach, 1982).

Masser (1982) suggests that use of an inter-organisational network model is also needed to display the distribution of power and influence among the various 'players'. The model used "distinguishes between centrally placed and peripherally placed schools because of the extent to which their bargaining abilities are enhanced or restricted by their position in the network. Where organisations provide services that are vital to a large number of other actors, for example, they may acquire power from the centrality of their functions and their dominant position in the network."

For a hazardous waste management plan in the New Zealand statutory context, with the large number of organisations and pieces of legislation involved, an inter-organisational network model could provide some valuable insights.

### 3.3.1 Conclusion

Politics is an integral part of the planning process. The political element ranges from the collective (large public participation exercises) to the personal (the individual planners style). It is particularly important to take cognisance of the political element of the planning process for a Solid and Hazardous Waste Management Plan because of the requirement for individual acceptance to implement the plan. The planning process developed for this plan needs to consider the implications of the timing of public consultation. To aid development of a public participation process, an inter-organisational network model could provide a useful "map". Finally, given the high profile of the issue, the planning process should be designed to capitalise on the political will evident, in making the plan a success.

## 3.4 PLAN CONTENT

The plan process development finally reaches the level of detail where plan content is decided upon. There will be components that occur in all plans, which are independent of plan type. There will also be components that vary, depending on what the plan is being developed for and the plan type that is selected.

Those elements that will be included in the plan, which are not dependant on plan type include the information gathering, monitoring and review parameters needed to assess plan performance, and some form of environmental impact assessment and risk assessment.

Plan content, **independent** of plan type will therefore include:

1. identification of the intended scope of the plan so it is clear what constitutes the bounds of the plan regarding such things as the physical area covered, the institutional administration of the plan, and the legislation involved;

2. definitions, so that everyone involved in developing the plan is speaking the same language. This is especially important for much waste management terminology: for example, co-disposal is not equivalent to mixed tipping, and there are major cost differences between these two treatment types ;
3. measurements mainly to monitor the plan performance, whether it is achieving its goals, whether its precepts are being complied with, whether these precepts are appropriate and whether the plan goals continue to be the most desirable goals for the community and the environment; and
4. implementation techniques which show **how** it is intended that the plan will be carried out.

Aspects of plan content that **are** linked to plan type are those which relate to the type of participation procedures used, such as the decision making process. It is at this stage that the content of technically rational, comprehensive, or strategic plans will diverge from integrated styles of planning.

Plan content, **dependent** on plan type will include the methodology by which the goals will be achieved. This will include the types of decision making used, whether decisions will be made by 'experts', public fora, or public representatives. It will also included how the public involvement is handled, whether this occurs early in the process, at the analysis stage, or left until later, at the synthesis stage.

### 3.4.1 Plan Content Parameters

It is at the plan content stage that the judicial and structural framework within which the plan is developed needs closer consideration. In looking at more general issues such as substantive issues, plan type and the politics of planning, close definition of the context is not vital. The parameters used are still broad

enough to allow adaptation from one country to another without reducing their effectiveness. When looking at plan content however, the tools used in one country may not adapt easily or be relevant if they are taken out of the judicial or institutional context.

In New Zealand, the RM Act 1991 is designed as a permissive piece of legislation at regional and local level. Permissiveness is found within a certain context and in this sense the RM Act 1991 sets resource management policy and planning in a new direction, with new concepts to come to terms with. For example the concepts of sustainable management, and the responsibility to meet the "reasonably foreseeable needs of future generations." At this early stage in the Act's existence, permissiveness at the central policy level is extreme. At this stage there are no national standards that must be complied with. There is no national policy in the area of hazardous waste management. There is no case law to refer to.

As a result the plan content for New Zealand hazardous waste management is going to be structured a different way from, for example, American solid and hazardous waste management plans. There, the 'regional' level of control is tightly bound by both state and federal legislature. The legislative context is very prescriptive.

This creates further difficulties in referring to hazardous waste management plans developed in other countries. The problems caused by importing specific techniques from one country to another without due recognition for contextual changes can be illustrated by considering the different uses of Environmental Impact Assessment (EIA) in different countries. Gilmour (1981) says "Environmental impact assessment has been imported into Australia and it has yet to be comfortably grafted on to the native administrative structures." Gilmour considers that a component of the U.S. Environmental Protection Agency legislation has been transplanted and used in a similar manner to that practised in the U.S., but without either the policy base or the judicial background. Broadly the problems have arisen because an inventory style of environmental impact study designed for the adversarial judicial system used in the United States, does not match the Australian process well. This is for



two major reasons, Gilmour considers that one reason is that in Australia there is "a dearth of a well developed body of environmental knowledge and sound experience of many of our natural systems" (which means that inventories cannot be developed easily or accurately). The other is the tendency to revert to a system of public enquiry and Royal Commissions to resolve environmental problems (which means that the way the assessment is carried out should reflect the conciliatory style rather than the adversarial style of judicial approach).

Gilmour considers that environmental assessments would be much more effective in Australia if a clear purpose for the assessment were defined, and a more appropriate framework to carry them out were developed. Dutton (1986) also considers that there has been a "lack of integration between the impact study and other phases of a project such as planning, feasibility assessment and post construction management."

In New Zealand, the RM Act 1991 asks for impact assessment in Section 35, this is at Annex D. The type of impact assessment asked for here, is the impact of the effectiveness of the plan or rule and whether it will achieve the outcome desired. This ensures that the results of an EIA are useful, but does not directly address the information gathering process (a requirement of Section 35). The judicial and structural context of New Zealand is more akin to Australia than the United States. Some of the points Gilmour and Dutton make may be applicable, but they will need further modification to match the New Zealand context.

Cost structures are also country specific, and have a major impact on plan content. In countries where liability for a product encompasses its entire life cycle and environmental costs are legislatively recognised in statute and in implementation of that statute, different plan mechanisms can be used from those available to managers in New Zealand. If a company knows it will be liable for clean-up, the efforts it makes regarding disposal will be different from a company that can evade clean-up costs. In essence, although the problem may not vary much from country to country in a technological or

cultural sense, the parameters of the plan will be closely defined by the national statutory and institutional context. Techniques which work overseas should be carefully analysed and adapted before being applied in New Zealand.

### **3.4.2 Definitions**

These must be standard and explicit. This is so that debate concentrates on the concepts and issues. Without definitions it is very possible to enter arguments (or have agreement) through people understanding terms to mean different things. In waste management, with major distinctions between such things as mixed tipping and co-disposal, the definition of what is intended and the differences must be made explicit (refer to discussion in Chapter Two, Section 2.4 on possible techniques for waste management).

### **3.4.3 Measurements and Evaluation**

Every plan needs measurements to determine whether the purpose of the plan is being achieved. These can be structured several ways depending on the type of plan being developed. Monitoring of effectiveness is generally carried out in three ways. These are:

- a. **State of the Environment** monitoring, which provides baseline and trend information enabling the planner to see what is happening in the environment. This information however does not necessarily show whether changes in the environment can be linked to the effectiveness or otherwise of the plan. State of the Environment (SoE) monitoring for solid and hazardous waste management will involve gathering information on water and air quality at strategic sites. It will also require information on groundwater flow and recharge patterns. Selection of data parameters to provide focused, useful and defensible (in court) information at the minimum cost is important. Selection of an information base structure that is flexible enough to include future data is also critical.

- b. **Compliance** monitoring, which provides information on the extent to which people are complying with the precepts of the plan. Information from compliance monitoring, will enable a planner to deduce whether the rules contained within the plan are working and therefore potentially capable of achieving the goals of the plan. Compliance monitoring does not measure the environment directly and therefore cannot be used to assess directly whether the plan is achieving its goals. Compliance monitoring will be used to measure compliance with rules and guidelines on disposal sites, and for storage and transportation safety. Compliance rules will be dependant on the actual or potential effects of the activities for which they have been developed. The monitoring techniques will be designed so that the consent holder is aware of which performance parameters are measured, and so that the information obtained from inspections meets clear objectives, is accountable and defensible.
- c. **Policy** monitoring, which is the type of monitoring that forms the link between measurement of the environment and measurement of the usefulness of the rules of the plan in achieving effects on the environment. It is this monitoring that is required by Section 67 "Contents of regional plans," of the RM Act 1991".
  - (1)(g) The environmental results anticipated from the implementation of these policies and methods; and
  - (1)(i) The procedures to be used to ... monitor the effectiveness of the plan as a means of achieving its objectives and policies".

All three types and the links between those must be made explicit in the plan.

The need to transfer this information to a varied audience, in an appropriate and understandable manner, is another consideration which cannot be overlooked (Bayfield 1991).

Achievement of policy and appropriateness of policy will be monitored mainly by measurement of compliance rates. State of the environment information will generally show long-term trends except in rare cases where rapid environmental

improvements are possible. SoE information is therefore more use in policy review than in day-to-day measurement of plan effectiveness. Baseline SoE data is very important for this phase of monitoring so that changes over a period of time can be assessed and attributed (or not) to particular policies and plans. Bayfield's comment on Taranaki Regional Council's experience regarding soil conservation SoE monitoring is that "No specific monitoring programmes had been designed or put in place that would clearly indicate success or otherwise for the Council's policies in this regard. The absence of such defensible data is damning in times of economic constraint when a critical demand exists to justify Government grants for such activities."

### **3.4.4 Implementation Techniques**

The implementation techniques available range from "soft" techniques such as information provision and education to "hard" techniques such as regulation. These include:

- advocacy;
- liaison/ coordination;
- information provision;
- education;
- monitoring;
- economic instruments;
- regulation; and
- service delivery.

The more commonly used techniques are physical or direct regulation, economic instruments and voluntary instruments.

#### **Physical regulation**

The aim is to influence directly the physical behaviour of private producers. Physical regulation for environmental policy takes the form of permits, guidelines and general regulations. Liability issues are also appearing as an



instrument for enforcement and for the provision of compensation for damages incurred by industrial activities.

### Economic instruments

These influence indirectly, private behaviours. The aim is to address the imbalance caused by the market system not recognising the environment as a scarce good, with alternate functions to that of a receptacle for waste. The main tools used here that are available to a regional authority (some will only work if applied at a national level) are:

- a. **Effluent charges.** These are charges on discharges into environment all media, based on the quantity or quality of the discharged pollutants;
- b. **User charges.** These are payments for the cost of collective treatment of effluent;
- c. **Administrative charges.** These are payments for service of the authorities, e.g. for the permit granting procedure.

