

THE FUNCTIONING OF ENVIRONMENTAL  
HEALTH DELIVERY SYSTEMS IN REMOTE  
NORTHERN MANITOBA COMMUNITIES

By

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## CHAPTER I

### INTRODUCTION

#### 1.1 Background

Sub-standard water supply and sanitation systems in many remote northern Manitoba Indian Reserve communities have repeatedly been identified as sources of persistent environmental health problems (Ginsberg 1980; Pritchard 1977). Efforts to provide safe drinking water supply services have been made by the federal and Manitoba governments, (Canada, Department of Regional and Economic Expansion, 1981). Unfortunately, they have resulted in only limited success (Ginsberg 1980).

Several programs designed to improve community health conditions, through the upgrading of drinking water supplies, have been introduced over the past twenty years. In 1964, for example, a project was initiated which provided a safe drinking water supply to an individual southern Manitoba Indian Reserve experiencing conditions similar to many northern communities (Canada, Department of National Health and Welfare 1964).

The 1964 safe drinking water project was jointly sponsored by two federal departments, the Department of National Health and Welfare and the Department of Indian Affairs and Northern Development (D.I.A.N.D.). The Chief of the Band and the Council were involved in both the planning and implementation of the safe drinking water project. A public health education campaign was conducted to encourage community participation in all phases of the project. The results of the program, measured by changes in reported cases of water-borne diseases,

were recorded as, "...very encouraging," (Canada, Department of National Health and Welfare 1964, pg. 35).

Several years after the project had been implemented, technical problems occurred affecting the availability of potable water. The individuals who had represented the federal government had been reassigned to other programs which further complicated the situation. The current status and history of the program initiated in 1964 is not known.

The Canada-Manitoba Northlands Subsidiary Agreement included provisions for a safe water supply program on a much larger scale than the 1964 project. The objective of the safe water supply program was to provide at least one source of potable water with "rudimentary delivery systems" to individual northern Indian communities:

...It was originally planned to design and install up to thirty (30) systems. This was subsequently increased to thirty-four (34) community systems in which varying degrees of expenditures actually occurred.

...Of the thirty-four (34) communities, twenty-seven (27) received either new systems or existing ones were updated and improved.

...Of the seven (7) remaining communities, Tadoule Lake and Lac Brochet have no services and obtain their water by dipping pails in the lake...

(Canada, Department of Indian and Northern Affairs 1981).

In those communities where water delivery systems were established, only limited success was reported.

The Canada-Manitoba Northlands Agreement identified the need

for safe water supplies in northern Manitoba as a priority. Two one-year interim Planning Agreements had assumed a position that access to a safe water supply was essential. The quality of community health had not been part of the initial objectives stated in the first one-year interim Planning Agreement. However, concern for the improvement of community health was later included in the overall objectives of the Northland Agreement signed in 1976 (Ginsberg 1980) which would run until 1981.

Representation from various agencies of federal and Manitoba Governments was included to complement the planning needs associated with the development and implementation of the Northlands Agreement.

While a long term Northlands Agreement was being developed, the two governments entered into an Interim Northlands Agreement (1 April 1974 to 31 March 1976) to facilitate immediate action in areas of obvious priority. Signatories of the areas Interim Agreement were the Department of Regional Economic Expansion (DREE) and Transport Canada on behalf of the Government of Canada, and the Manitoba Department of Northern Affairs on behalf of the Government of Manitoba.

On September 15, 1976, at Norway House, Manitoba, the federal and provincial governments signed a five year Canada/Manitoba Northlands Agreement which included two additional federal departments, the Department of Manpower and Immigration and the Department of Indian Affairs and Northern Development.

(Canada, Department of Regional  
Economic Expansion 1981)

No representation from either health or environmental agencies was formally included. The Department of National Health and Welfare is mentioned in background reports (Ginsberg 1980), but only as a supplier of data. The Environmental Protection

Service (E.P.S.) of the Department of the Environment which has expertise specifically directed toward northern technology design was never consulted (Gavin, Director, Environmental Protection Service, Manitoba District, personal communication, October 1981).

