

Foreword

The introduction of the Resource Management Act 1991 has brought about a major change to the way we manage our natural and physical resources such as air, water and land. We rely on such resources for our survival, health and wellbeing, and value them for their economic, social, cultural, aesthetic and amenity significance. It is important, therefore, that any decisions on the sustainable management of these resources should consider the effects on the environment and people of activities involving their use.

The Act acknowledges that people and communities are part of the environment. Therefore, when resource management decisions must be made, consideration of the potential effects of activities on the environment should also include, amongst other things, the likelihood of effects on people's health, safety and general wellbeing. This guide has been developed for that purpose. It provides a framework and process which guides:

- < resource consent applicants on the type of health impact information they may need to include in their 'assessment of effects on the environment' report on their proposed activity
- < public health service providers and the public who prepare submissions on consent applications or on proposed resource management policies and plans
- < resource management consent authorities who have responsibilities under the Resource Management Act for making decisions in relation to the sustainable management of resources.

In the course of developing this guide the Public Health Commission (PHC) sought comments on proposals in a discussion paper prepared in May 1994. Out of a total of 479 copies of the discussion paper sent out for comment, 48 submissions were received (see *Appendix 5*). These included comments from government departments, local authorities, Crown health enterprises (CHEs) and public health organisations making up 75 percent of submissions, and industry, consultants and individuals comprising the remainder. A second draft was circulated in February 1995 to a smaller group from amongst the original 48 submissions. Where appropriate, the views expressed in submissions have been incorporated into this guide. I would like to thank those organisations and individuals who have contributed to the development of this guide. In particular I wish to acknowledge the work of Bruce Taylor, the PHC's Senior Environmental Health Scientist (Policy), for managing the development of this guide so successfully.

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Contents

Foreword	1
Executive Summary	3
Aims and objectives of the <i>Guide to Health Impact Assessment</i>	3
Principles and key elements of health impact assessment	3
Intersectoral collaboration	4
Guide to Risk Assessment	5
Introduction	6
Purpose and Scope of the Guide	7
Guiding Principles for Health Impact Assessment	8
Application of Health Impact Assessment	10
Health impact assessment and resource consents	10
Health impact assessment and resource management policies, plans and objectives	13
Key Elements of the Health Impact Assessment Process	14
Preliminary analysis	15
Risk analysis	19
Implementation	23
Auditing	24
Conclusion	25
References	26
Glossary	27
Appendices	
1 Legislative Framework – Resource Management Act 1991	29
2 Other Relevant Legislation and Reforms	35
3 Standards, Guidelines and Codes of Practice Relevant to Environmental and Health Impact Assessment	36
4 Examples of Environmental and Health Effects which may be Dealt with Under the Resource Management Act 1991	41
5 List of Submissions Received on the <i>Health Impact Assessment Discussion Paper</i> , May 1994	43

Executive Summary

Aims and objectives of the Guide to Health Impact Assessment

Balanced assessment of effects on the environment should encompass a number of considerations. Depending on the nature, scope and significance of the project or proposal the assessment may include consideration of ecological, economic, cultural, aesthetic, health and safety, social and amenity impacts in relation to decisions on the sustainable management of natural and physical resources.

The purpose of this guide is to focus mainly on the health component of impact assessment and to provide a framework and guide for those who have responsibilities or an interest in resource management issues which have the potential to impact on the health of communities and individuals.

The aims of this guide are:

- < to facilitate and encourage the integration of health impact assessment into the "assessment of effects on the environment", as outlined in the Resource Management Act 1991
- < to assist those involved in the preparation and assessment of health impacts
- < to promote better understanding of the links between environmental quality and health and to improve decision making on resource management issues which may affect the environment and health.

It is not intended that public health goals and objectives will drive the resource management process, but that resource management decision makers take into account the potential for a community's health to be adversely affected or improved as a result of their decisions.

Principles and key elements of health impact assessment

This guide describes the application of health impact assessment to relevant individual resource consents, as well as to general resource management policies, regulations, plans and objectives of central and local government.

It sets out a number of principles and a systematic process for health impact assessment and risk analysis within the context of the Resource Management Act 1991 (RMA). It is intended to assist communities, for example, to determine whether adequate provision has been made for:

- < people's health and safety
- < avoiding, remedying or mitigating adverse effects on the environment which may also affect health
- < safeguarding the life-supporting capacity of air, water, soil and ecosystems
- < the maintenance and enhancement of the quality of the environment.

The guide has been designed to link in with the purpose and principles of the RMA. In particular, it is intended to be complementary to the assessment of effects on the environment and to be an integral part of that process outlined in the RMA. It has been developed to assist local government, consent applicants, public health agencies and the public to assess the potential for resource management objectives, policies, plans or consents to impact on the health of individuals, vulnerable groups or the community as a whole. It seeks to avoid or reduce risks to people either directly or indirectly as a result of environmental conditions or hazards.

Intersectoral collaboration

If health considerations are to be effectively integrated into the assessment of environmental effects process, it is important to encourage collaboration amongst the various agencies who have responsibilities for looking after specific aspects of the public interest. A collaborative working relationship between regional councils, territorial authorities, Crown health enterprises and other agencies enables the best use to be made of available resources and skills to achieve the best environmental and health outcomes.

The resource management functions of regional councils, and the resource management and environmental health functions of territorial authorities, places on them a duty to consult a range of interested or affected parties during the preparation of proposed policy statements or plans. In addition, the Act requires that notice of an application for a resource consent is to be served on all affected parties, and publicly notified (except for activities which the plan exempts from having to be notified). Everyone is to be given an opportunity to understand the general nature of the application, and the opportunity to make submissions. The aim is to avoid adverse effects or reduce risks to levels acceptable to the community, and to assist in determining what those levels should be.

Initially, consent applicants must take responsibility for ensuring that, when carrying out an assessment of effects on the environment of a proposal, any actual or potential impacts on the health of individuals or the community are properly addressed. This can be achieved in two ways:

- ⟨ early consultation with the consent authority and public health agencies to obtain background information on environmental quality, environmental and health standards, and, where it is available, information on the health status of the community likely to be affected by the proposal, and
- ⟨ where appropriate, submitting an assessment of effects on the environment, incorporating an assessment of any health impacts, with their proposals. This assessment provides the information necessary to enable decision makers and their advisors, as well as affected parties, to assess and estimate the risks, and to make decisions without unnecessary delays.

A collaborative rather than a confrontational relationship between health and resource management agencies will help to promote health impact assessment (HIA) within the assessment of effects on the environment (AEE) for the benefit of all parties concerned.

Local and regional authorities may wish to consider making provision for HIA in their policies and plans dealing with AEE. The public health sector should make submissions in support of such provisions at draft and proposed policy and plan stages.

Guide to Risk Assessment

The risk analysis model outlined in this guide includes a brief mention of risk assessment. This involves the use of scientific data to estimate the magnitude of the health effects predicted to arise from a proposed activity. As the effects of some decisions which impact on human health may be substantial, it is important that good estimates are available to decision makers in a readily usable form. For this reason a 'user friendly' guide to risk assessment is being developed to assist those who may be involved in HIA. The guide to risk assessment will be published as a separate but complementary document to this one, after a period of consultation.

Introduction

People's lives are influenced to a large extent by their surrounding environment. They suffer the consequences of environmental pollution, learn to adapt and cope with environmental changes, endeavour to protect themselves or reduce the risks from various natural and man-made hazards, and strive to improve the quality of the environment while at the same time contributing to its degradation. The quality of the environment is a major determinant of the health of the population. Seldom is a healthy population found in an unhealthy environment.

The range of influences and impacts on people's health include physical factors such as the quality of the air we breathe and the water we drink which are essential to maintain life and can also act as media for the transmission of diseases. Health is also influenced by social environment factors such as the availability and quality of housing, the provision of social amenities and social support for vulnerable groups, and the general quality of living and working environments. Active maintenance and promotion of health can be gained through improvements in environmental quality, reduction of health risks, and a supportive social environment.

This guide offers a framework for health impact assessment (HIA) to assist those involved in assessing effects on the environment of resource management consent applications. It may also be helpful to local authorities and others who have an interest in the effects of policy statements, regulations, plans, rules and objectives under the Resource Management Act.

It outlines a number of principles and a process for carrying out a HIA, including a risk analysis model. The first in what will be a series of HIA guidelines will deal with the risk assessment component of risk analysis.

