16 Hazardous Substances and Contaminated Sites

16.1 Hazardous Substances and Contaminated Sites: Main Points

Pressures

- There are around 450 industrial sites in the Northland Region that on a daily basis use hazardous substances as part of their manufacturing process. These industries in particular include the agriculture, horticulture and forestry sectors. In addition there are many other smaller industries that as part of their process use hazardous substances. These include boat builders, panel beaters and vehicle spray painters.
- Hazardous Substances Records (formerly Dangerous Good Records), show there are approximately 700 premises in Northland licensed to store hazardous substances.
- Between 1993 and April 2001 a total of 115 incidents involving hazardous substances excluding oil spills at sea were recorded by the Northland Regional Council. Most of these incidents involved the spillage of a hazardous substance ranging in volume from a few litres to a 100,000 litre spill of premium grade petrol, which was recorded at Port Road, Whangarei.
- Between 1993 and April 2001 a total of 598 incidents involving oil spills at sea were recorded by the Northland Regional Council.
- There are large volumes of petroleum products and flammable liquids stored and transported within the region.
- The use of pesticides in the region is widespread.

State

- There are approximately 1500 contaminated sites in the Northland region. These range from sites that have been confirmed contaminated, to those that are currently under investigation, and to those that have been remediated. The majority of potentially contaminated sites in Northland have yet to be investigated.

Response

- The issuing of resource consents where a particular site uses hazardous substances.
- The requirement for and approval of contingency plans for industries that use hazardous substances.
- A number of initiatives have been taken by the Northland Regional Council over recent years to manage contaminated sites in the region. A database of potentially contaminated sites contains a register of specific sites that have in the past used or are presently using hazardous substances on-site as part of their processes.
- The Council has operated a hazardous waste collection service for the collection, storage and disposal of waste hazardous substances since 1993.
- Providing a rapid response in the event of a hazardous substances incident.
- The Regional Council participates in various cross-organisational groups that manage hazardous substances and wastes.

16.2 Introduction to Hazardous Substances and Contaminated Sites in Northland

A hazardous substance has one or more of the following properties:

- An explosive nature
- An oxidising nature
- A corrosive nature
- Flammability
- Acute, chronic, immediate or delayed toxicity
- Environmental persistence and ecotoxicity.

There is a wide range of substances that fall into these categories. There are around 450 industrial sites in the Northland Region that on a routine basis use hazardous substances as part of their manufacturing process.

Stockpiled waste hazardous substances

These industries in particular include the agriculture, horticulture and forestry sectors. In addition there are many other smaller industries that as part of their process use hazardous substances. These include boat builders, panel beaters and vehicle spray painters.

In our homes on a regular basis we are all exposed to hazardous substances in some shape or form.

We use household cleaners, petroleum-based products and herbicides. In many cases we are unaware that the substances we are using can be hazardous.

A contaminated site is defined as a site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses, or is likely to pose an immediate or long-term hazard to human health or the environment (ANZECC, 1992).

Chemical contamination of land is not solely limited to former or current industrial sites. Agricultural land can also be chemically contaminated.

16.3 Regional Policy Statement Objectives

The objectives of the Regional Policy Statement for Northland are to:

- **Avoid, remedy or mitigate the adverse effects on people and the wider environment arising from the storage, use, transportation and disposal of hazardous substances.**

- **Avoid, remedy or mitigate the adverse effects of the risks to people and the wider environment from existing contaminated sites.**

16.4 Issues

The following is a summary of the significant issues relating to hazardous substances and contaminated sites of the region:

- Comprehensive identification of hazardous substance users and their waste disposal needs.

- Limited monitoring of industries using and storing significant quantities of hazardous substances including checking compliance with user guidelines and regulations.

- Provision of collection and disposal services and facilities to deal with household, farm and industrial hazardous wastes.

- Inadequate knowledge about the extent of sites seriously contaminated by hazardous substances in past operations, and associated issues.

16.5 Pressures Affecting Hazardous Substances and Contaminated Sites

16.5.1 Hazardous Substance Users

In 1991 the Northland Regional Council undertook a comprehensive survey of hazardous substances users (Northland Regional Council, 1991). It was estimated that there were some 450 types of industries in the region that use hazardous substances as part of their processes. The industry types range from petrochemical plants and food processing industries through to small manufacturing businesses and solo contractors.

Hazardous Substances Records (formerly Dangerous Good Records), show there are approximately 700 premises in Northland licensed to store hazardous substances.