An evaluation of the safe drinking water program conducted through the Canada-Manitoba Northlands Agreement, reported numerous difficulties in the implementation of the project. Inadequate funding and budgeting was reported to be partly responsible for the failure to meet objectives. The evaluation report concluded that the effectiveness of the safe drinking water program was seriously eroded by management problems associated with the coordination of operations (Ginsberg 1980).

Despite the efforts of governments to correct this situation, environmental health problems associated with drinking water supply continue to be a serious problem in many northern Manitoba communities. Reported cases of water-borne diseases<sup>1</sup> originating from northern communities have increased over the past several years (Canada, Department of Health and Welfare 1981).

<sup>1</sup> Appendix "B" contains a literature review prepared by Environmental Protection Service discussing the environmental control issues of selected water-borne diseases.



*Shigellosis*, a sometimes fatal acute bacterial disease of the intestines, is one example of water-borne disease associated with unsafe drinking water and poor sanitary conditions (Benenson 1980, pg. 285). The Medical Services Branch, 1980 Annual Review: Manitoba Region, observed that about eighty percent of all *Shigella* cases occurring on Indian Reserves in Manitoba originated on northern Reserves (Canada, Department of National Health and Welfare 1981, pg. 75). The total number of reported *Shigella* cases in the province was reported to have increased from 188 cases in 1979 to 540 cases in 1980, with the majority of cases originating in northern Manitoba communities (Dr. Eadie, provincial Epidemiologist, Department of Health, as quoted in the Winnipeg Free Press, 2 April 1981, pg. 1).

Examination of the impact of drinking water quality on the level of community public health has been incomplete. Studies have focused on individual aspects of the water quality/environmental health relationship (Gavin 1982). Efforts to identify and examine the direct and indirect costs associated with water-borne diseases were frustrated by the complete lack of pertinent data such as records of water quality after treatment (Chapter 3).

In 1981, the World Health Organization (W.H.O) declared the period between 1981-1990 as the International Drinking Water Supply and Sanitation Decade (I.D.W.S.S.D.). A major theme of the I.D.W.S.S.D. is to promote the improvement of people's health through an integration of water-supply, sanitation services and health care. The W.H.O. has urged that in many cases a re-examination of strategy is required:

A major aim of the International Drinking Water Supply and Sanitation Decade is the improvement of people's health. This will not be automatically achieved merely by building water-supply and sanitation systems, especially if they are built to meet traditional economic and financial criteria. Indeed it has been stated that the Decade cannot succeed if the same technology and the same management approach are applied as in the past. WHO, therefore, has adopted a Decade approach which can be summarized as follows: the Decade must contribute to implementing primary health care; water supply and sanitation development should be complementary and they should be jointly associated with other health development; policies and programmes should be focused on rural and urban underserved populations; full coverage should be achieved throughreproducible, self-reliant and self-sustaining programmes; the people for whom the services are intended should be associated with all stages of programme and project development; the Decade should be a matter of collaboration between all contributing sectors.

(World Health Organization  
1981, pg. 11)

The attention the W.H.O. focuses on water-supply/environmental health problems raises questions about the effectiveness of programs conducted in northern Manitoba. Concerns have also been raised about the effectiveness of inter-agency coordination of federal and provincial agencies (Ginsberg 1980).

## 1.2 Problem Statement

This practicum focuses on the administrative functions of federal and provincial government agencies responsible for control of environmental health conditions in remote northern Manitoba Indian Reserve communities. This research recognizes that no single administrative agency of either the federal or

the provincial government has been assigned exclusive jurisdiction over matters relating to environmental health. Effective coordination of inter-agency operations therefore become critical in the delivery of programs designed to improve sub-standard environmental health conditions.