Purpose and Scope of the Guide

The purpose of this guide is:

- < to facilitate and encourage the integration of health impact assessment (HIA) into the "assessment of effects on the environment", as outlined in the Resource Management Act 1991
- < to assist those involved in the preparation and assessment of health impacts
- < to promote better understanding of the links between environmental quality and health and to improve decision making on resource management issues which may affect public health.

To achieve this, there are three main objectives:

- 1 to establish principles and a process for identifying and assessing actual or potential effects on, or risks to, public health arising from proposed resource management policies, plans or consent applications
- 2 to identify roles and responsibilities of those involved in HIA, including post-development monitoring of effects
- 3 to identify sources of information which will assist in the assessment of health effects.

This guide does not advocate a stand-alone process which is separate from the "assessment of effects on the environment" (Fourth Schedule, Resource Management Act), nor should it add significantly to the costs of the assessment of effects on the environment (AEE). It is not the objective of this guide to manipulate resource management processes to achieve certain public health goals. However, there is the potential for resource management decisions to adversely affect public health if risks to health and safety are not properly considered. Conversely, there is also the potential to enhance environmental quality and to reduce environmental hazards leading to a general improvement in the quality of life.

Information from any HIA should be fed into the AEE procedure to assist the decision maker/consent authority. HIA may be regarded as a framework within a larger framework (AEE) which enables decision makers to consider any likely effects on the health and wellbeing of people and communities in addition to any effects on other parts of the "environment", as defined in the Act (s2).

This guide to HIA is intended to assist:

- < applicants for resource consents
- < the public who wish to comment on proposals
- < public health agencies who may wish to comment on the predicted impacts on health in any AEE reports, or in any policy statement or plan
- < consent authorities who prepare policy statements and plans, and who must make decisions on resource consent applications
- < the Planning Tribunal as the arbiter in any dispute concerning, for example, the granting of resource consents.

Appendix 1 outlines the legislative framework and parts of the Resource Management Act 1991 that are relevant to HIA.

Guiding Principles for Health Impact Assessment

A Working Group of the World Health Organization (WHO) in its report on Health and Safety Component of Environmental Impact Assessment (WHO, 1987) established four basic principles to help fulfil the potential of environmental impact assessment (EIA) for protecting human health.

- < One of the fundamental considerations in the approval of projects, policies and plans should be the health of communities affected by them.
- < Greater consideration should be given to the consequences of development policies and programmes for human health.
- < Environmental impact assessment should provide the best available factual information on the consequences for health of projects, policies and plans.
- < Information on health impact should be available to the public.

In its recommendations, the WHO working group emphasised the need to strengthen the overall framework of impact assessment rather than promoting a separate procedure for environmental health impact assessment. This could be achieved by:

- < increasing awareness about HIA within EIA
- < transferring knowledge, expertise and experience from relevant health professionals to the EIA community
- < improving practice in EIA to assess effects on health.

In addition, the working group recommended improving the screening of secondary and higher level impacts to make certain that no possible impact on health-related environmental factors is missed, and to improve the screening of potential impacts on vulnerable groups.

Health impact assessment should, therefore, be regarded as an integral part of the assessment of effects on the environment. To assist this process the following general and specific principles have been developed to complement the guidelines on the assessment of effects on the environment prepared by the Ministry for the Environment (Ministry for the Environment, 1992).

General principles

- < People and communities are part of the "environment" and rely on the quality of the environment for their survival and maintenance of good health and wellbeing.
- < Health impact assessment (HIA) should be integrated into the assessment of effects on the environment (AEE) to ensure that in the development or assessment of resource management policies, plans and consents, any actual or potential impacts or risks to public health are adequately addressed.
- < The level of risk analysis should be appropriate to the nature, scale and significance of the actual or potential effects of the proposed activity.
- < By addressing potential health impacts at the outset, local authorities, consent applicants, and communities are likely to avoid facing the relatively high costs of remedying environmental health problems that may occur later.
- < Where there is insufficient information or uncertainty about the risks to health, this should be clearly stated so that appropriate decisions can be made (eg, either to gather further information after a consent is granted, or to delay making a decision until adequate information becomes available).
- < The public have a right to know the actual or potential effects of an activity on their health and their environment, and they should be consulted on the management of risks.
- < Where there are issues contributing to the poor state of health of particular groups or communities, these should be addressed specifically.
- < Where appropriate, monitoring and evaluation of resource consents and plans should be carried out to compare actual with predicted effects.
- < Environmental and health controls, as conditions in consents, should be reviewed regularly.
- < The protection and, where necessary, the improvement of public health should be fundamental to HIA.

Application of Health Impact Assessment

Health impact assessment and resource consents

Part VI of the Resource Management Act (RMA) sets out the requirements in relation to resource consents, including making an application and what information needs to be provided (s88 and the Fourth Schedule), who needs to be notified of applications (s93-95), making submissions on applications (s96-98), and decision making by the consent authority on applications (s104-116). In particular, s105 sets out the powers of the consent authority, and s104 sets out those matters to which the authority must have regard in exercising those powers.

Conditions that can be imposed on a consent

Section 105(2) sets out the circumstances when a consent must not be granted (eg, for a prohibited activity).

Section 108 lists a number of conditions which the consent authority may include in a resource consent. For example, in relation to a discharge permit or a coastal permit for an activity which would otherwise contravene s15 (restriction on discharge of contaminants into the environment), the consent may include a condition requiring the holder to adopt the "best practicable option" (BPO) to prevent or minimise any actual or likely adverse effect on the environment of the discharge. However, if the BPO condition is to be imposed, the consent authority must be satisfied that, in the particular circumstances and having regard to the nature of the discharge and the receiving environment and other alternatives, the inclusion of the condition is the most efficient and effective means of preventing or minimising any actual or likely adverse effect on the environment.

An outline of roles, responsibilities and participation in the consent process

In relation to the duties and responsibilities of the various parties involved in preparing, processing or commenting on consent applications, and the interests and expectations of the public, the following is a general outline of effective participation in the resource consent process in relation to matters which may affect health.

Consent applicants

- ⟨ Take responsibility for preparing the case required for assessment of a proposal.
- ⟨ Clearly identify any potential health risks associated with the proposal, and the measures to mitigate those risks.
- ⟨ Consult the regional council, territorial authority and the public health unit of the Crown health enterprise (to assess if there is an actual or potential public health risk), as well as the affected communities and individuals as early as possible. Particular attention should be given to identifying any health characteristics of the area, such as the incidence of illness or injury likely to be exacerbated by discharges into the environment, or other environmental hazard.
- ⟨ Consult the consent authority on existing environmental quality and on any synergistic or cumulative effects likely to be created by additional discharges or hazards.
- ⟨ Consult the consent authority on a proposal evaluation and consultation timetable.
- ⟨ Identify opportunities to improve the physical and social environment, living and working conditions, amenities and the state of public health within the community (ie, opportunities to increase benefits and reduce costs to the community).
- ⟨ Make commitments to avoid where possible, or to minimise, ameliorate, monitor and manage environmental and health impacts, and to implement these commitments.
- ⟨ Review and, where necessary, amend environmental management practices where monitoring has indicated a need for improvement to avoid adverse health effects.

Consent authorities

- ⟨ Provide clear guidance on the type and level of assessment required for the proposal.
- ⟨ Provide guidance to all participants in the consent process on criteria for environmental and health risk acceptability of potential impacts. Reference can be made to relevant sources of information and advice including standards, guidelines, codes of practice and regulations.
- ⟨ Negotiate with key participants on the information requirements and a timetable for the assessment, and the plans for consultation.
- ⟨ Promote public participation throughout the process, using techniques and mechanisms suited to specific proposals and specific audiences.
- ⟨ Ensure that total and cumulative effects on the environment and health receive explicit consideration.
- ⟨ Report publicly on the assessment of proposals.
- ⟨ Ensure that responsibilities for monitoring and assessing environmental and health effects are clear, and that, where appropriate, the results are used to improve the management of environmental and health risks.
- ⟨ Monitor the efficiency and effectiveness of HIA in the AEE process and make improvements where necessary.

Public health agencies

- ⟨ Ensure that adequate resources and expertise are available to participate in and contribute to HIA.
- ⟨ Ensure that appropriate and timely advice is provided on relevant draft policies, plans and resource consent applications.
- ⟨ Establish and maintain information on the health status of the community and, in particular, information on local physical and social environmental factors affecting health.
- ⟨ Advise consent applicants and the consent authority of information held on health status and health risks in the region.
- ⟨ Promote the improvement and protection of public health and the co-ordination of public health advice.
- ⟨ Monitor the effectiveness of HIA in AEE, and help maintain consistency.