16.5.2 Hazardous Substance Incidents

Between 1993 and April 2001 a total of 115 incidents involving hazardous substances excluding oil spills at sea were recorded by the Northland Regional Council. Most of these incidents involved the spillage of a hazardous substance ranging in volume from a few litres to a 100,000 litre spill of premium grade petrol, which was recorded at Port Road, Whangarei.

Between 1993 and April 2001 a total of 598 incidents involving oil spills in harbours or at sea were recorded by the Northland Regional Council.

16.6 State of Hazardous Wastes and Contaminated Sites

16.6.1 Waste Hazardous Substances Generated

A 1991 survey undertaken by the Northland Regional Council identified the types and estimated the quantities of hazardous wastes generated in the region (Northland Regional Council, 1991). The survey estimated that between 200 and 300 tonnes of intractable wastes were produced each year from industries such as timber treatment plants.

The survey showed that the majority of hazardous wastes produced in the region come from a relatively small number of industries. Most of these industries are located in the Whangarei District and produce many different types of wastes. These include timber treatment wastes, agricultural chemical wastes, clinical wastes, solvent wastes, used oil, paints, resins and glues.

16.6.2 Contaminated Sites

A 1992 Ministry for the Environment study concluded that about 400 potentially contaminated sites exist within the Northland Region. These range from landfill sites to closed gasworks sites and oil terminals.

Contaminated site cleanup

However, a 1994 survey undertaken for the Northland Regional Council estimated a much higher figure of 1152 potentially contaminated sites in the region (Tonkin and Taylor, 1994). Investigations since that time have increased the number to approximately 1500 sites.

A contaminated site is defined as a site at which hazardous substances occur at concentrations above background levels and where assessment indicates it poses, or is likely to pose an immediate or long-term hazard to human health or the environment.

Table 28 summarises the currently known number of potentially contaminated sites in the region and their classification.

Table 28: Contaminated site classifications in Northland

Classification	Description	Number of sites
Confirmed contaminated	An investigation of the site has been undertaken, the results of the investigation confirm that the site is contaminated	90
Under investigation	Indicates that an investigation is underway to determine whether the site is contaminated above background levels	10
Remediated	This category includes service stations and oil storage sites that have been remediated to meet oil industry guidelines	33
Not investigated	The only information available about this category of site is that it is likely that a significant volume of hazardous substances have been used, stored or disposed of at the site. These are largely lower priority sites, due to their small size and types of chemicals used.	1367
Total		**1500**

Table 29: Summary of potentially contaminated sites in Northland by industry type (as of 1994, approximately 400 further sites have been identified since that time).

	Industry Type	Number of Sites
1	Airports and Air Fields	3
2	Animal and Food Processing Works	23
3	Asbestos Works	11
4	Bitumen Plants and Depots	14
5	Concrete Production	4
6	Chemical Plants	6
7	Dry Cleaners	23
8	Garages, Service Stations etc.	418
9	Gasworks	2
10	Incinerators	3
11	Landfill Sites	36
12	Metal Processing	8
13	Mining and Quarrying	20
14	Miscellaneous	18
15	Oil Refining and Bulk Storage	7
16	Paint Related Industries	145
17	Pesticide, Insecticide and Related Industries	13
18	Port and Dockland Sites	2
19	Power Stations and Related Actvities	3
20	Printing	58
21	Railway Stations, Yards and Depots	76
22	Scrap Yards	62
23	Sewage Treatment and Related Industries	102
24	Ship Building	40
25	Stock Sale Yards	15
26	Timber Treatment	31
	Total number of potentially contaminated sites	**1152**

16.7 Response to Hazardous Substances and Contaminated Sites

16.7.1 Northland Regional Council

In Northland a range of organisations are responsible for the management of hazardous substances and contaminated sites. Some industries in Northland that store and use hazardous substances are monitored on a regular basis by Northland Regional Council staff. In addition many of these premises are licensed for the storage of hazardous substances and are checked for compliance with regulations by District Council Hazardous Substance Officers.

Since 1993 Northland Regional Council has operated a **hazardous waste collection** service for the collection, storage and disposal of waste hazardous substances (**Case Study: Agrichemical Collection)**.

The Northland Regional Council has also participated in campaigns to manage hazardous substances, as described in **Case Study: Management of Polychlorinated Biphenyls (PCBs)**.

A number of initiatives have been taken by the Northland Regional Council over recent years to manage contaminated sites in the region. A database of potentially contaminated sites contains a register of specific sites that have in the past used or are presently using hazardous substances on-site as part of their processes.