### Voluntary instruments

The aim of this instrument is to internalise the environmental policy. There are three main mechanisms:

- a. **Education** is used to raise environmental awareness. Environmental awareness, however, needs to result in changed behaviour and in some situations this must be assisted by structural changes. For example, many people want to recycle resources, but without structural assistance, in the form of collection depots and markets, an educational change cannot result in an environmental change;

- b. **Information** dissemination can be particularly effective if the incentive to change, once the information has been provided is already there. For example, if, as a result of information on in-plant resource recovery, an industry can save money, provision of that information will trigger action.
- c. **Interactive policy making**, or covenants, can be used to achieve accord where the problem is complex and regulation in the area is non-existing. A New Zealand example is the covenant between the forest industry and environmental groups over native forest logging (New Zealand Forest Accord 1990). Problems with covenants revolve around enforceability, the responsibility for attainment of goals and their relation to existing regulation.

Any or all of these techniques need to be developed in an institutional, legislative, monitoring, resource and time based framework. The institutional responsibility for this is the regional council with its legislative mandate, the RM Act 1991. The monitoring and policy review framework is illustrated at Figure 9.

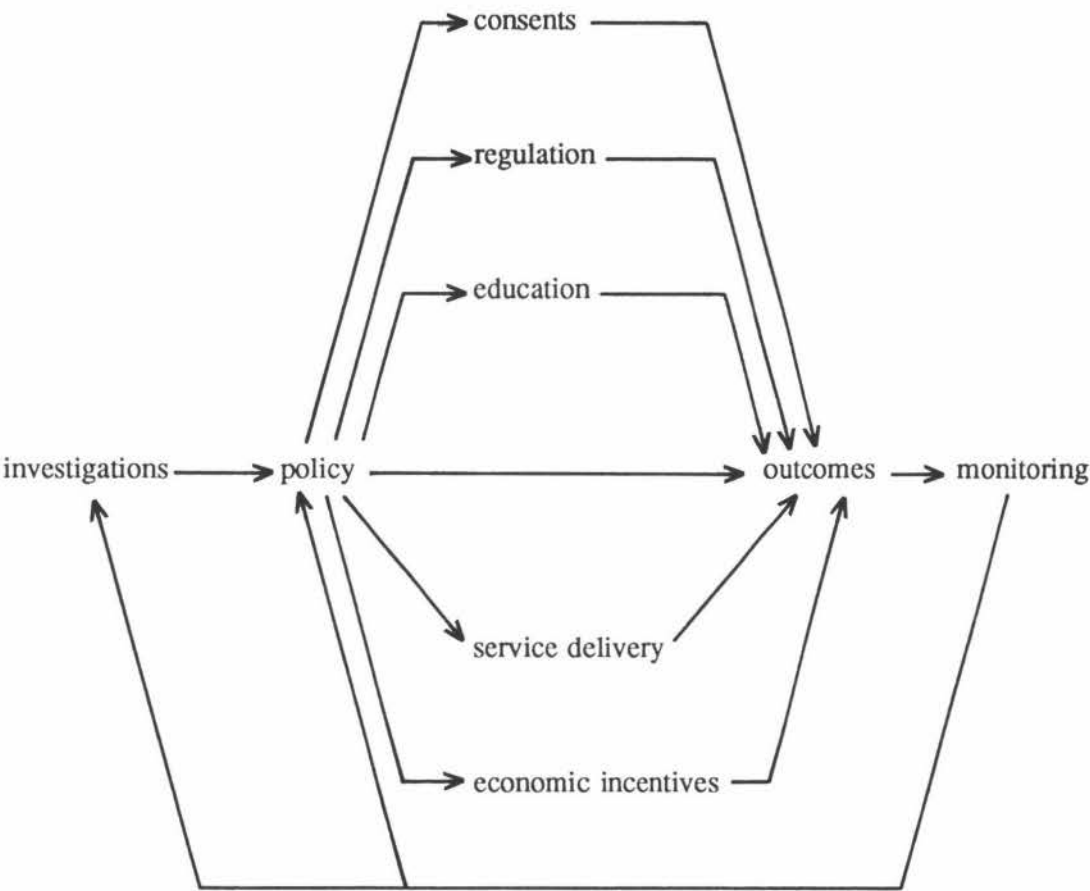
The time based framework depends on the development of a three-level policy framework:

- a. **normative** policy, which involves the establishment of the goals by all the organisations responsible for achieving them and has a 15 - 20 year planning horizon;
- b. **strategic** policy, which involves the development of strategies to implement the goals and has a 5 - 10 year planning horizon; and
- c. **operational** policy, which develops the detailed plans for year-by-year activities.

These planning horizons can provide clear guidance for organisations setting

budget allocations in their annual planning rounds.

**Figure 9: Methods Available to Carry out Functions**



**3.4.5 Methodology**

Plan methodology is a stage of plan process construction where the type of process used has an impact. The process chosen will affect the choice of implementation techniques used, and the types of decision-making process used, including how the public input will be incorporated.

**Decision-making Process/Public Participation Methods**

It needs to be made clear in the plan how the goals will be achieved and what methodology will be used. Both technologic and ecologic approaches to goals

can be used. The technological approaches can be defined as "tactical and situation-oriented decision making," with the "emphasis on changing the physical environment, while leaving the basic value system untouched." The primary focus is on the end state - substance or product is the key". The ecological approach on the other hand is "conceptual, futuristic, predictive, holistic and uncertain" (Petak 1980).

Another difference between the technical and ecological approaches is the difference between the "deductive-based logic or methodologies that forecast using trends based on past and present data, and the inductive logic or more normative methodologies that start with desirable alternative futures and work backward toward present decisions" (Petak 1980).

As well as using forecasting and inductive measures to set goals and design methodology to achieve those, identification of the costs and benefits of each methodological approach are needed. As Petak (1980) points out, prevention of pollution is not without cost, those required to pay the costs frequently either have not identified the problem or have not perceived it as serious.

Petak argues that "both tactical and strategic approaches to policy are required." He argues this is necessary because environmental decisions contain both costs and benefits. It is up to the public to decide which risks and costs it is prepared to play off against which benefits. It is up to the planner to articulate benefits, costs and risks in a language the public can understand so that those decisions can be made. Input from more than one 'world view' is needed because of the complexity of the problems faced and the scope needed for their solutions.

There needs to be an assessment made for each option presented, so that those making the decisions are operating with the most complete knowledge. The assessment must include:

- a. identification of the possible outcomes of each alternative,
- b. the estimated probability of each possible outcome,
- c. the estimated relative utility of each outcome to various interests, and
- d. the estimated utilities and weighting for the interest groups



involved.

These are essentially the requirements of the RM Act 1991 Sections 67(e) which states "The principle reasons for adopting the objectives, policies, and methods of implementation set out in the plan;" and Section 32. **"Duties to consider alternatives, assess benefits and costs, etc."**

Overall, the aims of the plan are:

functional, in that solid and hazardous waste will be managed for environmental and public health; and

economically efficient in controlling the problems of externalities.

### 3.4.6 Conclusion

A solid and hazardous waste management plan will include all the elements of content discussed in this section. Where it may differ from other plans is that little reliance can be placed on overseas examples, accurate and agreed upon definitions are critically important, and on public participation needs to be focused early, and comprehensive later. Initially when the plan focuses on regulation as a technique, monitoring may prove to be somewhat easier than it will be later, when it is likely that education will be the prime technique. The monitoring design will need to absorb and reflect this change in emphasis over time.

## 3.5 OTHER NEW ZEALAND SOLID AND HAZARDOUS WASTE MANAGEMENT PLANS

Regional councils throughout New Zealand are addressing the issue of solid and hazardous waste management. A number of different approaches are being taken to the planning and implementing process, regarding which items to include in the plan or strategy. For the purposes of comparison with the approach that taken with Manawatu-Wanganui, three other regional councils approaches are used as examples. These are Canterbury Regional Council, Taranaki Regional Council and Northland Regional Council. In all cases (Manawatu-Wanganui included) judgement regarding the effectiveness of plan

implementation is limited because the planning process has recently been initiated. Therefore, the comparison measures will be based on the process proposed and the precursors to the plan - the discussion documents. Discussion documents were released by Canterbury in March 1991 and Northland 1990. In Taranaki, the former Catchment Commission enshewed formal notification of a comprehensive plan, but developed a strategy with policy and recommendations in 1983. The work done by these three councils will first be described, and then analysed.

It would be wrong to suggest that no effort has been expended by authorities prior to 1986 (when the Department of Health provided subsidies to survey and to develop plans). However major reorganisation of local government in 1989 has provided a better vehicle for implementation of plans, and enactment of the RM Act 1991 has provided a more focused and better structured legislative base. Consequently, the ability of regional councils to plan for the management of hazardous substances has been substantially enhanced.

The other significant contributing factor to plans being developed now, is the very high level of support by the public and politicians for action on hazardous waste management. (NZ Values Today 1990.) In 1990 New Zealanders overwhelmingly agreed that "environmental protection is an urgent and immediate problem." The national mandate for environmental action is extremely strong at 85% of a standard sample survey. The conclusion drawn by the survey was: "It is clear that the overwhelming majority of New Zealanders are convinced of the urgent necessity for environmental protection. The high level holds good, across major social groups." There is, therefore, the strongest positive climate of opinion for environmental protection. "Policy of the most thorough-going nature could be assured of the most positive response from the New Zealand public. Whilst ozone layer protection and pacific nuclear tests command greater importance ranking, this is only relative to other items. All legitimate environmental protection must benefit from the powerful 4:1 predominance in favour of these comprehensive measures" (Gold and Webster 1990).

One final caveat for the comparison of other New Zealand examples is that lack of information and the short period of time for which most regional councils have been managing hazardous waste. Consequently, an assessment

of the effectiveness of these plans is incomplete. Comparative evidence comes from an interpretation by the staff of various organisations associated with hazardous waste management planning, and from anecdotal evidence.

The comparison will therefore be based primarily on whether it can be considered that the issues that have been covered are capable of being addressed adequately by the plan.

### **3.5.1 Taranaki Regional Council**

The problems associated with hazardous waste disposal were highlighted in Taranaki with the 'Think Big' developments of the petrochemical industry. An inter-agency working group developed a strategy for the disposal and management of hazardous industrial wastes within the Taranaki Region in 1983. Although the title of the report suggests that disposal was the only option considered, in fact, methods for reducing the amount of waste and for recycling were given a high priority.