The public

- ⟨ Participate in the policy and plan preparation stage and in the evaluation of proposals by offering advice, expressing opinions, providing local knowledge, proposing alternatives, and commenting on how a proposal might be changed to better protect the environment and health.
- ⟨ Become involved in the early stage of the process, as this is the most efficient and effective time to raise concerns.
- ⟨ Become informed and involved in HIA, including any health studies to determine the health status of the community and the potential risks to health of a proposal.
- ⟨ Take a responsible approach to opportunities for public participation in HIA, including seeking objective information about issues of concern.

Health impact assessment and resource management policies, plans and objectives

The underlying principles of health impact assessment may be of use in the preparation of regional policy statements, regional and district plans, rules and objectives. Central government agencies may also utilise HIA in relation to proposed national policy statements and to regulations prescribing national environmental standards. In fact, in its broadest sense, HIA could be a process applied to any proposed policy which is likely to have an impact on public health.

In relation to resource management policy and plan preparation, the following are examples of issues which may benefit from a health impact assessment/risk analysis at an early stage:

- < a national policy statement on an activity which affects or has the potential to affect more than one region (in terms of risk to public health and safety)
- < national environmental standards on noise and contaminants, and water, air and soil quality
- < regional policy statements on the control of the use of land to avoid or mitigate natural hazards, or to prevent or mitigate adverse effects associated with hazardous substances
- < regional plans to address any threat from natural hazards or hazardous substances, or the use of land that may adversely affect soil conservation or air or water quality which may also result in adverse health effects
- < district plans dealing with natural hazards and hazardous substances, and the effects of noise.

Key Elements of the Health Impact Assessment Process

The extent to which a HIA should be carried out (if at all) will depend largely on what is known about the activity and on its nature, scale and significance in relation to any environmental and health effects. Preliminary screening will help to determine whether the proposal warrants a more detailed analysis of the risks and what that analysis will involve. Where there are uncertainties in relation to environmental and health risks, these should be explicitly stated. If the risk is high, then the process of assessing and managing that risk must be rigorous.

There are seven steps in the HIA process which fall under three headings: *preliminary analysis*, *risk analysis* and *implementation* (NHMRC, 1994).

Steps in the HIA process

Preliminary analysis

Screening:	Does this proposal need a HIA? Is there the potential for cumulative effects from successive proposals?
Range of issues (Scoping):	What issues must be addressed in the HIA?
Baseline information (Profiling):	What is the current health status of the affected population and the quality of the local environment?

Risk analysis

Risk assessment:	What are the risks and/or benefits? Who will be affected, how and to what extent?
Risk communication:	Has there been adequate consultation on the risks? Have public concerns been taken into account?
Risk management:	How can the risks be avoided or reduced? What are the options (including consideration of costs and benefits) for treating the risks? Are contingency/emergency plans adequate? How can differing perceptions of risk be mediated? Can future health risks be predicted?

Implementation

Decision making: Is there adequate information for decision making?
Is there a conflict to be resolved?
How will conditions be enforced and by whom?
How and by whom will effects be monitored?
How will post-project management be resourced?

Monitoring: Is the project complying with its conditions?
Are the conditions achieving the desired outcomes?

Auditing

How well is the HTA process achieving its aims?

Preliminary analysis

The preliminary analysis helps to determine whether the project or proposal warrants a detailed HTA.

Some examples of activities which may require a HTA

As a general guide these include:

- < water supply plans or projects
- < sewage disposal plans or projects
- < waste disposal plans or projects
- < activities which affect the quality of recreational or shellfish-gathering waters
- < hazardous installations or activities
- < activities which have the potential to expose the community to the effects of:
 - discharges of contaminants to air (including odour), water or land
 - hazardous substances
 - radiation (ionising and non-ionising)
 - unreasonable or excessive noise
- < activities which have the potential to increase risks of injury, illness or infection, particularly amongst groups within the community who are vulnerable to injury or ill health
- < activities with the potential to affect the microbiological or chemical safety of food supplies
- < activities which are also subject to the provisions of the Health Act 1956 (eg, offensive trades, nuisances, etc).

Screening

Screening aims to identify any actual or potential effects including whether and to what extent any impacts on health are likely to occur. This should include potential positive effects as well as negative ones. If the project is such that there are no known or suspected risks to health, or that any risk is within limits already acceptable to the community, this should be stated. If this is confirmed, it is unlikely that a HIA would be necessary. In some situations a rapid hazard appraisal, such as the one being developed for the assessment of contaminated sites (Ministry for the Environment and Ministry of Health, 1993), may be a useful means of assessing the relative risks of proposals.

A rapid assessment process for environmental and health effects screening purposes should draw on the following information:

- < a checklist of indicators of health risk, for example, air and water quality guidelines, contaminated sites criteria, toxicity of contaminants
- < a checklist of possible vulnerable groups within the community such as the very young, older people, the chronically ill
- < local demographic data to identify vulnerable populations
- < local environmental data to identify vulnerable ecosystems which may be damaged and either directly or indirectly result in adverse health effects
- < issues of public concern in which health effects are not clearly defined or understood (eg, noise, odour, electromagnetic radiation)
- < risks of injury
- < issues which have both local and global effects on the environment and health (eg, ozone depletion and climate change).

In the preliminary analysis to determine whether a HIA is necessary, it will be important to examine the details of the proposal to ascertain its potential to impact on the environment and health. In this respect it is helpful to know:

- < the nature, characteristics, quantity and effects of discharges, including waste
- < the geography and climate of the location and the effects of these on the dispersion of contaminants
- < information on ambient environmental quality (eg, air, water and soil quality)
- < the potential for adverse effects on health in relation to the existing burden of ill health in the community, including particular groups within the community (eg, Māori health, the health of children and older people, etc).

An element of judgement will always enter into decisions at the screening phase, particularly if there are gaps in the information available.

Range of issues (scoping)

The process of identifying the work required to prepare an assessment of effects is referred to as scoping. Scoping identifies the issues which need to be considered in depth. Also identified at this stage are the parties who are:

- < key "stakeholders" (ie, those with an interest in or who are affected by the proposal)
- < responsible for preparing the assessment
- < responsible for analysing/commenting on the assessment.

The Fourth Schedule to the RMA sets out the range of matters that should be included in an assessment of effects on the environment and those which should be considered when preparing an assessment. It applies to any person making an application for a resource consent under section 88 of the RMA which requires an assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated. The requirement for an assessment is subject to the provisions of any policy statement or plan. For example, for a controlled or a discretionary activity, the assessment would only need to address those matters over which the local authority has decided to retain control and which are specified in the plan or proposed plan, or to which the local authority has restricted the right to exercise its discretion.

Identifying information needs relevant to HIA

- < description of the proposal
- < alternative locations or methods, where necessary, to minimise adverse effects
- < an assessment of the actual or potential effects of the proposed activity
- < an assessment of risks where the activity includes hazardous substances and installations
- < an assessment of the effects of the discharge of contaminants, including:
 - the sensitivity of the receiving environment to adverse effects, and
 - possible alternative methods of discharge
- < a description of the mitigation measures
- < an identification of key stakeholders and the outcome of consultation
- < project monitoring arrangements.

Effects to be considered in a HIA

- < effects on the health of people in the neighbourhood and the wider community, including any socioeconomic and cultural effects
- < physical effects on the locality which may impact on health
- < effects on ecosystems, including plants or animals, which may directly or indirectly affect people's health
- < potential effects on present or future generations
- < effects on people of the discharge of contaminants and the emission of noise
- < any risks to people in the neighbourhood or the wider community from natural hazards, or from the use of hazardous substances or hazardous installations.

Baseline information (profiling)

It is important to establish baseline information which characterises a community (eg, health status) and the local environment (eg, environmental quality), against which the likely impacts of any future activities can be assessed and any changes measured. Co-operation amongst local agencies is essential in gathering and sharing baseline information. Another term for baseline information is "profiling", commonly used in social impact assessment which, like HIA, is a distinct component of environmental impact assessment. HIA attempts to integrate social, biological and physical impacts into an overall analysis of health effects.

Initial screening and scoping provide a superficial overview of community characteristics, while profiling should investigate in more depth those aspects of the community, if any, which are likely to be particularly vulnerable to proposed projects. The profiling process will call upon not only existing health, environmental and social data, but in some cases it may require the collection of site-specific data.

Two areas of baseline information relevant to environmental and health impacts are:

- < information about the existing environment (eg, air, water and soil quality, transmission pathways for existing disease problems, natural and manufactured hazards) to determine existing environmental factors within an area which may influence the health of, or risks to, the local community, and
- < information on existing levels of human health, behaviour and exposure to hazards. This includes the size, location and characteristics of existing and transient populations, particularly their degree of contact with environmental factors which may affect health, and current health problems within the community.