The main objectives of the database are:

- To assist Northland Regional Council in prioritising sites that may require investigation and possible remediation.
- To assist the District Councils in their preparation of District and landuse plans.
- To ensure that any potential purchaser of a potentially contaminated site is made fully aware of any information that the Council may have on a particular site.

While the database is considered to be extensive, it is not complete and is regularly updated as information becomes available. Consequently the database may not list all potentially contaminated sites in the region.

Case Study: Investigation into organochlorine contamination on former Crown-owned land illustrates the investigation of some contaminated sites in Northland.

16.7.2 Other Responses

The Regional Council participates in cross-organisational groups that manage hazardous substances and wastes.

The New Zealand Fire Service has the responsibility of responding to spills of hazardous substances on land. They are however guided in their response by a **Hazardous Substances Technical Liaison Committee**. The members of this committee have expertise in emergency response, hazardous substances, public health and environmental management. The committee includes staff members from the Northland Regional Council.

In mid-1991, following an industry survey, the Northland Regional Council outlined its intention to convene a **Hazardous Wastes Technical Advisory Group** to assist the Council in its objective to promote the safe use, storage and disposal of hazardous wastes produced in Northland.

The first meeting of the technical group, which was held later that year, adopted a number of recommendations that set the framework for the management of hazardous wastes over the next 10 years. One of these recommendations was that the Northland Regional Council become the lead agency in Northland for co-ordinating the collection and disposal of hazardous wastes from the region.

16.7.3 Current Legislation

The Hazardous Substances and New Organisms Act 1996 (HSNO)

The main focus of this Act is the management of the life cycle (such as the identification, packaging, storage, emergency preparedness, tracking, use and disposal) of imported and manufactured hazardous substances. The aim is to protect the environment and the health and safety of people and communities by preventing or managing the adverse effects of hazardous substances. *The commencement date for the hazardous substance part of the Hazardous Substances and New Organisms Act has now been set for 2 July 2001, and the transfer of dangerous goods to the new regime will not occur until April 2003. The transfer of explosives will occur in June 2002.*

The Land Transport Act 1998

This Act covers the transport of hazardous substances on land and came into force in May 1999.

The Resource Management Act 1991

Under this Act Regional Councils are responsible for controlling the discharge of contaminants to the environment (Section 15). District Councils have responsibility for land use matters associated with hazardous substances under Section 31 of the Act.

16.8 Case Study: Management of Polychlorinated Biphenyls (PCBs)

Background

Polychlorinated Biphenyls were widely used for many years in New Zealand. They were used as heat-resistant fluids in electric transformers, hydraulic fluids and as components in brake linings. They are also very powerful solvents and were used as such in the manufacture of adhesives, sealants, varnishes and printing inks. They were also used in the production of marine anti-fouling paints.

Phasing out of PCBs

The properties of PCBs that made them so successful also contributed to their downfall. In the 1960s compelling evidence came to light from overseas showing that PCBs were widely distributed, persistent and accumulating in the environment. Evidence showed that they are absorbed by fatty tissues of animals and tended to concentrate throughout the food chain.

Government Intervention

In 1988 the Government of the day passed legislation restricting the use of PCBs in electrical equipment. In January 1994 legislation was passed prohibiting the use of PCB-containing equipment. Further legislation was passed later that year making it illegal to store PCB after June 1995.

Northland Situation

A meeting was held in Northland in early 1994 by all of the parties concerned to discuss a strategy for the removal of stocks of PCB from the region. On 1 May 1994 the Northland Regional Council opened a temporary storage depot for receiving PCB. During the period of time that the store was operational (1 year) approximately 8 tonnes of PCB were collected. The stocks of PCB were eventually exported to France where they were destroyed by high temperature incineration.

In 1995 it became illegal to store, use or possess PCB-containing equipment. However there are still a number of premises in the Northland Region that have PCB-containing equipment in light fittings and in electric motors. Council staff field enquiries on a regular basis regarding disposal options that may be available for the disposal of PCB-containing equipment.

From a Government perspective the campaign set out to ensure that New Zealand is relatively PCB-free, which is commendable. However, no organisation was given the responsibility to co-ordinate the collection of PCBs or inspect workplaces to ensure that in fact all buildings are PCB-free.

16.9 Case Study: Agrichemical Collection

Background

In the past a wide range of hazardous substances have been used for the control of pests and diseases. There is now however a general awareness among producers in the agricultural and horticultural sectors that the improper or incorrect management of the chemicals on which our modern society depends may pose unacceptable risks to the human population and the environment.