The strategy developed considers one issue. It defines the hazard in terms of waste characteristics and present disposal methods. It forecasts the additional load for disposal. It assesses the risk posed to the environment and people of Taranaki from the group's perspective and from the perspective of outside individuals and agencies. It evaluates other mechanisms for disposal then it develops policy and recommendations for improved management of hazardous waste in Taranaki. As this strategy was developed eight years ago, and the recommendations are quite specific, it is possible to assess the effectiveness of the strategies.

Many of the recommendations were designed for organisations which no longer exist: The Taranaki United Council and the Taranaki Catchment Commission. However, as personnel and corporate culture from both organisations melded to form the Taranaki Regional Council, the recommendations have been acted on in the new structural environment. Although the report is not referred to on a day-by-day basis, it forms the base policy on Hazardous Waste Management. The RM Act 1991 enactment now provides further organisational and institutional scope, and the hazardous waste management plan will consequently be replaced.

### 3.5.2 Northland Regional Council

Northland Regional Council, in developing their Regional Waste Management Plan, has taken a much wider view of waste. The Discussion Draft released in November 1990 considers waste under three categories - solid, liquid and hazardous. As it is often difficult to separate solid and hazardous waste, and an understanding of both is required if the principle disposal method used is co-disposal, it is helpful to consider them both in the same plan. Liquid waste is generally septage and sewerage. Like Taranaki, Northland considers that the first area to be addressed in the identification of the scope of the issue, in terms of what quantity of what wastes are produced and how these are managed. In Gilmour's terms this stage is the hazard identification phase. It then discusses how the plan development will proceed, how public input will be incorporated (the social evaluation phase) and comes up with an objective and some policies for future waste management. Three desired outcomes are identified and the policies, which have implementation methods and time frames attached, are designed to achieve these outcomes. The plan process does not consider substantive issues or how they could be addressed. It focuses strongly on implementation measures within the direct ambit of control of the Regional Council. The roles of other agencies such as District Councils and the Area Health Board are addressed, but there is no diagram for showing the link of the roles of the different authorities.

The plan type would probably be described as primarily strategic in that it focuses on outcomes and has a selective nature. It advances on corporate strategic planning by including several public participation cycles, but would not be described as an interactive plan, because the analysis has already occurred before participation from other perspectives is sought.

Feedback to the discussion draft has suggested that the plan coverage was good, but not complete in the eyes of the public. They wanted statements on air quality and incineration. The public comments also indicated that they wanted the Regional Council to take a lead role in recycling, as, in their view it was not being dealt with adequately by the district councils. The submissions were dealt with in an informal meeting, the topics were discussed and redefined where necessary, and the redraft sent back for further public comment.



### 3.5.3 Canterbury Regional Council

The Canterbury Regional Council has taken a different approach to deciding how to subdivide the problem. Instead of dealing with each type of waste in turn, it has developed the plan partly on a process by process basis, and then on a waste type basis. Each section concludes with a series of recommendations. The plan is introduced by defining what is considered to be the problem. Then the parameters of the issue, for statutory and institutional framework are discussed.

It is at this point that the Canterbury Plan differs from the two already discussed. It does not immediately identify what it means by hazardous waste, mainly because it considers that the answers on what volumes and types exist in Canterbury are too sketchy. Instead, it considers how to establish an initial database and mechanisms for keeping that up to date. The next section looks at options for waste reduction and the mechanism that can be used to achieve reductions. Hazardous wastes has a section of its own. Substantive issues, waste reduction and monitoring are all covered, making the hazardous waste section almost a plan within a plan.

Section 5, dealing with site suitability, development and management goes into a significant amount of operational detail in an area that is generally regarded as primarily District Council responsibility. The intention is to set a clear framework of what is considered acceptable operational standards for Regional Rules that the Districts "shall have regard to" (Section 74 RM Act 1991). Further District plans "shall not be inconsistent with ... any regional plan of its region regarding any matter of regional significance or for which the regional council has primary responsibility under Part IV (Section 75 RM Act 1991).

The final section deals with issues of mechanics - ensuring all waste streams are collected, costs of collection, costs of other elements of the plan such as education, and of compliance with plan provisions.

This is a discussion document and from it a plan will be developed. Although the process for plan development is not identified in the discussion document, the provisions for plan development laid out in sections 63 to 68 of the RM

Act 1991 will be followed. This will necessitate fairly substantial restructuring of the plan in line with the need to identify and analyse the options (Section 36 of RM Act 1991) for waste management (pers comm).

The requirements of the RM Act 1991 preclude a totally strategic approach to planning, or one that uses technical rationality only, because of the consultation provisions. It is likely that the plan typed developed by Canterbury Regional Council will be similar to that of Northland, in that it will exhibit some of the characteristics of strategic, of technical rationality and of integrated planning. It is also likely that the focus of the plan will be on maintaining or improving environmental quality, particularly underground water.

Submissions received on the discussion document (20 - 30 in all) tended to focus on what the Canterbury Regional Council should not do, rather than coming up with alternative solutions (Sheriff pers comm). It may be possible to design consultation response forms or the consultation method, so that people are encouraged to respond more constructively.

The processes used and the elements included by each regional council are expressed as a table below.

From this table it is clear that there is not much consistency between the approaches taken by regional councils so far. This can be explained several ways. The first is the different times that plans were prepared in the period 1983 - 1991 in a rapidly changing institutional and legislative environment. Another is a lack of precedent to base plan development on. The RM Act 1991 is entirely new legislation and has different requirements and focuses from preceeding legislation in this area. Finally, regions are functionally finding their feet and each have different relationships with the other local government units within their regions. This leads to different emphasis being placed on different elements of the plan.

**Table 1:** A comparison of planning process and content for three regional council Solid and Hazardous Waste Management Plans.

Regional Council	Canterbury	Northland	Taranaki
<b>Plan Development Process</b>			
Time linked?	no	yes	no
public participation	yes	yes	selected
process obvious?	no	yes	no
<b>Discussion Document</b>			
aim/objectives	yes	yes	yes
scope defined	yes	yes	yes
definitions	yes	yes	yes
issues	yes	yes	single issue
instruments	yes	yes	no
monitoring - SoE	yes	yes	yes
monitoring - compliance	yes	yes	yes
monitoring - policy	yes	not clear	no

### 3.5.4 Conclusion

Three New Zealand Regional planning processes for waste management have been analysed. All have taken different approaches, partly because of the legislative framework they have been bound by at the time and partly because of differences in approach to the problem. Useful elements can be found in each approach. The strategic approach by Taranaki, the public participation process and time-based programme used in Northland and the acceptance by Canterbury that the problem is ill-defined, all provide useful insight into approaching the problem. The advantages of the RM Act 1991 enactment are

to create a great deal more certainty in developing a Solid and Hazardous Waste Management plan than was the case even six months ago. However, the differences in approach that have become evident, mean that consistency between regions may become a problem if the resulting plans are very different from each other. As already mentioned, major differences in cost structures can result in undesirable trans-regional transport of wastes.

### 3.6 CONCLUSION

In designing a planning process, a large number of elements must be successfully woven together. If the rationale for considering and choosing these elements is made explicit, the planning process involved should become a repeatable exercise. Other planners can clearly see why certain options have been chosen and, using their own reasoning, can either use the same elements or focus on different ones which fulfil the need of their particular plans better.

The planning process for solid and hazardous waste needs to involve:

1. Ensuring that substantive issues are considered and that the plan type used will not foreclose future options on these. Waste management philosophy is changing at a rapid pace, and a static plan type would not be appropriate because it would restrict and restrain innovation;
2. The use of a plan type that focuses on means and on public "buy-in" because of the strong need for active public support in implementation to make the plan successful. For this reason strategic and integrated plan types will be used;
3. The use of an inter-organisational network model to make explicit the areas of responsibility in what is a multi-organisational issue. The purpose for using this is to make clear and explicit each organisations responsibilities for greater accountability;
4. Capitalising on public support and political will to ensure acceptance and successful implementation of the plan at a time when environmental



issues have a high profile and a high level of public support;

5. A flexible monitoring programme to enable a change in implementation instruments over time from regulation (easy to monitor for compliance) to education (difficult to monitor for effect), and;
6. The inclusion of elements of other New Zealand Regional Council Solid and Hazardous Waste Management Plans that have been proven to be useful.

The planning process must be dynamic, to absorb the changes inherent in a field where paradigm shifts occur. The emphasis on which part of the waste area to focus on has changed from: correct disposal (1986) to recycling (1989) to put emphasis on clean production (1991). The means used for the plan must be dynamic, but a clear focus on the desired end must be maintained.

The outcomes desired must ensure that solid and hazardous waste are managed in such a way and at such a rate that the effects on the environment are mitigated and remedied and the detrimental effect on the environment is minimal. This outcome is to be achieved at a cost that is socially and economically acceptable. The scope of the regional plan will be restricted/defined by the roles and mechanisms available to regional councils.

## **CHAPTER 4**

### **THE PLANNING PROCESS FOR SOLID AND HAZARDOUS WASTE MANAGEMENT**

#### **4.1 PURPOSE, ENDS AND MEANS**

Before a plan can be developed, the elements that will be used in the process of developing the plan must be clarified. The process used is heavily dependent on the issues covered by the plan. Once the purpose of the plan is clear, the process used to develop a plan to achieve that purpose can be generated. The plan development process, distinct from the processes used within the plan to achieve its aims, is the subject of this chapter.

In developing a plan for the management of solid and hazardous waste a number of elements of plan process need consideration. These can initially be looked at as purpose, ends and means.

The purpose of the plan is to stabilise, mitigate, and ameliorate the uncontrolled outcomes of private investment decisions on environmental and human health.

The plan development process therefore must address how people consider the plan will be able to achieve its purpose. It must include mechanisms within the development process for people to own the problem, and as a result of owning the problem, develop the solutions themselves for implementation through the plan.

##### **4.1.1 Ends**

The desired outcomes need to be clarified and decided upon. Desired outcomes have been identified broadly for solid and hazardous waste management by the 'New Zealand Values Today' study, and the Discussion Document for the

Regional Policy Statement as health related - both people and environmental, but should be defined more closely for the development of the regional plan.

The outcomes desired are that: solid and hazardous waste are managed in such a way and at such a rate that the effects on the environment are minimised, and where necessary, mitigated and remedied and the detrimental effect on the environment is minimal. This outcome must be achieved at a cost which is socially and economically sustainable. The scope of the regional plan will be restricted/ defined by the roles and mechanisms available to regional councils.