Management problems have been reported in inter-governmental and inter-departmental matters, and also in planning, reporting, budgeting funds and direction (Ginsberg 1980). The key question is:

Do the federal and provincial governments, and their respective agencies, have common plans, priorities and working arrangements directed towards the correction of recurring environmental health problems in northern Indian Reserve communities?

There are mechanisms for cooperative planning and communication both within and among departments, such as through the Northlands Agreement, but these are largely unstructured and intermittent. There are numerous gaps and overlaps in the existing environmental health system. The current organizational mechanisms are uncoordinated and ineffective in each sector of government, including local government on Indian Reserves.

### 1.3 Objectives

The purpose of the research was:

1. to identify federal and provincial government agencies with legislated mandates, or assumed responsibilities for environmental health in northern Manitoba Indian Reserve communities;

2. to identify and evaluate existing inter-governmental and inter-departmental functions related to environmental health in northern Indian Reserve communities; and
3. to recommend management alternatives towards improved coordination of inter-governmental and inter-departmental functions concerned with environmental health in northern Indian Reserve communities.

#### 1.4 Methods

This research consisted of four distinct phases:

1. Information Assembly and Data Gathering
2. Identification of Existing Environmental Health Services Delivery System
3. Analysis
4. Presentation of Management Alternatives

##### 1.4.1 *Information Assembly and Data Gathering*

Information relevant to an understanding of environmental health conditions at remote northern Manitoba Indian Reserve communities was collected. Data gathering was conducted through literature reviews, interviews and direct observation.

In this study, a significant portion of the data collected was through interviews and direct observation. During the summer of 1981, an attempt was made to examine specific water-borne environmental health problems in five northern Manitoba Indian Reserve communities (Huebert 1981), namely: Cross Lake

Nelson House, Norway House, Split Lake and York Landing.  
(See Appendix "A").

Although the study successfully identified environmental problems associated with drinking water quality, considerable difficulty was encountered in obtaining accurate health data. Inadequate monitoring of environmental and public health conditions in the identified communities as well as inadequate management of environmental health information was found.

The study did identify major concerns raised by the Band Chiefs, Councils, and by representatives of the various federal and provincial agencies concerning environmental health matters. This research is a continuation of the 1981 Huebert study included in Appendix "A".

Data gathering techniques used to update and expand the information data base in 1981 were:

i) Literature reviews, with respect to:

- water-related environmental health concerns;
- programs designed and implemented to correct or alleviate sub-standard environmental health conditions in northern Manitoba; and
- applicable federal and Manitoba statutes, regulations and agreements concerning environmental health matters on Indian Reserve communities in northern Manitoba.

ii) Interviews:

- Approximately 250 unstructured interviews were conducted from one or more representatives from each department, agency, organization, Band and private agencies responsible for the delivery of services associated with environmental health.

iii) Direct Observations:

- The 1981 Study of Environmental Concerns on five selected northern Manitoba communities was used to illustrate specific administrative problems. Observations made in the functioning of agencies responsible for water supplies and community services are included in Appendix "A".

1.4.2 *Identification of Existing Environmental Health Services Delivery System*

A general systems analysis was used to identify and examine federal, provincial, Band and private agencies directly involved with environmental health. Selection and examination of these agencies functioning in the existing environmental health services delivery system was based on following criteria:

- i) Legislation - The Indian Act R.S.C., 1974-75-76, c. 48, empowers the Chief and Band Council with authority similar in nature, but greater in scope, than a municipality. In addition to the primary authority of the Chief and Band Council, the federal and provincial government have accepted specific responsibilities associated with environmental health matters. For the purpose of this study, a review was conducted to identify federal and provincial administrations which had mandates over environmental health concerns, e.g. Department of National Health and Welfare Canada.
- ii) Financial Involvement - Not all government agencies involved with matters which impact on environmental health have statutory authority to enter into such matters directly. In some instances, agencies became involved in environmental health matters through funding arrangements, e.g. Department of Regional Economic Expansion.