Profiling requires access to information collected locally by regional councils, territorial authorities and the public health units of Crown health enterprises (CHEs), and linked with national databases on health, environmental and socioeconomic status.

Baseline information which contributes to profiling

- < characteristics of the existing and, where appropriate, new or transient residents of the region (size, age structure, socioeconomic status, groups at risk)
- < physical characteristics of the region (eg, meteorological, geographical, hydro-geological characteristics)
- < existing and proposed land uses (compatibility with proposed development)
- < current environmental quality (levels of pollution over various periods of time)
- < current health status of the population (morbidity, mortality, social and psychological health indicators)
- < information from studies carried out on similar developments at similar locations.

The precise information requirements will depend on the nature of the proposed project and on the characteristics of the environment and population of the area.

Risk analysis

Even in situations where there is either insufficient or no information on the health of the community or on the effects which changes in environmental factors may have on health, some attempt needs to be made to assess or evaluate the potential impact. Risk analysis is one way to do this.

Risk analysis consists of two phases – *risk assessment* and *risk management*. A third component, and an important one in terms of the public's perceptions of the risk, is *risk communication*.

A public health risk analysis model

Risk assessment

A widely used model comprises four interrelated phases (USEPA, 1993):

- ⟨ **Hazard identification**
 - assess available evidence on the presence and hazards of contaminants likely to cause adverse effects
- ⟨ **Dose-response assessment**
 - determine the degree of the effects at different doses
- ⟨ **Exposure assessment**
 - estimate the magnitude, duration and frequency of human exposure to pollutants of concern and the number of people exposed via different pathways
- ⟨ **Risk characterisation**
 - combine the information obtained from the hazard identification, dose-response assessment, and exposure assessment to estimate the risk associated with each exposure scenario considered, and to present information on uncertainties in the analysis to risk managers

Risk communication

- establish a two-way communication process with the affected community
- recognise that people's feelings and emotions are legitimate
- involve people in making decisions that directly affect them
- inform and advise the community about risks and their impact
- involve the community in plans for managing the risk

Risk management

- set priorities based on risk assessment
- establish efficient and consistent risk reduction policies, taking into account public perception of risk
- evaluate the range of risk reduction alternatives, including the social, economic and cultural implications of options
- identify cost-effective risk reduction measures
- identify risk mitigation and contingency measures.

Risk assessment

Risk is the probability of the occurrence of specified adverse effects. Adverse health effects are caused by exposure to harmful substances, organisms or sources of energy, for example, and can vary from lethal effects to more subtle biochemical, pathological or physiological effects. The United States Environmental Protection Agency (USEPA) has defined human health risk assessment as:

"evaluating the toxic properties of a chemical and the conditions of human exposure to it in order both to ascertain the likelihood that exposed humans will be adversely affected, and to characterise the nature of the effects they may experience" (USEPA, 1993).

While this definition focuses on chemicals, it could also apply to a range of physical, biological or radiological hazards. Risk assessment is a generic process which can, in principle, be applied to beneficial exposures as well as adverse ones.

The challenges faced by anyone having to assess effects on public health include:

- < identifying likely health effects (both direct and indirect)
- < establishing cause-effect and dose-response relationships
- < determining accurate measures of exposure (Hope, 1993).

Unfortunately, the assessment of health effects of environmental hazards and pollution is not a straightforward task nor will it always produce a definitive answer. In the case of environmental damage, the signs may be obvious (eg, damage or disruption to ecosystems, discoloration of waterways) and the relationship between cause and effect much clearer. In some cases, such as physical injury caused by exposure to the release of a particular chemical, the cause and effect may be obvious, but in other circumstances there may be subtle effects on human health and no clear cause(s). Other complicating factors include:

- < movement of people between environments (eg, between home, work, transport and recreational environments) and exposure to a wide variety of contaminants and hazards
- < some people may be particularly vulnerable (eg, because of age, socioeconomic status, pre-existing ill health, or unusual sensitivity to certain contaminants)
- < for some hazards, effects may not appear until a long time after initial exposure (eg, asbestos)
- < information on health effects may not be known or understood (as is the case with many chemicals in common use).

Risk assessment comprises identification, estimation and evaluation, and is associated with assessing alternative actions and options. The outcome of risk assessment is a preferred option selected after the estimates for the alternatives have been compared against predetermined criteria, standards or risk target levels to enable decisions to be made about acceptable levels of risk and appropriate strategies to manage risks.

Risk assessment as a component of risk management

In the risk analysis model outlined above, risk assessment is an objective, scientific process which seeks to quantify the risk on the basis of evidence of hazard, dose-response and exposure, and is separate from and precedes the risk management process. However, during the course of an assessment, questions may arise which are, in principle or in practice, unanswerable by science. One example of this is long term, low level exposure to a hazard (eg, low level radiation), the effects of which may be unknown and practically impossible to determine. In situations such as this, issues relating to risk are not purely technical. It becomes difficult to separate scientific from political and value components. Risk management then becomes the whole process of risk assessment, implementation and monitoring (including risk reduction, sometimes referred to as risk control or risk treatment).

Risk communication

In many situations, people's concern about risk will be based on their perceptions of the hazards and their outrage over involuntary exposure to those hazards. It will be necessary to address such concerns in an appropriate manner. In some cases a detailed quantitative risk assessment or comparison with other day-to-day high risk voluntary activities (eg, crossing the road) may not be sufficient to allay public concerns about threats to their health or safety. The public's fears should not be dismissed as unscientific or irrational, but acknowledged as being valid and relevant to those individuals or communities who are likely to be affected by another party's activity and over which they have no direct control.

Risk communication should be a two-way process used by decision makers and the affected public to help decide how to address an environmental and health risk. Risk communication should be carried out throughout the risk assessment and risk management processes. It is a process of not only informing the public of the risks and how they are to be managed and mitigated, but also taking account of and acting on their concerns, and involving them in the decision making process (Ministry for the Environment, 1993). The importance of this step should not be underestimated. An effective risk communication strategy will assist the community's understanding of the issues, decision makers will be in a better position to make an informed decision, and the consent applicant is less likely to face a prolonged consent process or the added costs and delays of any appeal.

Risk management

This is the process of making decisions about the appropriate means for managing risk to a level acceptable to all parties. Risk management incorporates consideration of political, social, cultural, economic and technical information to develop and select the appropriate response to a potential health hazard.

The RMA enables decisions on the management of effects (including risk) to be made at the most appropriate level of government. There are issues such as minimum requirements for managing aspects of hazardous substances (eg, labelling and packaging), and for air and water quality which need to be set at national level. Then there are local activities which may give rise to local effects. The management of risk and any controls on these types of activities are more appropriately dealt with by local government, drawing on any national standards or guidelines, regional policies, regional and district plans, and in consultation with the affected communities.

The options for managing risk include regulatory (eg, new regulations and rules), self-regulatory (eg, codes of practice) with compliance monitoring, or non-regulatory (eg, economic measures, guidelines, advice), as well as the option of leaving things as they are if the risk is considered by the community to be acceptable.

Uncertainty and assumptions

The unavoidable uncertainty inherent in risk assessment makes it important that each assessment includes a clear statement about assumptions and uncertainties.

Dealing with uncertainty and assumptions

- < assumptions and scientific judgements should be clearly stated
- < the nature and magnitude of uncertainties must be explained
- < areas where there is a lack of scientific knowledge must be clearly stated
- < risk assessment and risk management should both be addressed
- < the choice of a particular risk assessment methodology over alternate methodologies must be explained
- < risk estimates must be presented to afford comparison of risks
- < the role of risk assessment in decision making should be specified
- < the agency responsible for decision making should be clearly identified and publicly accountable.

Implementation

During the HIA process, the decision maker needs to be satisfied that sufficient, valid and reliable information has been presented. The decision making process then becomes a matter of drawing on that information and taking into account statutory requirements as well as concerns and values expressed by the community through policies, plans and submissions to decide:

- < is there a conflict to be resolved?
- < can the proposal proceed, with or without conditions?
- < do the risks (costs) outweigh the benefits of the proposal?
- < how are conditions to be complied with and enforced?
- < what system of monitoring and evaluating effects is necessary and how is it to be resourced?