The process of developing the plan must keep this outcome clearly in focus - and actively encourage further definition for the actual plan.

#### **4.1.2 Means**

The planning process used for developing the Solid and Hazardous Waste Management Plan for the Manawatu-Wanganui Regional Council will, by legal necessity, be developed in the context of the RM Act 1991. The RM Act 1991 prescribes certain processes of plan development. These are elaborated below in Section 4.2.1.

Although the RM Act 1991 does restrict plan process choice to some extent, it does not preclude other elements being added. From discussion in earlier chapters, there are a number of additional features that would enhance both the plan development process and the final plan, but are not requirements of the Act. Elements of a number of the plan types described in Chapter 3 will be used to develop a suitable plan process. The principle plan types used however, will be strategic and integrated. This is primarily because the factors affecting the achievement of the desired outcome are well known and strategic methods can be used to ensure implementation. Integrated planning will help identify the links between governmental responsibility, the people involved and other environmental concerns.

The plan process used to achieve a given series of outcomes is related to plan

content. Hence, the types of issues that are addressed will also have a bearing on which plan types are used. For developing this plan, a high level of early public involvement in the plan development process is needed, to ensure the plan is developed in a way that it can be implemented.

## **4.2 DEVELOPING THE PLANNING PROCESS**

### **4.2.1 Requirements of the Resource Management Act 1991.**

The plan type used to develop the regional plan is prescribed by the RM Act 1991 to include certain processes (First Schedule). These include;

1. Consultation, with the public and a range of organisations.
2. Public notice and provision of document to public bodies.
3. Submission process including notification of decisions and recommendations.

The plan content is also restricted to a certain style by the provisions of Section 67 **Contents of regional plans**. These are:

1. Explanation of the policies developed in regard to the issues which are addressed by the plan and the objectives sought to be achieved by the plan.
2. The reasons for adopting the objectives, policies and methods of implementation set out in the plan.
3. Environmental results anticipated
4. Procedures used for review and monitor the effectiveness of the plan as a means of achieving its objectives and policies.



#### 4.2.2 Additional desirable features

The process needs to take account of substantive issues. For example, a major financial commitment to one type of technology will not encourage the continued search for other options for reducing the scale of the problem, i.e. installing a large capacity incinerator will not encourage changes to clean production. Awarding landfill contracts on a volume basis is another example of sending signals which conflict with stated aims. The planning process should therefore discourage the early narrowing of options which could be considered in the plan.

The process should be strategic in business terminology. Objectives must be specific, measurable, achievable, relevant and time-bound.

The process should be strategic, in overall planning in that there is; a clear focus on a defined outcome, that there is a focused and selective approach to the range of issues dealt with by the plan, and that there is a clear understanding of the strengths and weaknesses of the organisation implementing the plan. The process should also use features of integrated planning, to gain strong public and political commitment. The use of the inter-organisational network model will help identify the loci of control held by the organisations involved.

In developing the planning process:

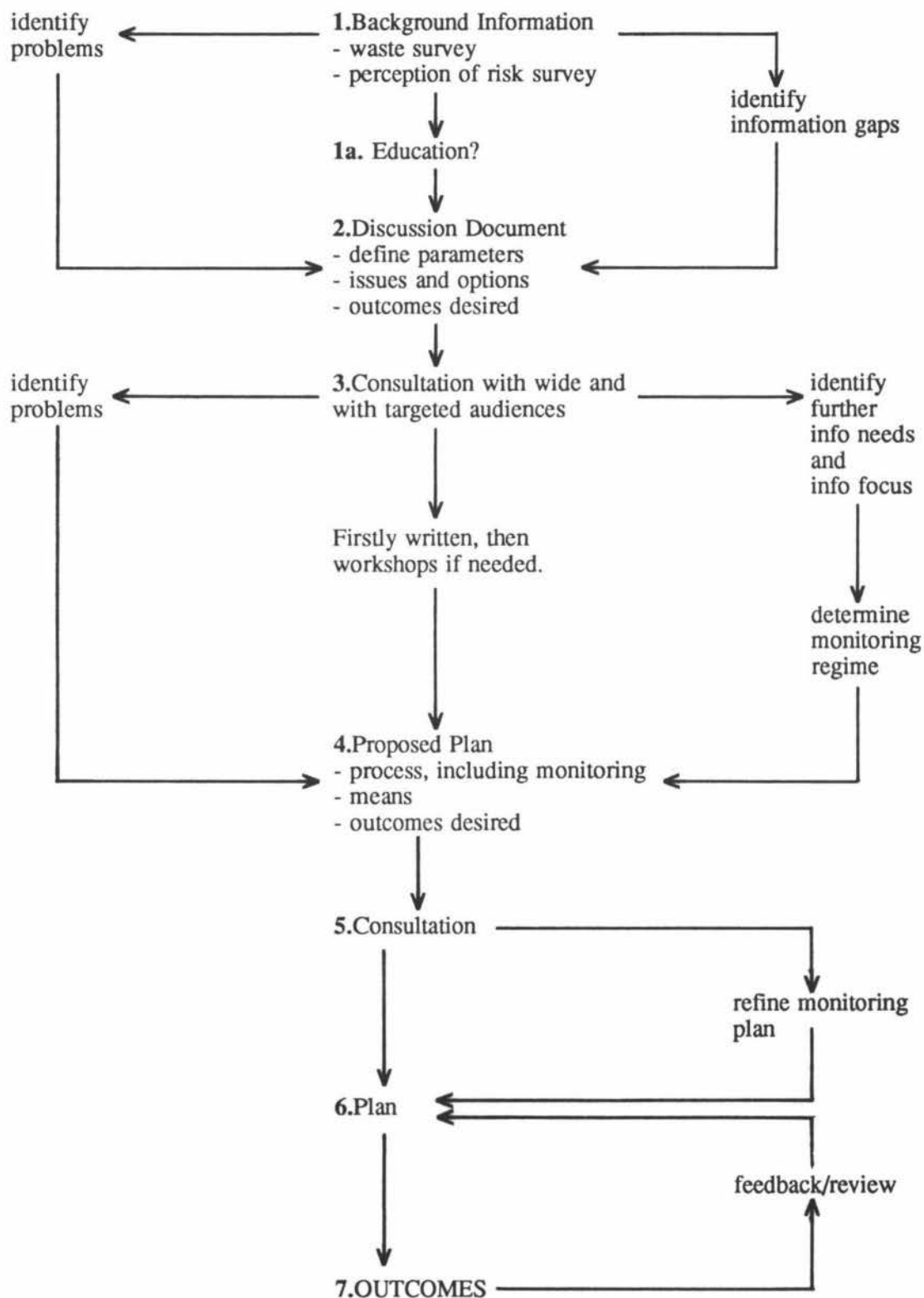
1. The outcomes need to be clearly identified;
2. The substantive issues need to be considered to avoid foreclosing options;
3. The information requirements need to be identified;
4. The areas where changes can actually be made need to be identified (there is no point spending time or energy on topics over which the organisation has no control);
5. The points at which public input will affect plan direction (i.e. where their input will be most valuable, by use of an inter-organisational

model) need to be identified;

6. The monitoring and review strategy needs to be identified;
7. The fact that the plan will begin to be implemented before it has been completed needs consideration.
8. An attempt be made to identify the planners agenda - because integrated planning will be used, the repeatability of the plan is dependant on having an understanding of this element.

These needs are expressed as a process in Figure 10.

**Figure 10: Process for Preparation of the Manawatu-Wanganui Regional Council Solid and Hazardous Waste Management Plan.**



### 4.3 PROCESS

Figure 10 shows the anticipated mechanics of the planning process. It is not possible to actually develop the plan in detail without more information on both the problem (which will primarily be gained by survey) and on public perception of the problem (which will also be gained by survey). The information gained by talking to the public on their perception of risk may have considerable influence on the later stages of the plan development. If perception of risk is dramatically different from actual risk in either direction (i.e. people consider their risk exposure is much higher than it really is, or much lower) this will necessitate the inclusion of a further step in the plan process - that of education.

Implementation of the plan starts to occur at the background information gathering stage of the plan development process. There will be information that comes forth for which action will occur, before the plan is finally defined. Information which arises from this early implementation will shape plan development and final plan form.

The process shown on Figure 10 are now discussed in detail, and in sequence.

#### 4.3.1 Background Information

This includes the primary identification of what information is required. This can be considered as two components; that which is readily available, and that which will have to be found out. It will also consider the methods of finding out the information that is not readily available.

The information required includes an accurate identification of the quantities and types of wastes produced, where they are, and their current treatment and disposal methods. This information will provide the physical dimensions of the existing problem. In addition to the 'snapshot' picture provided, an identification of trends in hazardous substance usage, and trends in the spatial



distribution of hazardous substance usage are both valuable. This is to ensure that process, management and treatment facility design will match current and future needs.