- iii) Special Arrangements - The federal government has jurisdiction over specific matters on Indian reserves. Under the terms of special agreements, provincial government departments have entered into agreements to assist federal departments over other matters arising on Indian reserves, e.g. Manitoba Department of the Environment has an agreement with the federal Department of National Health and Welfare concerning drinking water monitoring.

#### 1.4.3 *Analysis*

As the focus of this research is directed toward management concerns of an environmental health system, an examination of organizational factors was included. The research classified identified management problems into categories representing functions of management. Only agencies which were identified as components of the northern Manitoba environmental health system were examined.

Organizational functions examined were: planning, organization, direction, reporting, budgeting, supervision and coordination. (See 1.6 for definitions.) The purpose of an organizational analysis is to determine if the resources of government are effectively deployed towards the control of environmental problems.

#### 1.4.4 *Management Alternatives*

A summary of management considerations affecting environmental health conditions was presented. Organizational alternatives, offered as management options, were discussed with specific attention to northern Manitoba conditions.

#### 1.5 Limitations

The study was limited to:

1. water-related environmental health concerns;
2. remote and northern Indian Reserve communities in Manitoba;
3. legislation in effect as of August 1, 1982; and
4. occupational health was not included.

#### 1.6 Definition of Terms

<i>Agency</i>	- an administration functioning as a factor or agent for a principal authority, e.g., The Department of National Health and Welfare acts as an agent for the Minister of Health.
<i>Budgeting</i>	- a plan for financing an administration for a period of time.
<i>Communicable Diseases</i>	- diseases capable of being transmitted from one person to another (Dorlund 1977).
<i>Control Agency</i>	- a governmental health or water quality and pollution control agency vested with the responsibility of assessing the safety and approving a drinking water supply (Canadian Drinking Water Guidelines, 1979).
<i>Coordination</i>	- to bring into common action (Webster 1979)
<i>Environment</i>	- the sum total of all conditions and elements that make up the surroundings and influence the development of an individual (Dorlund 1977)



- Environmental Control* - the prevention of disease through the identification and control of environmental hazards (Purden 1980).
- Epidemiology* - the study of the relationship of various factors determining the frequency and distribution of diseases in the human community (Dorlund 1977).
- Health* - a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity; it includes satisfaction of the aesthetic aspirations of man (Guidelines for Canadian Drinking Water Quality 1979).
- Infectious Diseases* - diseases caused or capable of being communicated by infection (Dorlund 1977).
- Institution* - an established society, corporation, or organization, e.g., medical profession
- Northern Communities* - Manitoba communities considered northern are those stretching north from a line drawn from the Winnipeg River northwest to a point south of The Pas near the Saskatchewan border, then turning north to the 60th parallel of latitude (Canada Department of Regional and Economic Expansion 1976).
- Organization* - the structure, state or manner of being organized.
- Planning* - method or scheme or actions, procedure or arrangement (Webster 1979).
- Pollution (water)* - anything causing or including objectionable conditions in any water course and affecting adversely the environment and use or uses to which the water thereof may be put (Canada, Department of National Health and Welfare 1979).

- Potable Water*
- water suitable, on the basis of both health and aesthetic considerations, for drinking or cooking purposes (Canada, Department of National Health and Welfare 1979).
- Raw Water*
- surface or ground water that is available as a source of drinking water but has not received any treatment (Guidelines for Canadian Drinking Water Quality 1979).
- Remote Communities*
- includes all communities not located within the Canada Land Inventory boundaries, and all other communities within C.L.I., but considered as lacking all weather roads (Gillies 1975).
- Reporting*
- to give formal or official account of an observed incident or situation.
- Safe Drinking Water*
- same as potable water.
- Supervision*
- the direction and evaluation of operations.
- Sanitary Survey*
- a survey and analysis of the physical environment for the purpose of identifying existing and potential sources of health hazards and environmental contamination (Canada, Department of National Health and Welfare 1979).
- Water-borne*
- spread or transmitted by drinking water (Dorlund 1977).