Monitoring the project may be necessary to ensure that any consent conditions are being complied with and, if necessary, enforced. Responsibility for monitoring and information

feedback mechanisms should be arranged at the time of the consent granting. Post-development monitoring and evaluation are useful for revealing the accuracy of predictions and any gaps or deficiencies in the assessment and decision making processes. They are also useful as the bases for reviewing the conditions of a consent to ensure that they are relevant, effective and appropriate, taking into account any new information on health impacts not known at the time of the original approval. The results of monitoring should be made available to the community to allay any concerns there may be about the implementation of control measures or compliance with them.

Auditing

In the context of this document, auditing describes the systematic examination of the project and of the AEE/HIA process in satisfying and achieving both environmental and health goals. Auditing should be regarded as an integral element of HIA which provides the feedback necessary to continuously improve the process.

Objectives of HIA auditing

The project

- < to evaluate the effectiveness of compliance requirements and monitoring, and to recommend changes where appropriate
- < to evaluate the effectiveness of surveillance and environmental and health monitoring programmes, and recommend changes where necessary
- < to determine whether the commitments of the environmental and health impact statements have been implemented
- < to determine whether risks and adverse effects are being properly managed.

The environment and health

- < to determine the state of the environment and the health status of the population affected
- < to improve environmental and health impact predictions
- < to identify any undesirable effects that were not predicted in the HIA.

The process

- < to evaluate the accuracy of predictions made during the HIA process
- < to evaluate the efficiency and effectiveness of the process and to make improvements where necessary.

Conclusion

The Resource Management Act creates opportunities for communities and individuals to have input into decisions relating to the management of their environment. In cases where uses or development of natural and physical resources are likely to have adverse effects on the health, safety and wellbeing of people, then appropriate consideration needs to be given to these effects during the decision making processes.

Health impact assessment, like social, cultural, economic and ecological impacts, is an essential component of the assessment of effects on the environment. The assessment of effects on the environment, therefore, requires a number of skills and the contribution of a range of sectors to ensure that well informed decisions are reached and risks are minimised.

This guide has been developed primarily as a framework for use by those who may be involved in health impact assessment. As such, the PHC's expectation is that it will be a useful guide for public health service providers, consent applicants, consent authorities and the public who either have a responsibility for or an interest in environmental quality and the protection and promotion of public health.

References

Hope V. The Assessment of Public Health Effects: Seeing the Wood for the Trees. Paper presented to the Workshop on Assessment of Environmental Effects for Resource Management. Auckland: Environmental Science, University of Auckland, August 1993.

Ministry for the Environment. Assessment of Environmental Effects. Information Sheets Nos 1 to 3. Wellington: Ministry for the Environment, November 1992.

Ministry for the Environment. Workshop on Risk and Decision Making Developed by the US Environmental Protection Agency. Wellington: Ministry for the Environment, April 1993.

Ministry for the Environment and Ministry of Health. Draft National Rapid Hazard Assessment System for Potentially Contaminated Sites. Wellington: Ministry for the Environment, December 1993.

National Health and Medical Research Council (NHMRC), Australia. National Framework for Environmental and Health Impact Assessment. Canberra: Australian Government Publishing Service, 1994.

United States Environmental Protection Agency (USEPA). A Guidebook to Comparing Risks and Setting Priorities. Washington: USEPA Office of Policy, Planning and Evaluation, September 1993.

World Health Organization (WHO). Health and Safety Component of Environmental Impact Assessment. Environmental Health Series No 15. Copenhagen: WHO, Regional Office for Europe, 1987.

Glossary

Assessment of effects on the environment (AEE)

An assessment carried out in accordance with the Fourth Schedule to the Resource Management Act 1991.

Consent authority

Includes the Minister of Conservation, a regional council, a territorial authority or a unitary authority (combined regional council and territorial authority) who make decisions concerning resource consents.

Contaminant

Includes any substance (including gases, liquids, solids, and micro-organisms) or energy (excluding noise) or heat, that either by itself or in combination with the same, similar, or other substances, energy or heat:

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

(Resource Management Act 1991, section 2(1)).

In the context of this guide, contaminants may adversely affect health either directly because of their hazardous properties, or indirectly through contamination of air, water, soil or food.

Effects

Include:

- < any positive or adverse effect
- < any temporary or permanent effect
- < any past, present, or future effect
- < any cumulative effect which arises over time or in combination with other effects – regardless of the scale, intensity, duration, or frequency of the effect, and also includes
- < any potential effect of high probability, and
- < any potential effect of low probability which has a high potential impact.

(Resource Management Act 1991, section 3).

Environment

Includes :

- < ecosystems and their constituent parts, including people and communities
- < all natural and physical resources
- < amenity values, and
- < the social, economic, aesthetic, and cultural conditions which affect the matters above or which are affected by those matters.

(Resource Management Act 1991, section 2(1)).

Environmental health	A subset of public health which focuses on environmental conditions and hazards which affect, or have the potential to affect, human health, either by direct or indirect means. It is the art and science of the protection of good health, the promotion of aesthetic, social, economic, cultural and amenity values, and the prevention of illness and injury through the fostering of positive environmental factors and the reduction of potential hazards – physical, biological, chemical and radiological.
Hazard	A source or situation of potential harm.
Health impact assessment (HIA)	A systematic process to assess the actual or potential effects of policies, objectives, programmes, plans, consents, or activities on the health of individuals, groups or communities. An assessment of risks to people either directly or indirectly as a result of environmental conditions or hazards.
Health status	A set of measurements which reflect the health of populations. The measurements may include physical function, emotional wellbeing, activities of daily living, etc.
Intersectoral collaboration	Formal and informal networks amongst agencies or officials for the purpose of addressing a specific issue or project in which each agency has a direct or indirect interest.
Local authority	A regional council or a territorial authority (district or city council).
Morbidity	Illness.
Mortality	Death.
Objective	The end result a programme or action seeks to achieve.
Public health	The science and art of preventing disease, prolonging life, and promoting health through organised efforts of society.
Public health agencies	These include public health units of Crown health enterprises, and territorial authorities (city and district councils) in terms of their environmental health functions.
Resource consents	Include land use consents, subdivision consents, coastal permits, water permits and discharge permits, as described in s87 of the Resource Management Act.
Risk	<p>The probable incidence of unwanted events. The likelihood of a specified undesired event occurring within a specified period or in specified circumstances. The probability of harmful consequences arising from a hazard. In quantitative terms, risk can be expressed in values ranging from zero (no possible harm) to one (a certainty that harm will occur).</p> <p>In relation to human health effects, risk is usually expressed as the probability (or likelihood) of dying or developing a disease or injury as a result of exposure to a hazard. For example, an acceptable health risk may be regarded as a one in one million (1×10^{-6}) lifetime risk of developing cancer.</p>

Appendix I:

Legislative Framework - Resource Management Act 1991

The Resource Management Act sets out the rights and responsibilities of individuals, territorial and regional councils, and central government in relation to the purpose of the Act – the sustainable management of natural and physical resources. The Resource Management Act (RMA) sets up a system of policy and plan preparation and administration which allows the balancing of a wide range of interests and values. Amongst other things, the Act deals with the environment as a whole and requires decision makers to address more than the immediate economic gains from the use of resources, but also to have regard to the actual or potential effects on the environment (including people and their social and cultural values), and to consider the needs of future generations. The RMA requires communities to state explicitly the outcomes they are seeking and the trade-offs they are making in achieving the purpose of the Act.

People and communities are included in the definition of “environment”. Clearly there would be risks to the health and safety of people, and to other constituent parts of ecosystems, if the life-supporting capacity and quality of essential resources such as air and water are threatened. The sustainable management approach of the RMA requires such matters to be taken into account when managing the use, development and protection of natural and physical resources. The following outlines those sections and parts of the RMA which are considered relevant to decision making on sustainable management, and on the control of adverse effects, from the perspective of safeguarding people’s health, safety and wellbeing.

Sustainable management

Sustainable management recognises the need for people and communities to manage resources in a way, or at a rate, that provides for their social, economic and cultural wellbeing, and for their health and safety. The meaning of “sustainable management” is contained in section 5(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 for natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations
- (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.”

Other matters which decision makers under the Act must recognise, provide for, have regard to, or take into account include:

- < matters of national importance which include the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, wāhi tapu, and other taonga (s6)
- < kaitiakitanga (the exercise of guardianship and, in relation to a resource, the ethic of stewardship based on the nature of the resource itself) (s7)

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- < the maintenance and enhancement of amenity values (s7)
 - < the maintenance and enhancement of the quality of the environment (s7)
 - < the exercise of functions and powers under the Act must take into account the principles of the Treaty of Waitangi (s8).