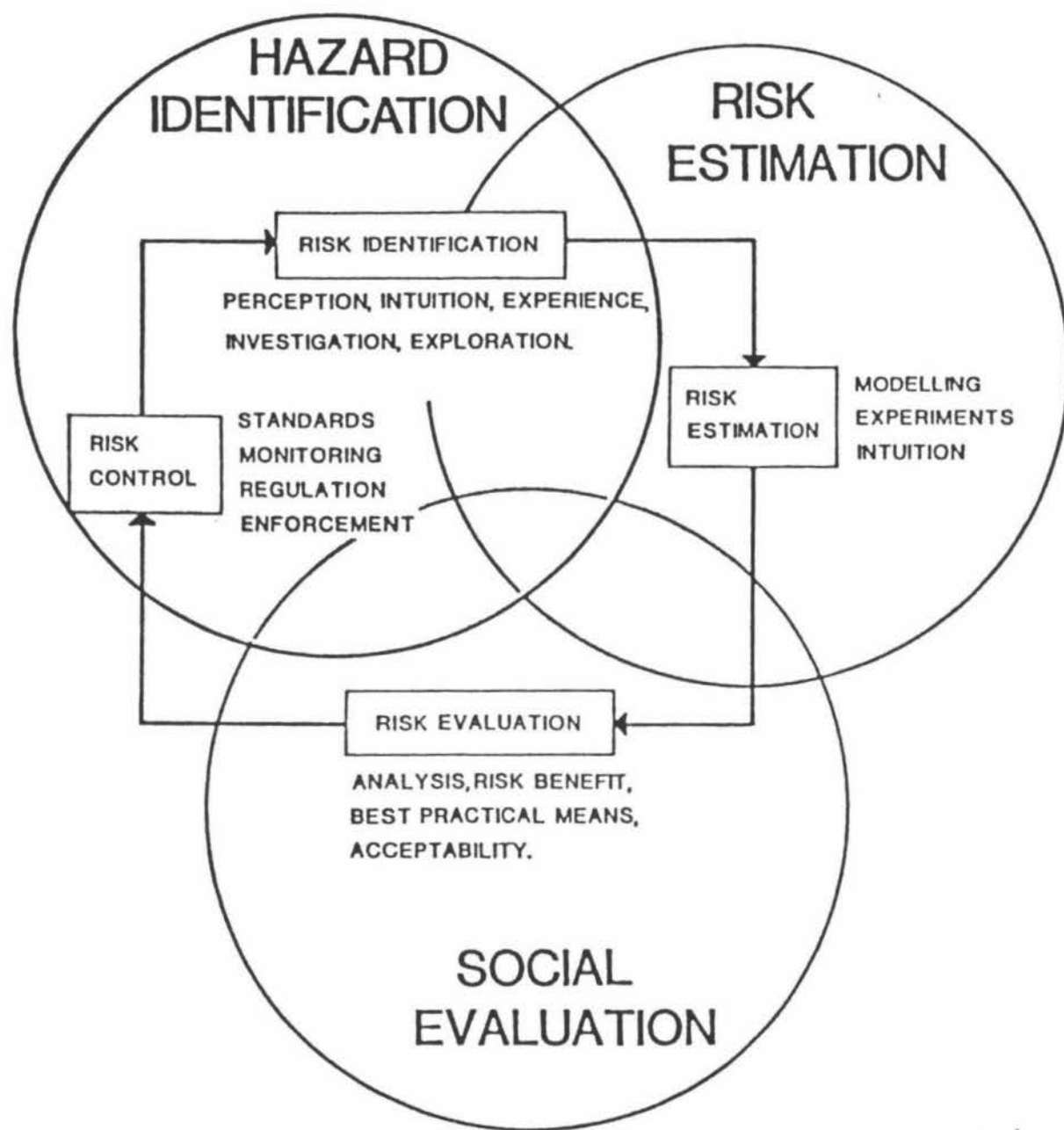
To obtain information on hazardous substance, a survey of hazardous substance users, which indicates the quantities and types and dilution of the wastes involved is required. This survey also should identify how the waste is collected, transported and disposed. A checklist of the technical information required is included in Annex E.

To identify trends, population and industry distribution trends can be used. Hazardous substance production and use is very closely linked to population distribution. For example, as Palmerston North grows, it can be expected that the amount of hazardous substances requiring to be disposed of will also increase. New industry in the Region will also have an impact on the type and amount of wastes produced, for example, if the forests planted in the 1980's are processed in the Region, this will influence the hazardous substance production.

An assessment of the existing disposal site capability in terms of physical capability and management practices is also required. This information, measured against the amount being disposed, will quickly indicate the scale of the management problem in terms of provision of suitable treatment facilities that needs to be addressed. Preliminary results indicate that the existing sites are generally not suitable for upgrading due to location e.g. too close to streams, or on highly permeable soil types. Existing sites are often over-full according to District Council estimates regarding their proposed lifespan (Department of Health 1988).

Ideally, the next piece of background information to collect is an assessment of the attitude to risk from hazardous substances, by the people of the community (in this case, the regional community). Risk consciousness will affect how the plan is further developed. Risk control measures, which address both assessed and perceived risk can then be identified for inclusion in the

Figure 11



Modified from O'Riordon 1979  
After Kates 1978

plan. Figure 11 shows the process for risk management that will be used (O'Riordan, 1979). If risk perception is much lower than calculated risk, it will be difficult to proceed with a plan process where an input from the public in terms of capital or behavioural change is required, simply because the motivation for change will not be high enough.

If risk perception is much higher than calculated risk, there is a danger that the implementation of the plan will be stymied by alarmists. If new sites are needed, this type of response will exacerbate the NIMBY (Not In My Back Yard) syndrome. On the positive side, there is also a possibility that the concerns can be effectively addressed and may be able to be avoided or mitigated.

The development of survey design, choice of survey technique and the questions used for risk perception assessment is a specialised field. Development of such a survey is beyond the scope of this thesis. Overall, the intention is to use similar principles to those used in a survey of flood hazard awareness in Christchurch, New Zealand (Blackford 1989) with the objective of identifying the differences between perceived and assessed risk, and in what areas those differences occur. The task is then that of trying to find an acceptable compromise between peoples conflicting interpretations, wants, beliefs, and values, against an assured basis of scientific fact ('truth' about how big the risks really are) (MacGill in Brown, 1989).

Risk perception results will determine whether to include an education phase in the plan, to address the problems which have been eluded to, or if there is a mis-match between perceived and real risk.

#### **4.3.2 Education**

An education programme would aim to better match perceived and real risk. In instances where perceived risk is higher than real risk, the education programme would target the particular terms which cause emotive responses. For example the term 'hazardous waste' has strong negative connotations. If

the term is linked to specific items e.g. oil and batteries, rather than being used as a general term, people can recognise and relate to the term. It then becomes less threatening - although it is still no less of a problem. It means that the problem can be dealt with, rather than permanently being put in the too hard basket and left as a problem. Because there is not a strong link in peoples minds between 'hazardous waste' and the specific things that they use, education to achieve the opposite effect may be required - that is, to associate such things as oil, batteries, paints and thinners with the term hazardous waste.

### **4.3.3 Discussion Document**

The size of the problem and the awareness of people to the issue form the basis of the next phase of the process, which is the preparation of a discussion document which discusses the issues and presents the options available for hazardous waste management. These option will present opportunities to focus on the 4 "R"s that precede residue disposal. Each of these: Reduce; Reuse; Recycle and Residue disposal will be clearly explained. Support for each option, the preferred technology and preferred implementation tools (education, regulation etc.) will be ascertained and realistic time frames for completion assessed. It will also discuss the possibilities for residue treatment, including estimates of costs.

The discussion document will also include an inter-organisational network model which identifies the statutory responsibilities of each group and identifies, in strategic planning terms, their interest and loci of control. This is to enable the people reading the document to identify for themselves which agency is responsible for what, and determine for themselves their satisfaction regarding that organisations level of performance. Catalytic effects can be identified on this chart too. For example, although the Regional Council cannot drive the whole process of hazardous waste management, its responsibility for the processes involved in issuing consents to discharge wastes causes other organisations to involuntarily participate. This can precipitate a domino effect. Because of the public notification requirements of the discharge consent, other issues are brought up when the discharge consent is applied for,



and other issues and responsibilities are inevitably addressed.

The final issues dealt with by the discussion document are those of the methods to use to achieve policy in a broad sense. Most organisations have a range of methods available to them to achieve their objectives. These include education, information provision, advocacy, economic instruments, service delivery, and regulation. Those more commonly used are:

- a. physical or direct regulation,
- b. economic instruments, and
- c. voluntary instruments.

What the discussion document aims to achieve is an understanding of the views of the publics involved on the most appropriate mix of these methods. The discussion document is not spatially linked except insofar as identifying areas of concentration of hazardous wastes. It does not deal with site assessment (except to explain the selection criteria) as this could be seen as predetermining some of the solutions. The discussion document also points out the areas where more information is needed and assumes that more information needs are likely to appear as a result of comment on the discussion document.

#### 4.3.4 Consultation

As identified in earlier in the chapter, at 4.2.1, there are statutory requirements for consultation laid down in the RM Act 1991. These requirements address **who** will be consulted but not **how** they will be consulted. Consultation carried out to the letter of the law is unlikely to produce a plan that reflects the views of the community, and for this plan to succeed, it needs community support. Therefore, additional consultation will be required. The consultation style is not set by the Act, so provided that the statutory requirement is met, the Regional Council is free to choose whatever other methods it considers will work.

There are a number of interested parties who will not be reached by the

statutory requirements for consultation at a regional level (which focus on the treaty partners, the Crown and Iwi). These include the transport industry, industry that uses hazardous chemicals and groups with a stake in other parts of the process (recyclers) and activist groups. These groups all need to be specifically included if the plan is to be workable. If specifically targeted, it is considered that these major interest groups will have the incentive to respond to a document which has been sent to them (i.e. written invitation: written response consultation). Although they will respond, a written:written style of consultation will not promote the best understanding of each groups position and concerns/interests. It would be more productive to use a consultation method which involves dialogue, such as a working party.

How other interested people can be reached and encouraged to respond is more of a vexed question. With 220 000 people potentially interested, probably one of the few practical methods of involving those who want to be involved is to do an initial sweep via radio/ newspaper/ bulk letters. The content of this initial sweep would tell people how are they are likely to be affected by the implementation of the plan. Personal experience has indicated that this will attract a limited response. However it is not physically or financially possible to encourage all those who will be affected in a way that they will respond to and so they will subsequently become included in the process. Those who do respond however can be approached for further comment using more of a dialogue approach.

Through direct response to the discussion document (written or oral) and discussions (workshops or working party) the preferred methods for dealing with the problem, options for the 5 "R"s and the preferred methods of achieving the outcomes will be arrived at. At this stage further problems will probably be identified for incorporation in the plan. Further information needs will also become apparent at this stage. From this stage on, elements of the plan may be implemented, if it can be seen that they are unconditional improvements. This is because the plan development process is flexible enough, and it needs the information input of the incremental style.

#### 4.3.5 Proposed Plan

As a result of the discussion document and its response, a proposed plan can be developed. As preferred options and methods have been identified it is now possible to develop a monitoring programme which addresses the three monitoring needs: State of the Environment, compliance monitoring with standards that have been set, and plan effectiveness. These monitoring requirements will be developed in line with the requirements of Section 35 of the RM Act 1991. They will be designed in such a way that as the instruments used in the plan change gradually from "hard" (regulation) to "soft" (education) the monitoring techniques will still be effective.