## CHAPTER II

### THEORETICAL FRAMEWORK

#### 2.1 Introduction

Environmental health literature, environmental health programs, as well as federal and provincial environmental health related activities, were reviewed. The W.H.O. (1972) has identified specific organizational components as essential for the effective operation of an integrated environmental health system. The control of environmental health problems, especially communicable diseases, is largely dependent on the effectiveness of environmental health programs. The organization strategies advocated by the W.H.O. constitute a major component in this chapter.

#### 2.2 Environmental Health

Environmental health has not been defined as such in the general literature on environmental control or health. What has been expressed as a vague association between environmental conditions and human health. The World Health Organization alludes to environmental health as, "...the interactions (interdependencies) between health and the environment," (1972, pg. 332).

Definitions of environmental health have been offered. However, in most instances, they reflect the writers attention toward a selected aspect of environmental health.

The focus on specific attributes and conditions of environmental health has resulted in a rather uneven body of information. The reluctance of the W.H.O. to provide a firm definition of environmental health is indicative of the current status of the environmental health field.

Purdom (1980) has recognized the difficulty in developing a definition of environmental health. The field of "environmental health" is undergoing a process of development. As Purdom suggested, whatever definition is offered will be debated. Rather than discount the field of environmental health as undeveloped, it may be expedient to note further refinement in the control of environmental health problems and our understanding of environmental health.

In 1972, the World Health Organization directed international attention toward health hazards associated with environmental conditions. The relationship of environmental hazards to human health was clearly established as requiring increased worldwide attention. Four major areas were identified as requiring immediate consideration; they were:

- Basic environmental health and sanitation must be improved in all countries, and especially in the developing countries; special emphasis should be placed on the provision of adequate quantities of potable water and on the sanitary disposal of wastes.

- International agreement should be reached on criteria, guides and codes of practice concerning known environmental influence on health.

- The development and coordination of epidemiological health surveillance should be stimulated in order to provide basic information on adverse effects of human health attributable to the environment: one method of achieving this is through environmental monitoring systems.

- Knowledge of the effects of environmental factors on human health should be extended by collecting and disseminating information, by stimulating, supporting, and coordinating research, and assisting in the training of personnel.

(W.H.O. 1972, pg. 11)

The W.H.O. noted that in order to fulfill its obligations, efforts would be required to recruit individuals and agencies with expertise outside the traditional areas of health agencies. (W.H.O. 1972, pg. 271).

Environmental health services represent an outgrowth of public health programs. The relative success of the late nineteenth century public health practices demonstrated the significance of the interaction between human health and environmental factors:

...the observed decline in mortality in the nineteenth and early twentieth centuries in Western Europe and North America is attributed to improvements in the environment (e.g., better water and sewage systems, food and housing), and inoculations against various infectious diseases...

(Soderstrom 1978, pg. 15)

While public health agencies continued to advance the merits of preventative medicine, environmental data requirements continued to increase. This phenomenon lead to changes in the

function and direction of many public health agencies:

...Public health departments from their earliest beginnings have needed to develop systems for collecting and recording what were considered to be essential public health data. Initially, such systems were organized so as to facilitate the early identification and control of communicable diseases.

...More recently, the attention paid to collecting and assessing data on sanitary and environmental conditions has increased considerably, and a number of national and international institutions and organizations are now gathering information of the human environment...

(W.H.O. 1972, pg. 325)

One of the consequences of the increased attention directed toward collecting information on environmental conditions has been the need to develop specialized environmental health systems. Public health agencies can no longer cope with both the delivery of traditional services and the collection of environmental data.

Eventually, a much wider range of activities distinguished environmental health from public health. Public health continues to be recognized with medical professions including: communicable disease control, enforcement of environmental sanitation regulations, and community health services (Soderstrom 1978, pg. 41). Consequently, environmental health took on a more expanded meaning:

Environmental health services have at least three major dimensions: occupational health services... public health services...; and environmental control programs. The latter includes control of air, water, radiation and land pollution. Programs promoting such things as motor vehicle and driving safety can

also be considered environmental control programs...