Requirements and restrictions

Requirements or restrictions under the Act which have a direct or indirect effect on individuals' or community health include:

- < restrictions on discharges of contaminants into the environment (s15)
- < a general obligation to avoid, remedy or mitigate adverse effects (s17)
- < duties (on local government and certain Ministers) to consider alternatives, and assess benefits and costs of policies, plans objectives and rules (s32)
- < assessment of any actual or potential effects that an activity (requiring a resource consent) may have on the environment, and the ways in which any adverse effects may be mitigated (s88).

Functions, powers and duties

The functions, powers and duties of central and local government are outlined in Part IV.

Part V specifies the purposes of:

- < national environmental standards
- < national policy statements
- < New Zealand coastal policy statements
- < regional policy statements
- < regional plans
- < district plans.

The current *Ambient Air Quality Guidelines* (Ministry for the Environment, 1994), although not promulgated as a national environmental standard yet, is a good example of a primarily health-based set of guidelines to accompany the RMA. These have been developed for use by resource management agencies when preparing policies, plans and objectives for air quality.

Resource consents

Section 104 sets out the matters to which the consent authority is required to have regard in considering an application for a resource consent (in addition to the purpose and principles of the Act). These include:

- < any actual or potential effects on the environment of allowing the activity
- < any relevant regulations
- < any relevant policy statements, plans, objectives and rules.

If the application is for a discharge permit, for example, the consent authority must also have regard to:

- < the nature of the discharge and the sensitivity of the proposed receiving environment to adverse effects, and the applicant's reasons for making the proposed choice, and
- < any possible alternative methods of discharge including discharge into any other receiving environment.

Consultation - general

Requirements for local authorities to consult during the preparation of proposed policy statements or plans are outlined in the First Schedule to the Resource Management Act. It must also include other local authorities and Ministers who may be affected (paragraph 3(1)(b)).

The Act allows anyone to make a submission on a proposed policy statement, plan or notified resource consent application. There is no longer a requirement for a person to show that they have "standing" (greater interest than the general public) before they can make a submission.

In relation to resource consent applications, s93 of the Act sets out requirements for notification of all interested parties and for public notification. However, not all resource consent applications have to be notified (eg, those having only minor or no effects may be exempt by a regional or district plan).

An important judgment on what constitutes "consultation" was made by the Court of Appeal (*Wellington International Airport Ltd v Air New Zealand*, 1993) which held that:

"the word "consultation" did not require that there be agreement...nor did it necessarily involve negotiations towards an agreement, although this might occur particularly as the tendency in consultation was at least to seek consensus. It clearly required more than mere prior notification. If a party having the power to make a decision after consultation held meetings with the parties it was required to consult; provided those parties with relevant information and with such further information as they requested, entered the meetings with an open mind, took due notice of what was said and waited until they had had their say before making a decision: then the decision was properly described as having been made after consultation."

The PHC has used this judgement as the basis for developing *Consultation Guidelines* to ensure adequate ongoing consultation with the health sector, government and non-government organisations, national and regional providers of services, and the community, including Maori (PHC, 1994).

Consultation - Maori

Local authorities must consult with persons or parties who may be affected by the proposed policy statement or plan, including the tangata whenua of the area, through iwi authorities and tribal runanga. The question of what is effective consultation incorporates preliminary questions of when it is appropriate, what it should involve and who should be consulted. The obligation under the Act lies with the local authorities to initiate mechanisms and strategies that will meet that requirement (Ministry for the Environment, 1991).

Te Puni Kokiri (TPK) has also published a useful consultation guide (TPK, 1993). It includes descriptions of examples of consultation processes in which different approaches were used according to the requirements of the situation. It points out, for example, that processes are as important as outcomes in a partnership relationship, and a genuine consultation acknowledges rangatiratanga and the status of Maori as a Treaty partner.

Assessment of effects on the environment

Environmental impact assessment is referred to in the Resource Management Act 1991 as "assessment of effects on the environment" (AEE). It applies to applications for resource consents and includes *"an assessment of any actual or potential effects that the activity may have on the environment, and the ways in which any adverse effects may be mitigated"* (section 88(4)(b)) which *"shall be in such detail as corresponds with the scale and significance of the actual or potential effects that the activity may have on the environment"* and *"prepared in accordance with the Fourth Schedule"* (section 88(6)). For consents relating to controlled or discretionary activities over which the local authority has restricted the exercise of its discretion, the assessment needs only to address those matters in the plan over which the local authority has retained control, or has restricted the right to exercise its discretion (section 88(5)).

Two schedules to the Act set out a number of matters to be considered in relation to effects on the environment:

- < matters that may be provided for in regional policy statements and plans, including any matter relating to the management of any actual or potential effects on the community, or any group within the community (including minorities, children, and disabled people (Second Schedule, Part 1, paragraph 4)
- < matters to be included and considered in an assessment of effects on the environment (Fourth Schedule).

An activity for which a resource consent is required, may need to provide to the consent authority (regional, district or city council) an assessment of the actual or potential effects of the activity on the environment. However, regional and district plans may specify certain activities or uses which do not require AEE (eg, prohibited uses and permitted uses). Developments which are more likely to require an AEE include non-complying or discretionary uses, controlled uses, and developments requiring a discharge permit (ie, permit to discharge contaminants into air, or into or onto water or land). The extent of an assessment will depend on the scale and significance of the actual or potential effects that the activity may have on the environment.

The Fourth Schedule to the Act outlines matters that should be contained in an assessment of environmental effects, and matters that should be considered in its preparation:

Matters that should be included in an assessment of effects on the environment include:

- < a description of the proposal
- < a description of any possible alternative locations or methods of undertaking the activity, especially if there are likely to be significant adverse effects
- < an assessment of the actual or potential effect on the environment of the proposed activity
- < where the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment
- < where the activity includes the discharge of any contaminant, a description of:
 - the nature of the discharge and the sensitivity of the receiving environment, and
 - possible alternative methods of discharge, including to other receiving environments
- < a description of measures to mitigate adverse effects (eg, safeguards and contingency plans to prevent or reduce adverse effects)
- < details of consultation with affected parties
- < description of post-development monitoring to be undertaken.

Matters that should be considered when preparing an assessment of effects on the environment include:

- < any effect on those in the neighbourhood or wider community, including any socioeconomic and cultural effects
- < any physical effects on the locality, including any landscape and visual effects
- < any effect on ecosystems
- < any effect on natural or physical resources of special significance (eg, historical, aesthetic, cultural)
- < any discharge of contaminants into the environment, including any unreasonable emission of noise and options for the treatment and disposal of contaminants
- < any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.

The Act imposes time limits upon councils to process applications once they have received sufficient information. It also allows more AEE information to be requested before the clock starts on the assessment and decision making processes.

In the decision making process regard has to be had to the provisions of relevant policies and plans and of any AEE report when considering an application for a resource consent. There are powers to hold joint hearings between regional and district authorities. The public has the opportunity to make submissions on policies, plans and resource consents, and there is a right of appeal against a council's decision to the Planning Tribunal. Decisions of the Tribunal can be appealed to the High Court on points of law.

References

Ministry for the Environment. Consultation with Tangata Whenua. Wellington: Ministry for the Environment, 1991.

Ministry for the Environment. Ambient Air Quality Guidelines. Wellington: Ministry for the Environment, 1994.

PHC. Consultation Guidelines. Wellington: Public Health Commission, 1994.

Resource Management Act 1991. Reprinted as on 1 March 1994.

TPK. A Guide for Departments on Consultation with Iwi. Wellington: Te Puni Kokiri, 1993.

Wellington International Airport v Air New Zealand [1993] 1 NZLR 671.

Appendix 2:

Other Relevant Legislation and Reforms

Health Act 1956

The purpose of this Act is to promote and conserve the public health. Amongst other things it sets out the functions and powers of local authorities in respect of public health, including abatement of nuisances which are offensive or likely to be injurious to health. The Act also deals with the functions and powers of medical officers of health, such as powers in relation to offensive trades, protection of water supplies, and the control of infectious and notifiable diseases.

A review of public health legislation is currently being carried out by the Ministry of Health.

Building Act 1991

This Act provides for the co-ordination of controls on building work and use of buildings, ensuring that buildings are safe and sanitary, and there is a means of escape in case of fire. Matters which have to be considered in achieving the purpose of the Act include:

- < safeguarding people from injury, illness or loss of amenity
- < provision of fire protection
- < storage of hazardous substances
- < efficient use of energy
- < national costs and benefits of any control, including safety, health, and environmental costs and benefits.