The proposed plan will obviously go into a lot more detail on how each implementation method will be used and the relationship between the instruments available to the Regional Council. Likely choices of instrument will include: advocacy to both Central Government and territorial authorities, education, coordination, advice, service delivery, regulations, and guidelines. It will go into detail on which issues are perceived to be the most important - while maintaining a strategic focus on those issues that the Regional Council can make a difference. It may, in this context, identify which issues are better dealt with by other organisations (e.g. Territorial Authorities may be more appropriate for recycling). A list of the specific items likely to be considered in the proposed plan can be found at Annex F.

The proposed plan will clearly identify the desired outcomes which will result from its implementation. These will be couched in specific, measurable, time-based terms. The proposed plan will have to comply with Sections 63, 65, 66, 67, and 68 of the RM Act 1991 which addresses Regional Plans and their; purpose, preparation, matters to be considered, contents and the regional rules. Sections 32 and 35 must also be taken account of, these deal with assessing alternatives and gathering information and monitoring.

#### **4.3.6 Consultation**

The proposed plan is then released for comment. At this stage it is likely that a lot more interest will be shown, mainly because most people feel more comfortable making comments in reference to something fairly specific, because they can see how it affects them.

This round of consultation will be predominantly through the means of written submissions because by this stage of the process the major ideas have been thrashed out and comments are likely to be on matters of detail. It is considered that most of these can be adequately considered in a written context. If it appears that more informative meetings are required, public meetings can be held at this stage.

The expected result of this round of consultation is that it will promote evolutionary changes, rather than revolutionary changes, and it will result in refinements being made to the desired outcomes, to the processes, to the methods, and to the monitoring design.

#### **4.3.7 Plan**

The plan is completed, incorporating the modifications arising from the consultation referred to at 4.3.6, and then implemented. Its implementation, as mentioned earlier, may have begun in some areas, but this stage brings all the threads together in a coherent document which clearly shows the implementation process that will occur. Overall, the plan is not linear, but uses multiple aspects to achieve its goal. It can be visualised as a series of aircraft (planes, helicopters, hot air balloons, gliders) all of which have a fixed destination, but have different motive powers, go different speeds, take different routes and take different times to get there. The plan is not linear, but uses multiple aspects to achieve its goal.

The plan language uses action words which are time-linked. The plan is dependent on committed people or a person to drive it (to act as overall air



traffic controller). It needs one focus and is therefore personality dependent. It differs from many plans because of the action link.

#### **4.4 CONCLUSION**

The plan development process reached here is original in that it has adapted general planning theory for a specific practical application. In achieving that aim it has made clear a planning process which has often been unstated. The model developed means that the plan development process can be shown explicitly. The process can also be expressed in time-based terms. It links resource planning approaches with the business planning approaches required of local government as a result of the Local Government Act amendments. It allows tangible progress in plan development and waste management can be linked to expectations. It sends clear signals with clear intentions at a regional level which then allows other affected organisations to plan programmes for their linked areas of responsibility.

If the planning process is implemented in accordance with the framework outlined it should be possible for anyone to see at any time where in the plan development the regional council has reached in the timetabled process. Expectations and reality can be linked, with resultant requirements of accountability and performance.

## CHAPTER 5

### THE PLAN

The plan development process brings people in early to decide on the best methods of reaching the outcome and purpose outlined at the development stage. Because of uncertainty associated with the direction of response from early public participation, subsequent plan development can only be broadly guessed at. However, chapter five considers what elements may be expected to be found in the plan, although it cannot go into detail on their form.

The plan process that has been chosen is based on strategic and integrated planning theory. Using integrated planning will mean that the content and focus of the plan is going to be dependent to a large extent on the results of the first round of consultation. Therefore detail of plan construction cannot be assumed until the first round has concluded. The consultation in turn is dependent on the preparation of a discussion document. This cannot be produced until there is an adequate information base, which relies on a preliminary survey. Therefore the start of the plan development hinges on the completion of two surveys and analysis of the results.

The amount of emphasis that each area of the plan receives is dependent on the outcome of the consultation. There will be some areas that have to be covered irrespective of the outcome of the consultation, and, if previous experience in consultation is anything to go by, construction for legislative reasons. Plan construction may also be dependent on the focus of the discussion document as construction may steer the focus to certain issues. The planner needs to be conscious of this politicisation.

In designing the plan both technical and social issues must be considered. "It is generally recognised that hazardous waste management is not a technical problem, i.e. solutions do exist, given adequate resources and political will, but a social problem which requires the participation and consent or buy-in by the public to the recognition of the problem and need to proceed with solutions" (Simpson, 1991).

Despite being unwilling to predetermine what will be in the plan, it is most likely that the layout and major areas of content will be as shown below, in Figure 11. Figure 11 shows the **compilation** of the plan. Discussion on this figure will elaborate on the content.

In an area as complex as waste management there are a large number of individual items to keep track of. To ensure that the opportunity for due consideration of these individual elements is not lost, they are presented as a checklist at Annex F.

**Figure 12: Likely Construction of a Solid and Hazardous Waste Management Plan.**

## BACKGROUND

identification of

- size and scope of problem
- risk, perceived/assessed
- population trends and industry trends 1986 -1990 data
- statutory bounds

## ISSUES

The five R's:

- Reduce - change process through audit and reduce amount used
- Reuse
- Recycle
- Recover resources - e.g. composting
- Residue treatment;
  - incinerate
  - fixation
  - treat - chemically, biologically or physically (by generator)

## IMPLEMENTATION TECHNIQUES

These will be referenced to each of the five R's listed above.

advocacy

- to central govt.
- to District Council's to assist reduction in solid waste stream
- to District Council's provision of sites at all population centres (transfer stations maybe)

information provision

- on clean production
- on options for any of the five R's

education

to raise environmental awareness

coordination/ liaison

for provision of facilities that affect more than one district

monitoring

of uptake of information, of the environment, of the success of other policies

advisory services

on what to do with hazardous substances

economic instruments

effluent, user and administrative charges

regulation

permits, guidelines, prosecution.

service delivery

clean up spills (cross reference to emergency spills policy)

## POLICY FRAMEWORK

Each issue, and the implementation techniques used for each one needs to be put into the context of a policy framework. The three time frames of that policy framework are considered to be:

1. goals/objectives (long time frame 15 - 20 years)
2. strategy (medium time frame 5 - 10 years)
3. operation (short time frame, updated annually)

An integral part of the policy framework is how it is monitored. Monitoring is considered for:

environmental quality

compliance

performance c.f. objectives. This is effectively a continual plan review stage.

## ANNEXES TO PLAN

1. identify places that hazardous substances should go
2. develop a waste hierarchy identifying which wastes to treat in which way.
3. things to include in the plan process
4. The Waste Minimisation Assessment Procedure (Baas 1991 Annex IV)
5. Eleven steps corporations should take to implement pollution prevention and waste minimisation. (Baas 1991 Annex V)

### 5.1.1 Background of Plan

The background will discuss the results of the hazardous waste survey, which



have identified the size and scope of the physical, and some of the institutional aspects of the problem. It will also discuss the results of the risk survey, and how that affects the plan. It does a limited amount of forecasting, of what would happen if the current rates and types of growth in waste production continued. It outlines the statutory responsibilities and bounds. In other words it sets the scene for the need and purpose of the plan.

### **5.1.2 Issues**

These will be comprehensively explained, so that the need to start at the top of the waste hierarchy, and avoid waste production in the first instance is understood. The circumstances and techniques available for all five waste management "R's" will be discussed. This is basically a discussion on existing technology and techniques, which is specifically related to application within a regional context.

### **5.1.3 Implementation Techniques**

The wide range of implementation techniques available to the regional council will be used in differing proportions for each of the issues. For example, education is likely to be the major technique for clean production whereas regulation will be more strongly favoured for residue treatment. The implementation techniques chosen will reflect the views of the public on the appropriate level of involvement by a regional council for each of the 5 R's.

### **5.1.4 Policy Framework**

Long term goals and objectives are needed for issues where a long term change in attitude is the desired outcome, and where an instantaneous response cannot be expected. Using long term goals, rather than expecting immediate action, also assists goal acceptance when dealing with third party organisations. It avoids the stonewalling that can occur if major changes in thinking are imposed on short time frames.

The policy framework can also be designed to ensure that the implementation programme is locked into the annual planning process so that any resource

requirements can be adequately budgeted for. This can apply not only to the lead organisation, the regional council, but can also be used to encourage other linked authorities to include in their process, e.g. district councils. The cost of the monitoring programme for example, will be budgeted for.

### 5.1.5 Annexes

In a complex and technical field such as hazardous waste management planning, there are a number of areas that should not be left out, but which can be appended rather than overwhelming the plan with technical detail and jargon.

## 5.2 CONCLUSION

The purpose of the **process** is to find out what is necessary to develop a **plan** that will result in action. As discussed in chapter two, the purpose of the **plan** is to overcome inertia, change behaviour and environmental impact. The objective is to achieve that aim by making what incremental improvements are already possible (pre-plan). The plan uses multiple approaches to achieve its goal, rather than being a linear time sequence.

The plan language uses action words which are time-linked. The plan is dependent on committed people or a person to drive it (act as overall air traffic controller). It needs one focus and is therefore personality dependent. It differs from many plans because of the action link.

The purpose is to avoid the fate of many plans, by linking the objectives to specific dates and linking it to the corporate planning process.

The desired outcomes are that: solid and hazardous waste are managed in such a way and at such a rate that the effects on the environment are mitigated and remedied and the detrimental effect on the environment is minimal. This outcome desired is to be achieved at a cost which is socially and economically sustainable. The scope of the regional plan will be restricted/ defined by the legislative roles and mechanisms available to regional councils.

## CHAPTER 6

### CONCLUSIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The goal of this thesis was "to develop a planning process that culminates in the development of a plan for the management of Solid and Hazardous Waste in a New Zealand region". It has done this by considering a problem in the context of several planning theories. Theories that appear most relevant have then been chosen, the institutional and legislative framework have been added and finally, a planning process to develop a plan capable of overcoming the inertia associated with current hazardous waste management has been derived.

The purpose of the thesis has been to identify the elements of planning theory which can be used in a practical application at regional level to enable a New Zealand regional council to fulfil its responsibilities under the RM Act 1991 in developing a plan. It is considered that this pragmatic use of theory is necessary to bridge a gap which exists in New Zealand regional planning between theory and practice. The test of the proposed planning process will be in application. However, the effectiveness of any resultant plan will be as dependent on the drive of the person and organisation running it, as it will be on the elegance or otherwise of the construction of the plan. This 'political' impact is a clearly understood facet of using integrated planning theory. One impact of using integrated planning theory is that it does make repeatability of the plan less certain.