(Soderstrom 1978, pg. 37)

Definitions of environmental health will continue to be debated as long as the field of environmental health continues to expand. The literature suggests that some conditions associated with environmental health matters have gained general recognition. Most notably, public health can be considered as part of a community of interests in environmental health; the opposite would not necessarily be the case.

For purposes of this practicum, environmental health is a term indicating a field of activities conducted by institutions dealing with environmental matters that impact on the quality of human health. Institutions include traditional health professions as well as agencies of environmental control, infrastructure and engineering, and any other directed enterprise which can aid in the identification and control of environmental health hazards.

### 2.3 Environmental Health System

An environmental health system is a term used to describe the interactions, coordination and cooperation among institutions responsible for environmental health matters. The development of the public health field coincided with the transfer of environmental control organizations (W.H.O. 1972, pg. 325-326). The W.H.O. has observed that the transfer of environmental control operations from health institutions has resulted in the creation of an environmental health system as a consequence of institutional growth.

The W.H.O. suggests that in order to have an effective environmental health control program, the optimum organization of inter-agency activities becomes a critical factor.

...in principle, even major human or economic activity contributes to some extent to pollution problems, the need to acquire sufficient relevant data poses a serious problem because the acquisition of such data is costly. Data are needed to provide the basis for decisions calling for control actions, and the types of data collected must be selected with this specific aim in mind. For the purposes of decision-making and control the existing steady (or normal or initial) state of the system (baseline) must first be determined. The relations between the control parameters and the states of the system must then be analysed and computed so that both short and long-term hazards may be detected, and the efforts of control actions predicted.

(W.H.O. 1972, pg. 326)

The W.H.O. concept focuses on the need for organization of technical services. The level of inter-agency communication, however, is dependent on several organizational factors.

In his discussion on emergency delivery systems, Kueneman addresses the aspect of organizational effectiveness:

All human organizations can be viewed as sets of stable social relations deliberately created with the explicit intention of continuously accomplishing some specific goal or purposes. Thus each of the organizations, branches and departments of government structure can be identified by their legislated mandate. While all organizations display some degree of organization as they set goals to meet their purposes, they vary along a continuum of systemness. Organizations vary in the degree to which they can achieve centralization of control and information, interdependence of its various



parts, effective monitoring and adjustment to changes in its environment. The greater the ability of an organization to develop structures to accomplish these characteristics, the closer they approximate the idealized system, which displays a high degree of effectiveness.

(Kueneman 1978, pg. 41)

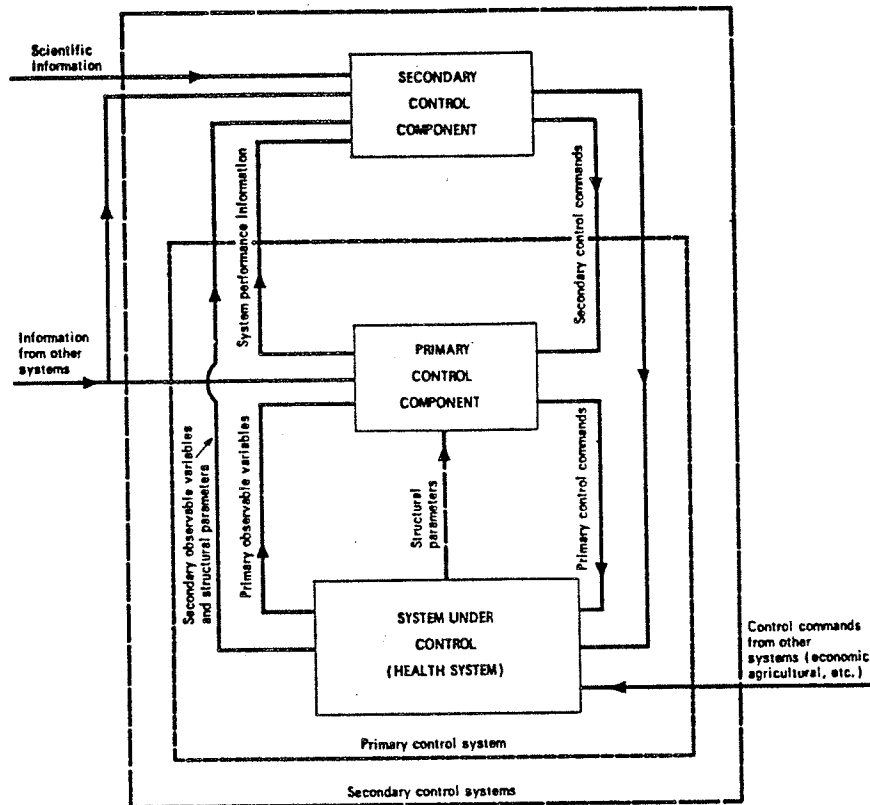
The overall level of "effectiveness", that W.H.O. is concerned with, is the optimal decision-making capacity of environmental health systems operating under perfect conditions. However, Kueneman recognizes that decision-making must coincide with the major functions of public administration. Legislated mandate, degree of centralization, and clearly defined goals are major factors which will effect the operation of any institutional organization and cannot be overlooked.