Local Government Act 1974

This outlines the districts and functions of local authorities (regional and territorial) and the administration of those functions. The environmental health service delivery and control functions of local authorities covered by this Act include:

- < hazardous waste management
- < water supply
- < sewerage and storm water drainage
- < trade wastes
- < refuse collection and disposal
- < public health and wellbeing.

Health and Safety in Employment Act 1992

The principle object of this Act is to prevent harm to employees while at work, although the Act is not limited to this. Employers and others are also expected to ensure that actions at work do not result in harm to other people, including members of the public.

Hazardous Substances and New Organisms (HSNO) Bill

Under the proposed HSNO legislation, all hazardous substances and new organisms will be assessed prior to their introduction, development or manufacture in New Zealand using a public process. The purpose of the reform will be to manage the risks from hazardous substances and new organisms to protect the environment and people's health, safety and economic, social and cultural wellbeing.

Appendix 3: Standards, Guidelines & Codes of Practice Relevant to Environmental & Health Impact Assessment

Agenda 21 Guide to Agenda 21. Wellington: Ministry for the Environment, June 1993.

Taking up the Challenge of Agenda 21 – A Guide for Local Government. Wellington: Ministry for the Environment and the NZ Local Government Association, June 1994.

Air quality Ambient Air Quality Guidelines. Wellington: Ministry for the Environment, July 1994.

Odour Measurement and Management, Discussion Document. Wellington: Ministry for the Environment, November 1994.

Air Quality Guidelines for Europe. Copenhagen: Regional Office for Europe, World Health Organization (WHO), 1987 (currently under review).

Ventilation for Acceptable Indoor Air Quality, American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 62-1989. Atlanta: ASHRAE, 1989.

Discussion paper on Indoor Air Pollution. Canberra: Australian and New Zealand Environment Council, June 1990.

Australian Guidelines for the Control of Legionella and Legionnaires' Disease. Canberra: National Health and Medical Research Council, 1988.

Control of Microbial Growth in Air-handling and Water Systems in Buildings – HB32-1992. Sydney: Standards Australia, 1992.

Guidelines for the Control of Legionnaires' Disease. Melbourne: Victoria Health Department, 1989.

Guidelines for the Control of Legionellosis. Wellington: Public Health Commission. In press.

Climate change Information for the Guidance of Local Authorities in Addressing Climate Change. Wellington: Ministry for the Environment, June 1993.

Climate Change: Impacts on New Zealand – Implications for the Environment, Economy and Society. Wellington: Ministry for the Environment, May 1990.

Climate Change: A Review of Impacts on New Zealand. Wellington: Ministry for the Environment, April 1990.

Contaminated sites Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. Canberra: Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC), January 1992.

Draft Health and Environmental Guidelines for Selected Timber Treatment Chemicals. Wellington: Ministry of Health and Ministry for the Environment, September 1993.

Code of Practice for the Safe Use of Timber Preservatives and Antisapstain Chemicals. Wellington: Occupational Safety and Health Service, Department of Labour, August 1992.

Health and Safety Guidelines on the Clean-Up of Contaminated Site. Wellington: Occupational Safety and Health, Department of Labour, March 1994.

Protocol for the Health Risk Assessment and Management of Contaminated Sites. Summary of a national workshop on the health risk assessment of contaminated sites, edited by Langley AJ and El Saadi O. Adelaide: South Australia Health Commission, 1991 (photocopies available from the Ministry for the Environment, PO Box 10 362, Wellington).

Hazardous installations

Code of Practice for the Design, Installation and Operation of Underground Petroleum Storage System. Wellington: Occupational Safety and Health (OSH), Department of Labour, 1992.

Corrosives Tankwagon Code: Bulk Transport of Class 8 Dangerous Goods by Road. Wellington: Department of Labour, 1985.

Specifications for Segregation Devices for the Transport of Class 6.1 and Class 8 Hazardous Substance. Wellington: OSH, Department of Labour, 1993.

Managing Hazards to Prevent Major Industrial Accidents - an approved code of practice. Wellington: OSH, Department of Labour, July 1994.

Code of Practice on Hazardous Goods Storage Facilities, OSH, Department of Labour, 1988.

Hazardous substances

NZS 5433: 1988 - Code of Practice for the Transport of Hazardous Substances on Land. Wellington: Standards New Zealand, 1988.

NZS 5417: 1986 - Specifications for Transportation Labels for Hazardous Substances. Wellington: Standards New Zealand, 1986.

Recommendations of the United Nations Committee of Experts on the Transport of Dangerous Goods - 8th revised edition. New York: UNO, 1993.

OECD Guidelines for the Testing of Chemicals. Paris: OECD, 1993.

Draft Agrichemical Users' Code of Practice. Wellington: New Zealand Agrichemical Education Trust, 1994.

Agrichemical Distributors Accreditation Manual. Wellington: New Zealand Agrichemical Education Trust and AGCARM, 1994.

Essentials of Safety, Health and Environmental Management – A Management Guide to Responsible Care. Wellington: New Zealand Chemical Industry Council Inc, September 1992.

Safe Management of PCBs – Code of Practice. Wellington: Ministry of Health (formerly Department of Health), December 1988.

Guidelines on the Management of Lead-Based Paint. Wellington: Occupational Safety and Health Service and Public Health Commission. In press.

Noise and vibration

Standards New Zealand publications:

- NZS 6801: 1991 – Measurement of sound.
- NZS 6802: 1991 – Assessment of environmental sound.
- NZS 6803: 1984 – Construction noise.
- NZS 6804: pending – Sound level meters.
- NZS 6805: 1992 – Airport noise management and land use planning.
- NZS 6806: pending – Road traffic noise.
- NZS 6807: 1994 – Measurement, assessment and management of noise from helicopter landing areas.
- NZS 6808: pending – Noise from water craft.

Technical Basis for Guidelines to Minimise Annoyance due to Blasting Overpressure and Ground Vibration. Canberra: Australian and New Zealand Environment Council, September 1990.

Australian Standard AS 2670: 1983 – Vibration and Shock – Guide to Evaluation of Human Exposure to Whole-body Vibration. Sydney: Standards Australia, 1983.

Radiation

Health effects of power-line electromagnetic fields – a review paper prepared by the National Radiation Laboratory for the Interagency Committee on the Health Effects of Electric Lines. Christchurch: National Radiation Laboratory, January 1993.

NZS 5433: 1988 – Code of Practice for the Transport of Hazardous Substances on Land. Wellington: Standards New Zealand, 1988.

NZS 4304: 1990 – Health Care Waste Management. Wellington: Standards New Zealand, 1990.

Various papers, reports and guidelines published by the National Radiation Laboratory, PO Box 25 099, Christchurch.

**Resource
management**

Scoping of Environmental Effects. Wellington: Ministry for the Environment, June 1992.

Kia Matiratira: A Guide for Maori. Wellington: Ministry for the Environment, June 1992.

Guide to the Act. Wellington: Ministry for the Environment, August 1991.

Resource Consents and Good Practice. Wellington: Ministry for the Environment, February 1994.

Various information sheets and ideas papers on the Resource Management Act, Ministry for the Environment, PO Box 10362, Wellington.

**Sewage treatment
and disposal**

Guidelines for the Safe Use of Sewage and Sewage Sludge on Land. Wellington, Ministry of Health (formerly the Department of Health), 1992.

The Building Code Handbook. Wellington: Building Industry Authority, 1992.

**State of the public
health**

Our Health, Our Future. Hauora Pakari, Koiora Roa: The state of the public health in New Zealand. Wellington: Public Health Commission, 1993 and 1994.

The Public Health in Canterbury 1993. Christchurch: Healthlink South Ltd, 1993.

Waste management

NZS 4304: 1990 – Health Care Waste Management. Wellington: Standards New Zealand, 1990.

Hazardous Waste Management Handbook – A Guide for Local Authorities. Wellington: Ministry for the Environment, June 1994.

Waste Analysis Protocol. Wellington: Ministry for the Environment, November 1992.

Producing Less Waste. Wellington: Ministry for the Environment, June 1991.

Cleaner Production Guidelines. Wellington: Ministry for the Environment, May 1994.

Waste Management Guide: 02 – Treatment and Disposal of Timber Preservative Wastes: Copper, Chromium and Arsenic. Wellington: Ministry of Health, 1986.

Waste Management Guide: 03 – Leaded Petrol Sludges: Treatment and Disposal. Wellington: Ministry of Health, 1988.

Waste Management Guide: 04 – Electroplating Wastes: Management Waste Reduction, Treatment. Wellington: Ministry of Health, 1989.