Ongoing Service to Northland Residents

Recognising the risks that many of these substances may have on the environment the Northland Regional Council has since 1993 continued to provide an ongoing service for the collection, storage and disposal of waste hazardous substances. In conjunction with Wrightson, four agricultural chemical depots are located at Kaitaia, Waipapa, Dargaville and Whangarei. An additional purpose-built store is also located in Whangarei. This store is used for the temporary storage of the higher risk chemicals prior to despatching them to Auckland.

Hazardous wastes store

Quantities Collected

Between June 1993 and 31 March 2001 more than 21 tonnes of waste hazardous substances have been collected from throughout the Northland Region. The quantities collected since the collection service commenced have gradually increased.

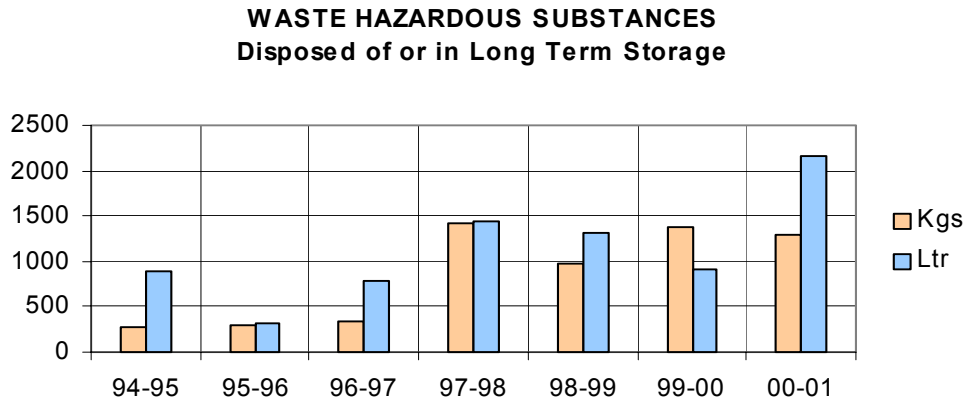


Figure 47: Quantities of waste hazardous substances collected

Of the 21 tonnes collected approximately 4 tonnes were redistributed for reuse, 4 tonnes returned to the manufacturer or reconstituted (solvents), and 5 tonnes disposed of. The remaining 8 tonnes of intractable chemicals are currently in long-term storage as there are presently no disposal options available within New Zealand.

16.10 Case Study: Investigation into Organochlorine contamination on former Crown-owned land

During 1961, a shipment of beef carcasses, which had been exported to the USA from New Zealand, was found to contain residues of the insecticides DDT, Dieldrin and Lindane. The New Zealand government of the day immediately banned their use as livestock remedies.

Later in the same year the government implemented a national recall of organochlorine-based insecticides. The holders of the stocks of the now banned insecticides were paid compensation by the government.

The collected chemicals were initially stored throughout New Zealand including at a number of sites in Northland. This action eventually created a problem for the government as the packages and drums began to deteriorate and leak.

A number of options for the disposal of the insecticides were investigated including disposal at sea, incineration, burial in mine shafts, export to Pacific islands for insect control and finally aerial application on to Crown-owned land.

The chosen option was the **aerial application** of the banned products on to **Crown-owned land.** During 1963 and early 1964 a considerable quantity of the insecticides were disposed of by aerial application on to Lands and Survey farm settlement blocks. The spraying is known to have occurred on to land in Northland, Waikato, Bay of Plenty, Hawkes Bay and Southland.