For applied planning to be useful, it needs to fulfil a specific purpose by directing and enabling a specific effect. To meet RM Act 1991 requirements it must have a clearly identified purpose and fill a recognised need. A plan of this nature involves a significant cost to prepare. Its need and effect must be able to be justified, not only in that it must be dealing with an issue of importance, but also from a financial perspective, as this will be scrutinised through the annual planning process of the Local Government Act amendments. The process developed for this thesis will assist the regional council with its implementation of the RM Act 1991 for developing plans, particularly if there are any challenges to the Planning Tribunal regarding the need for a plan. The

issues to be addressed, the outcomes sought, the objectives, the methods to be used, the reasons for adopting these, the methods of review, which are all requirements of Section 67 of the RM Act, will all be covered if the plan process developed by this thesis is followed.

This thesis has created a better process for solid and hazardous waste management in New Zealand by deliberately choosing particular planning theories which fitted the type of plan and process required. The desired outcome of the plan was clear and unequivocal, the focus of the process and the plan therefore had to be on the means to achieve that end. The type of problem could be described as compound, in that it was made up of a number of related parts. The planning theories which best deal with means-focused plans for compound problems were therefore chosen. They were considered to be strategic and integrated.

Another feature of the problem was the need to include people throughout the process and the plan, because it has been peoples' collective action that has caused the problem and it will only be with collective application to solving the problem that it can be dealt with. This last point again favoured the use of strategic planning theory, provided it has been adapted from its private sector source for conditions where commitment by a large number of people is required (private sector strategic planning does not always have to have majority support to succeed), and integrated planning - which takes cognisance of the political elements of the plan.

The value of this explicit process is that it makes a readable, understandable 'map' for others to follow, or adapt, in a way that implicit planning does not allow.

The process is easy to understand because overall it has been made explicit and the choice of the various elements that make it up has also been explained. This means that even if the problem is considered to be composed of different elements in a different region, the problem can be analysed and the elements of the problem that still apply can be used to tailor-make a plan. It is therefore adaptable either directly, or in a more modular sense to the problems found in other regions. This explicit nature is how this planning process differs from

plans developed in other regions to date. Existing regional discussion documents on solid and hazardous waste management do not make their choice of theory explicit or clear. This makes their plans less portable from region to region because it is not readily apparent why certain theories and techniques have been used in certain parts of the document.

The process developed in this thesis is easy to apply in other regions, because the information collected in other regions can be plugged into a process designed to comply with the RM Act 1991 and to overcome the major problem for implementation, which is political.

One of the discoveries made while researching for this thesis was that planning theories are seldom acknowledged by definition, by many planners in practice. Although many techniques are used instinctively, their effectiveness could be increased by developing them in the full understanding of the theory that surrounds them i.e. moving from a position of unconscious application to one of conscious and deliberate choice. We will continue to see the use of technical rationality and incremental planning unless the worth of using alternative methods can be shown and understood.

Definition and discourse on some of the planning theories discussed in chapter three of this thesis will continue to be advanced by theorists. Cognisance needs to be taken of the political and organisation impediments at all levels of government before such theories could be adapted for implementation.

Directions for future research need to include more studies of the planning theories and techniques used to construct actual plans, and the effectiveness of those plans. Emphasis should be placed on using methods that have a chance of working rather than methods that merely meet academic criteria for soundness. To this end the study of plan failure as well as the study of plan success is important to determine which elements were successful or which ones could be attributed to plan failure. Plan review is an extremely important step which has not been carried out often enough at regional level. This lack of review has arisen largely because of local government reform - plans designed for one type of institutional context cannot be applied to the post 1989 local government structure, therefore their effectiveness cannot be



assessed, and their replacements have not had long enough to prove their effectiveness or otherwise.

Statutory mechanisms for plan review are a recent part of local government history. Plans have been developed in the new local government context which focuses on plan effectiveness and review for such a short period of time that no review dates have yet been reached. This plan development process suggests using an on-going review process which is part of the monitoring programme. It is the section of monitoring which deals with policy monitoring rather than state of the environment or compliance monitoring. It focuses on ensuring that the purposes of the policy are being met. It relies on the plan being specifically designed to allow for this type of on-going review.

The application of process developed in this thesis will provide further opportunity for study on the link between theory and practice, and the applicability of theory to practice in a New Zealand region.

**Annexes**

Appendix 5 from MFE 1988B

# Uses of Hazardous Substances

## Annex A

The products listed below indicate the breadth of the useful applications of hazardous substances in New Zealand.

### 1. Petrochemicals

Products include:

- Motor spirit for petrol engines of all kinds.
- Diesel fuel for the road transport industry, local and international shipping, fishing, and naval and fisheries protection vessels.
- Aircraft fuel for use in domestic and international travel, carriage of freight, the tourist industry, the airforce, fisheries protection and search and rescue operations.
- Fuel oils for marine bunkering of local and international ships, industrial and domestic heating, steam generation and electricity generation.
- Natural gas-based products including the manufacture of synthetic gasoline, methanol for the manufacture of urea, transport fuels, electricity generation, industrial and domestic heating, steam generation and recreational use.
- Solvents for uses such as paint and varnish manufacture and for the formulation of a wide range of chemical products.

### 2. Pesticides

These include:

- Control of pests and diseases of horticultural and arable crops, pasture and forestry. This is important not only to crop yield but also to the quality necessary to meet overseas standards.
- Control of public health disease vectors such as insects and rodents in hotels, restaurants, wharves, food stores, etc.
- Disinfestation of export products to comply with overseas quarantine regulations.
- Control of vertebrate pests which reduce pastoral and forestry production and threaten land stability. The best known such pests in New Zealand are rabbits and possums.
- Preservation of timber against attack by insects and moulds.
- Control of nuisance insects such as flies.

### 3. Explosives

Uses include:

- Coal and metalliferous mining - underground and open cast.
- Tunnelling - water reticulation, sewerage, dams, road and rail.
- Quarrying - road metal, building aggregates, etc.
- Roading - road cuttings, widening and straightening.
- Trenching - pipelines and cables.

- Building foundations and site levelling.
- Metal forming and metal cutting - oil well-head recovery etc.
- Demolition - buildings, bridges, etc.
- Seismic prospecting - oil and gas.
- Underwater - trenching, harbour deepening and rock removal.
- Agricultural - stump removal, ditching and dams, tree planting.
- Military.
- Recreational - track clearing, avalanche control, shotgun powders.
- Entertainment - special effects etc.

With appropriate precautions, modern explosives are safe and simple to use. Blasting techniques are well controlled with minimal effect on the environment.

Use of explosives minimises the need for heavy earth moving equipment and reduces the time involved. They can perform tasks that would otherwise be too hazardous or impossible to perform.

### 4. Radioactive Substances

Uses include:

- Sterilisation of hospital disposables.
- Sterilisation of vaccines and therapeutic intra-venous fluids.
- Medical diagnosis.
- Radiotherapy.
- Fundamental and applied biological research.
- Alteration of strength of plastics, eg shrink film.
- Geological dating.
- Analytical tool in industry and science.
- Elemental analysis to measure wear and corrosion.
- Food disinfestation
- Food irradiation

### 5. Other Industrial Compounds

These include:

- Cyanide - case hardening of steel, gold mining.
- Ethylene glycol - antifreeze.
- Fluoride - dental health.
- Formaldehyde - wood glues for particle board and plywood.
- Hypochlorites - water treatment and bleach.
- Nitric acid - cleaning stainless steel (dairy industry).
- Oxalic acid - leather tanning and bleaching of textiles.
- Sodium hydroxide - soap manufacture, paper pulp production,

aluminium manufacture, detergents, electroplating and refining of vegetable oils.

- Sodium nitrate - curing of meat and rubber manufacture.
- Trichloroethylene - metal degreaser and solvent for waxes and oils.
- Ammonia - refrigerant and household cleaner.
- Hydrogen peroxide - pulp and paper bleaching and swimming pool treatment.
- Methacrylic acid - perspex sheet and paint resin.
- Chlorine gas - treatment of potable water and swimming pools.
- Arsenic - timber treatment.
- Mercury - dentistry and mining.
- Lead - paint, storage batteries and enhancement of petrol octane rating.
- Phenols - timber treatment and resin manufacture.

## 6. Paints

These include:

- Organic solvents - used for viscosity adjustment and control in paint.

- Lead compounds - not now widely used, the main uses now being industrial coatings and primers for galvanised iron.
- Peroxides (and other free radical producing materials) - used in production of acrylic resins and as a catalyst for the curing of unsaturated polyester resins.
- Acids and alkalis mainly used in pre-treatment formulations.
- Isocyanates - used as a cross-linking agent in urethane paints. These paints are used for automobiles, buildings and industrial equipment where durability and resistance to damage are required.
- Nitrocellulose - once widely used in automotive coatings but currently used mainly in furniture coatings.
- Compressed gases - nitrogen, oxygen, hydrogen, etc are used on paint manufacturing sites for production of inert atmospheres (nitrogen) during resin manufacture and in laboratories for gas chromatography analysis.

## 7. Pharmaceutical Products

Used very widely in preventive and therapeutic medicine for treatment of humans and domestic animals.

# Present Legislation for Pollution and Hazardous Substance Activities

## Annex B

### 1. Principal Legislation Pertaining to PHS Activities

A large number of Acts and Regulations provide the legislative framework for the management of hazardous substances through various stages of their life cycle, or control activities which produce pollution, or both. A list of those Acts identified as having a role in the management and control of PHS activities is given below. Details of the significant features of these legislative instruments and comparison of their structure and effect is given in sections 3 and 4.

A more detailed analysis of the main Acts is provided in Appendix 17.

### 2. Classification of Acts

The Acts which have been listed have been divided into five groups according to the nature of their effect on PHS management.