Waste Management Guide: 05 – Acid and Alkali Wastes: Management, Treatment, Disposal. Wellington: Ministry of Health, 1991.

Waste Management Guide: 06 – Pesticide Wastes: Management, Treatment, Disposal. Wellington: Ministry of Health, 1991.

Grading of Landfills. Wellington: Ministry of Health, 1983 (1995 version in press).

Water quality

Water Quality Guidelines No.1 – Guidelines for the control of undesirable biological growths in water. Wellington: Ministry for the Environment, June 1992.

Water Quality Guidelines No.2 – Guidelines for the management of water colour and clarity. Wellington: Ministry for the Environment, June 1994.

Provisional Microbiological Water Quality Guidelines for Recreational and Shellfish-Gathering Waters in New Zealand. Wellington: Ministry of Health (formerly Department of Health), January 1992.

Drinking Water Standards for New Zealand. Wellington: Ministry of Health, 1995.

Grading Public Water Supplies. Wellington: Ministry of Health, 1993.

Giardia and Giardiasis in New Zealand: A Review. Wellington: Ministry of Health (formerly the Department of Health), 1991.

Guidelines for Drinking Water Quality, Vols. 1-4. Geneva: World Health Organization (WHO), 1993.

Water Fluoridation in New Zealand. Wellington: Public Health Commission, 1994.

NZS 5826: 1985 (Part 1) – Code of Practice for the Operation of Swimming Pools. Wellington: Standards New Zealand, 1985.

Appendix 4: Examples of Environmental & Health Effects which may be dealt with under the Resource Management Act 1991

Discharges to water

Actual or potential physical, chemical or microbiological contamination of water managed for:

- < the gathering or cultivating of shellfish for human consumption
- < contact recreational purposes
- < water supply purposes.

Examples include physical and chemical effects such as objectionable odour, taste and discoloration, as well as acute and chronic effects arising from heavy metals and carcinogenic contaminants. Microbiological contamination can give rise to effects such as gastrointestinal illness and, in extreme cases, death.

Where regional plans classify waters for human uses such as shellfish-gathering, contact recreational purposes or water supply, for example, the RMA (s69 and the Third Schedule) does not permit them to be rendered unsuitable for those purposes by the presence of contaminants.

Discharges to land

Discharges to land can result in:

- < ground water contamination
- < run-off of contaminants into water bodies, coastal marine and catchment areas
- < contamination of crops
- < restrictions on future land use (eg, residential development of former industrial, commercial or agricultural land).

Effects can include risk of poisoning by contact with contaminated soil or water, or ingestion of contaminated produce or drinking water. Some effects may not appear immediately, but build up over time after prolonged exposure.

Discharges to air

The effects will largely be determined by the nature of the discharge. For example, in some situations the issue may be:

- < the physical characteristics of the pollutant (eg, dust, fine particulates)
- < the chemical characteristics and toxicity of the pollutant
- < the microbiological characteristics of the pollutant (eg, airborne bacteria such as *Legionella*).

Effects can vary depending on, for example:

- < the concentration of the pollutant
- < the hazard associated with the pollutant
- < duration of exposure

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- < the vulnerability/sensitivity of the population exposed
 - < the contribution of other pollutants to the overall effect (eg, cumulative, synergistic).

The effects can range from death, chronic or acute illnesses, through to nuisance and loss of amenity.

Hazardous substances and hazardous wastes

The RMA covers the prevention or mitigation of any adverse effects of the storage, use, disposal, or transportation of hazardous substances. Throughout the life-cycle of a hazardous substance there will be varying risks to people ranging from fatal short term exposure to a highly hazardous substance, to long term, low level exposure to a substance whose hazard may not be clearly understood or known.

Hazardous facilities

These are activities which either involve the use of hazardous substances or have a hazard potential (eg, inert gases stored under pressure). Potential effects on human health and safety include effects occurring both on-site and off-site from:

- < controlled releases of hazardous substances (discharges to air, water and land)
- < unintentional releases of hazardous substances (eg, spills, fires)
- < catastrophic events (eg, explosions, fire, earthquake).

The risks to public health and safety will depend largely on safety and emergency management measures put in place. Potential effects may range from multiple deaths and injuries through to the stress of living near a hazardous facility.

Noise

The effects of exposure to noise varies depending on the intensity and other characteristics of the noise, and the duration of exposure to high noise levels. Effects range from hearing loss to nuisance. Noise induced hearing loss arises mainly from continuous exposure to high levels of noise and is mostly associated with occupational exposure. Excessive noise in the community can give rise to stress-related effects.

Appendix 5: List of Submissions Received on the Health Impact Assessment Discussion Paper, May 1994

The Public Health Commission gratefully acknowledges the contributions of the following:

- 1 Transit New Zealand, HD, Wellington – Dr Ian Appleton
- 2 Millwatch, 68 College Road, Edgecumbe, BoP – Reuben Cohen
- 3 Te Wai Ora Community Health, Nelson Marlborough Health Services Ltd, Nelson – Paul Bell
- 4 & 25 Northland Regional Council, Whangarei – Helen Codlin
- 5 Dairy Advisory Bureau, Wellington – Megan Williams
- 6 Core Services Committee, Wellington – Wendy Edgar
- 7 South Waikato District Council, Tokoroa – B S O'kell
- 8 ACC, Wellington – unsigned
- 9 Donald F Ian, Rotorua
- 10 Lincoln Environmental, Lincoln University – Janet D Gough
- 11 Wellington School of Medicine, Dept of Public Health – Dr Don Bandaranayake
- 12 Rodney District Council, Orewa – P A Garbett
- 13 Hutt Valley Health, Lower Hutt – Vivienne Johnson and Stephen Palmer
- 14 Parliamentary Commissioner for the Environment, Wellington – Jenny Boshier
- 15 Porirua City Council, Porirua – J B Seddon
- 16 Royal New Zealand Plunket Society, Dunedin – John D Thompson
- 17 Ministry for the Environment, Wellington – Sue Veart
- 18 Ministry for the Environment, Wellington – Regina C Thompson
- 19 Taranaki Regional Council, Stratford – Bill Bayfield
- 20 Healthcare Hawkes Bay, Napier – Bill Littley
- 21 The Royal New Zealand College of General Practitioners, Auckland – Dr Nelum Soysa and Dr Neil Algar
- 22 New Zealand College of Midwives (Inc), Christchurch – Julie Richards
- 23 Public Health Association of New Zealand Inc, Wellington – Pauline Barnett
- 24 Auckland Regional Council, Auckland – Susan Turner
- 25 Northland Regional Council, Whangarei – Jo Brosnahan
- 26 John Feltham, Consultant, Otaki
- 27 MidCentral Health, Palmerston North – Peter Wood
- 28 New Zealand Institute of Environmental Health Officers, Gisborne Branch – Nick Parker
- 29 Louise Croot, Health Promotion Advisor, Dunedin
- 30 Matamata Piako District Council, Matamata – T P Winter
- 31 Healthcare Otago, Dunedin – A M Shand
- 32 Healthlink South, Christchurch – B A Prendergast
- 33 Otago Regional Council, Dunedin – Tony Avery
- 34 New Zealand Kiwifruit Marketing Board, Auckland – R A Martin
- 35 New Zealand Nutrition Foundation, Takapuna – John Birkbeck
- 36 Christchurch City Council, Christchurch – T Moody for J G Dryden
- 37 Manukau Environment, Manukau City Council, Manukau – Ron Sutherland
- 38 New Zealand Family Planning Association, Wellington – Sue Ineson
- 39 Te Puni Kokiri, Wellington – Lorna Dyll
- 40 Kapiti Coast District Council, Paraparaumu – D A Ferrier
- 41 Toxins Awareness Group NZ Inc, Auckland – Jill Thorne and Leone Bartrom

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- 42 ESR Health, Christchurch - Alistair Sheat
 - 43 Canterbury Regional Council, Christchurch - Bob Ayrey
 - 44 Southern Health, Invercargill - Kevin Campbell
 - 45 Environment Waikato, Waikato Regional Council, Hamilton - Adrienne Gravatt
 - 46 Ministry of Commerce, Wellington - Geoff Sanderson
 - 47 Hamilton City Council, Hamilton - Clare Shallcross
 - 48 Ministry of Education, Wellington - Merus Cochrane

Copies of the summary of submissions can be obtained from the Public Health Commission, PO Box 1795, Wellington (up to 30 June 1995) or the Public Health Group, Ministry of Health, PO Box 5013, Wellington (after 1 July 1995).