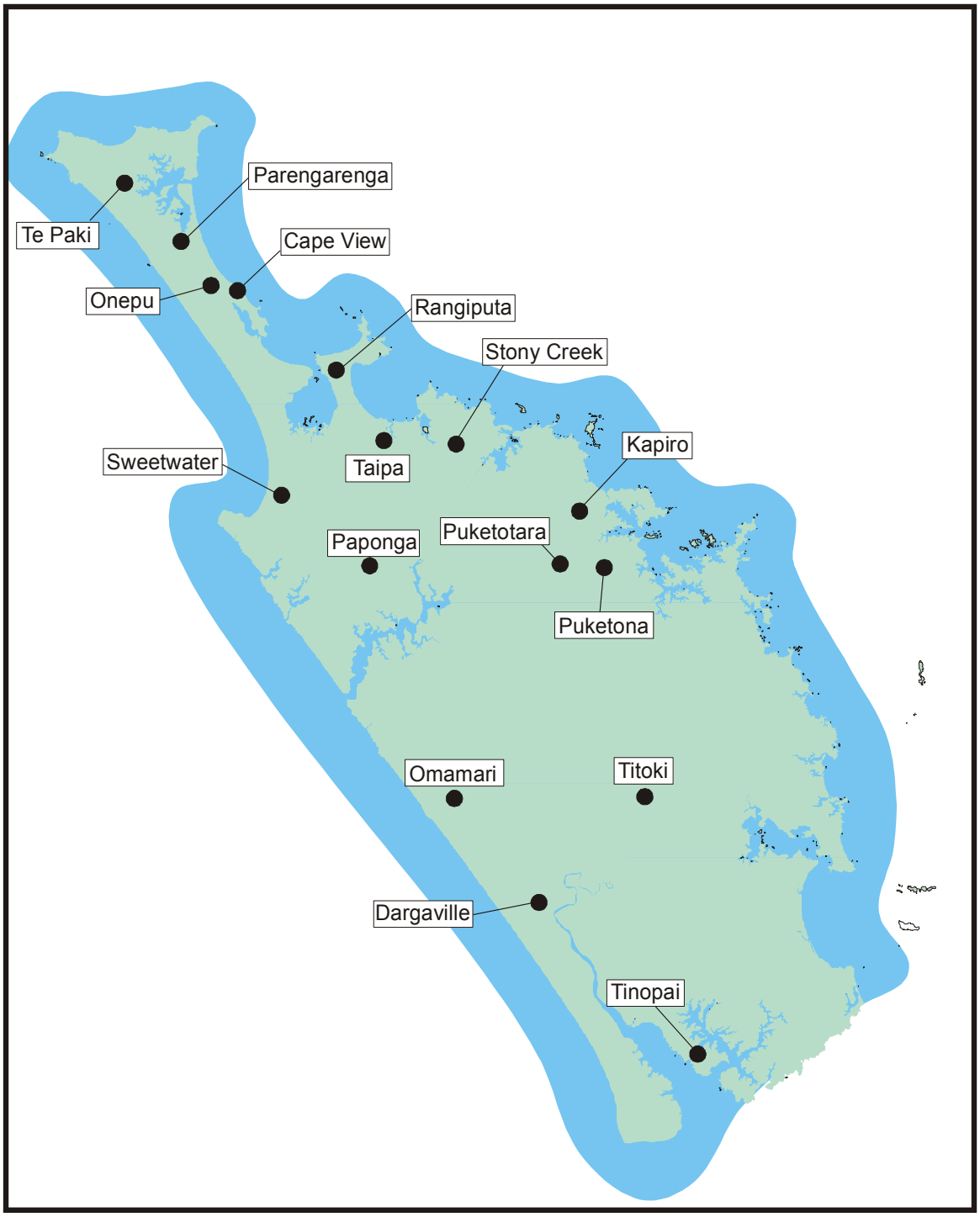
A further government directive was issued in late 1964 **halting the application of the insecticides to land**. However, the condition of the remaining stocks were reported at the time to be in a deteriorating state. In 1967 a quantity of the banned insecticides were exported to the USA for destruction. This appeared to be the end of the problem.

During the early 1990s concern was expressed by the government opposition in parliament regarding the disposal of banned insecticides in the Northland, Waikato, Bay of Plenty and Southland Regions. A Christchurch-based consultancy company was commissioned by the Ministry for the Environment to investigate allegations that banned insecticides had been buried on land settlement blocks in these regions.

In early 1995 Northland Regional Council staff commenced an investigation into the disposal of insecticides in Northland. The findings of the investigation showed that central depots were used for the temporary storage of the insecticides prior to their disposal. These depots were located at Whangarei, Okaihau, Dargaville, Kaitaia and Kaikohe.

The investigation also confirmed that over 9000 hectares of land settlement blocks had been sprayed with insecticides. One application at Parengarenga covered over 2000 hectares, and was the single largest area sprayed in Northland.

Soil samples were collected from 12 land settlement blocks in the region and analysed for a wide range of insecticides. In addition soil samples were collected from each of the former storage sites at Whangarei, Okaihau, Dargaville, Kaitaia and Kaikohe.



FORMER CROWN OWNED LAND
Sampled for Organochlorine Residues

Map 24: Former Crown-owned land sampled for organochlorine residues

The **results of analysis** of the sampling undertaken identified only one of the land settlement blocks (Onepu) and one of the ex storage depot sites (Robert St, Whangarei) as having insecticide residue levels that warranted further investigation.

The results of the investigation were passed onto the Department of Survey and Land Information who were the Crowns agency for dealing with contamination issues on Crown owned lands. Both sites were assessed further and remediated as required.