#### 2.1 Hazardous Substances Acts

- Animal Remedies Act 1967
- Dangerous Goods Act 1974
- Explosives Act 1957
- Pesticides Act 1979
- Radiation Protection Act 1965
- Toxic Substances Act 1979

#### 2.2 Principal Pollution Control Acts

- Clean Air Act 1972
- Marine Pollution Act 1974
- Noise Control Act 1982
- Water and Soil Conservation Act 1967

#### 2.3 Acts Controlling Specific Activities with Significant PHS Content

- Construction Act 1959
- Factories and Commercial Premises Act 1981
- Gas Act 1982
- Mining Act 1971
- Petroleum Act 1937

#### 2.4 Acts Pertaining to the Management of PHS Activities

- Area Health Boards Act 1983
- Conservation Act 1987

- Environment Act 1986
- Fire Service Act 1975
- Health Act 1956
- Local Government Act 1974
- Town & Country Planning Act 1977
- Transport Act 1962
- Treaty of Waitangi Act 1975

#### 2.5 Acts with Minor Application to PHS Activities

- Accident Compensation Act 1982
- Agricultural Workers Act 1977
- Boilers, Lifts and Cranes Act 1950
- Bush Workers Act 1945
- Carriage by Air Act 1967
- Carriage of Goods Act 1979
- Civil Aviation Act 1964
- Civil Defence Act 1983
- Coal Mines Act 1979
- Customs Act 1966
- Fair Trading Act 1986
- Fisheries Act 1983
- Food Act 1981
- Geothermal Energy Act 1953
- Medicines Act 1981
- NZ Nuclear Free Zone, Disarmament and Arms Control Act 1987
- New Zealand Railways Corporation Act 1981
- Noxious Plants Act 1978
- Quarries and Tunnels Act 1982
- Sea Carriage of Goods Act 1940
- Shipping and Seamen Act 1952



## Annex C

### 7. Disposal of Hazardous Wastes

#### 7.1 Responsibilities for Disposal

No agency has a clear statutory responsibility to ensure that wastes are disposed of in a safe manner.

Regional Water Boards have, under the Water and Soil Conservation Act 1967, responsibilities for the control of water pollution. This includes control of liquid waste disposal and leachate disposal from landfills.

Local authorities are empowered by the Local Government Act 1974 to make bylaws for the disposal of trade waste. Where a local authority chooses to undertake refuse collection and disposal, the Local Government Act requires this to be carried out to the satisfaction of the Medical Officer of Health. Local authorities under the Clean Air Act control the disposal of wastes into the atmosphere for smaller combustion processes while the Department of Health may do so for larger processes.

The Department of Health has general responsibilities under the Health Act 1956 to protect public health and therefore has a general responsibility to ensure that hazardous wastes are safely disposed of. The Department's National Radiation Laboratory controls the disposal of waste radioactive materials.

Marine disposal and incineration at sea are controlled by the Ministry of Transport through the Marine Pollution Act 1974. Disposal of radioactive materials at sea is prohibited by the New Zealand Nuclear Free Zone, Disarmament and Arms Control Act 1987, administered by the Ministry of Foreign Affairs.

#### 7.2 Strategy on Hazardous Waste Disposal

A management strategy on hazardous waste disposal has been endorsed by the Hazardous Waste Task Group of the ICC. The essential elements of the management strategy are:

- a survey of wastes, including hazardous wastes in each region;
- an investigation of existing and potential landfill sites to determine their suitability for hazardous waste treatment and disposal;
- the preparation of a management plan to state what wastes will go where, and under what conditions;
- the implementation of the plan by the agencies identified in the plan, in accordance with defined operational procedures.

This strategy is already being implemented through Department of Health grant and subsidy schemes.

Recently Cabinet has decided that a policy on hazardous waste management should be developed and the above features are very likely to be included. This policy is to be based on the following principles agreed to by Cabinet:

- i Production of hazardous wastes should be reduced, avoided or eliminated by use, within practicable limits, of waste reduction techniques.
- ii The use of practicable resource recovery and re-use techniques should be maximised.
- iii The responsibility for making satisfactory provision for hazardous wastes rests with the generator, in keeping with the polluter pays principle, provided that efficiency, equity and practicability are not compromised.
- iv Due consideration should be taken of the need for public participation and of Maori values.

**Annex D****Section 35 of the Resource Management Act 1991****Duty to gather information, monitor, and keep records**

- (1) Every local authority shall gather such information, and undertake or commission such research, as is necessary to carry out effectively its functions under this Act.
- (2) Every local authority shall monitor--
- (a) The state of the whole or any part of the environment of its region or district to the extent that is appropriate to enable the local authority to effectively carry out its functions under this Act; and
  - (b) The suitability and effectiveness of any policy statement or plan for its region or district; and
  - (c) The exercise of any functions, powers, or duties delegated or transferred by it; and
  - (d) The exercise of the resource consents that have effect in its region or district, as the case may be,-
- and take appropriate action (having regard to the methods available to it under this Act) where this is shown to be necessary.
- (3) Every local authority shall keep reasonably available at its principal office, information which is relevant to the administration of policy statements and plans, the monitoring of resource consents, and current issues relating to the environment of the area, to enable the public-
- (a) To be better informed of their duties and of the functions, powers, and duties of the local authority; and
  - (b) To participate effectively under this Act.
- (4) Every local authority shall keep reasonably available at each of the offices in its region or district such of the information referred to in subsection (3) as relates to that part of the region or district.
- (5) The information to be kept by a local authority under subsection (3) shall include-
- (a) Copies of its operative and any proposed policy statements and plans including all requirements for designations and heritage orders, and all operative and proposed changes to those policy statements and plans; and

- (b) All its decisions relating to submissions on any proposed policy statements and plans which have not yet become operative; and
- (c) In the case of a territorial authority, copies of every operative and proposed regional policy statement and regional plan for the region of which its district forms part; and
- (d) In the case of a regional council, copies of every operative and proposed district plan for every territorial authority in its region; and
- (e) In the case of a regional council, a copy of every Order in Council served on it under section 154 (a); and
- (f) Copies of any national policy statement or New Zealand coastal policy statement; and
- (g) Records of each resource consent granted by it, including any transfer of a resource consent; and
- (h) Records of all extensions of time periods and waivers granted by it under section 37 in relation to applications under section 10 (which relates to existing uses), section 125 (which relates to lapsing of consents), and section 184 (which relates to lapsing of designations) during the preceding 5 years; and
- (i) A summary of all written complaints received by it during the preceding 5 years concerning alleged breaches of the Act or a plan, and information on how it dealt with each such complaint; and
- (j) Records of natural hazards to the extent that the local authority considers appropriate for the effective discharge of its functions; and
- (k) Any other information gathered under subsections (1) and (2).

### **Environmental Impact Assessment (EIA)**

For EIA to be an effective element of the plan, it needs to be carefully structured so that it is integrated into the plan. This needs to be done with a clear focus so that the EIA is a useful assistant in decision making rather than an unwieldy, expensive catalogue.

Environmental impact assessments are usually used in a decision making process where the outcome will be to develop or not to develop - an all or nothing outcome. In developing a hazardous waste management plan for Manawatu-Wanganui, the use of environmental impact assessment will be to determine the level of acceptable risk on a continuum. To have no

development is not an option. Its use will be firstly to determine risk on a non-spatially linked sense, and to ensure that when Districts do develop new residue disposal sites, an EIA for the risk associated with any site is carried out. The use of risk analysis methodology is considered to be a useful way of focusing the EIA on a purpose.

Problems of interpretation and prediction of environmental response can be reduced by integrating prediction and monitoring in a management context.(Dutton)

For the plan, the risk assessment will include three key elements

- hazard identification - what constitutes a threat?
  - risk estimation - what is the measure?
  - social evaluation - what is the meaning?
- (Gilmour 1981 pg 27).

These elements have fairly clear data collection and analysis needs and the process (from Hutzler and Boyle 1980 in Gilmour 1981)

1. Hazard identification (show cause and effect)
  - a. define acute effects
  - b. define chronic effects
  - c. define positive effects
  - d. identify confounding factors and
  - e. identify susceptible populations
2. Risk estimation (determine probability of adverse effects).
  - a. define dose/response for hazardous substance and population
  - b. identify sources and amount of hazardous substance
  - c. define conditions of exposure and
  - d. calculate risk
3. Social evaluation (judge acceptability of risk)
  - a. identify and define benefits and
  - b. criteria for acceptability
    - i. severity and reversibility of consequences
    - ii. existence of alternatives
    - iii. necessity of risk
    - iv. equity of risk

v. uncertainty of risk

A requirement of the Resource Management Act is that alternatives, benefits and costs must be weighed before one course of action is followed (Section 32). This could lead to a lack of precision in identifying the crucial hazards of a development proposal - because they are obscured by a large amount of irrelevant detail. Using a risk analysis format may mean that the significant environmental issues of the plan can be focused on in a practical context, and informed debate about the real issues in regional hazardous waste management can occur.

Once the risk analysis has been done, and acceptable levels of risk have been decided upon, there are operational considerations. Public focus is on management controls, waste reduction, environmental monitoring, public involvement and information.

Accurate risk predictions are central to essential to information programmes because it allows the debate to be confined to a smaller number of real concerns. (Balkau et al 1986).

All of these factors must be dealt with in a clear and comprehensible manner if there is any expectation of input from a wide variety of groups.

Education to change viewpoints and behaviour is in the long term a much less labour intensive exercise than regulation.



## Annex E

**DETAILED CHECKLIST OF ITEMS TO INCLUDE IN THE PLAN** (not in any particular order)**GUIDELINES/REGULATIONS/RULES**

Clear performance standards, phased exit of tips, linked to clear deadlines.

Identification of waste hazard characteristics

Quantifying waste hazard characteristics

regular waste audits

Record keeping, allowing for subsequent tracking of wastes

Safety precautions

Storage requirements

transportation of wastes

Spillage control and emergency procedures

Disposal options

Design and management of co-disposal sites

degree of hazard classification (from Centre for Advanced Engineering)

documentation and supervision

management plan

costs

storage

transport

Classification of waste as according to Centre for Advanced Engineering

other considerations:

1.toxicological data including limits of confidence LD 50 etc

2.safety evaluation (ignite, corrode, react)

3.waste loads (chemicals and quantities to be stored, treated oft disposed of on site)

4.Environmental fate (factors influencing movement or degradation of waste at site)

5.exposure (est. of the [chemical] and residence time at point of exposure by organisms; e.g. groundwater)

management plan

should clearly define procedure for handling special waste

inventory of accepted and excluded wastes and procedures for disposal available to operator on site.

leachate collection process and quality control + testing

covering and capping

origin, quantity, constituents, nature of hazard, date of disposal,

surveyed location of specific wastes



**GUIDELINES**

identification of hazardous waste (for correct disposal Canterbury Regional Council appendix 1))

minimisation techniques (audit) -in process reuse/recycle, input substitution, product redesign, process redesign.

storage

correct disposal (guidelines (use health dept ones) for DC's and individuals)

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