#### 2.4 Components of Environmental Health Systems

The major objectives of any environmental health system are to be able to recognize, identify and control environmental problems which may have adverse effects on human health. The recognition and identification of possible environmental problems is restricted by the stock of information available, e.g. certain multi-resistant pathogens. However, where health problems such as certain water-borne diseases have been identified, and effective methods of control are available, the control of environmental factors is not only possible, but necessary. (See Appendix "B".)

The W.H.O. has defined the term "to control" as:

Figure 1.0  
AN ENVIRONMENTAL HEALTH  
CONTROL SYSTEM:  
GENERAL SCHEME



World Health Organization  
Health Hazards of the Human  
Environment  
Geneva, 1972, pg. 335

"to cause the magnitude of a variable to remain within defined limits." Thus, to control pulmonary tuberculosis would mean to restrict the frequency of its occurrence to the currently practicable minimum level.

(W.H.O. 1972, pg. 332)

The control of environmental health problems involves a variety of institutional activities such as environmental control measures, control of communicable diseases, sanitary waste management, environmental monitoring, etc.

The W.H.O. has proposed, that while the many medical, scientific and technical services associated with environmental health matters are the foundation of any environmental health system, it is the integration of these services that largely determines the relative "success" or "failure" of environmental control systems. A model was developed by the W.H.O. which serves to integrate the various components of an environmental health system (W.H.O. 1972, pg. 332-338). The model proposed was based on general systems theory. The major features of the proposed environmental health systems model will be reviewed.

The W.H.O. suggests that prior to the identification and review of potential components of an environmental health system, the resources of a community should be examined. Many of the attributes of an environmental health system exist in a non-formalized structure with varying levels of development:

...thus, every community, region, or country has an existing, organizational structure for the methods of supplying water, existing sewage systems and sewage disposal plants, and existing

railways and other transport networks, The cities and towns are already there, as are the factories and farms.

(W.H.O. 1972, pg. 333)

Environmental health systems represent the organization of institutions with common purpose and goals, over matters relating to the control of environmental health hazards. A strict set of criteria which lists the specific type of activities that could be considered as distinct elements of an environmental health system would not provide an appreciation of central mechanisms, i.e. the decision-making process. The main consideration in the examination of an environmental health system should be in terms of the degree of interaction among institutions rather than a list of administrative functions without consideration for the interdependencies of agencies.

#### 2.4.1 *Structure and Control Mechanisms of an Environmental Health System*

The W.H.O. has developed an idealized model of an environmental health system which has been used to identify the operational features of an integrated system (W.H.O. 1972, pg. 332-338). Two distinct aspects of institutional operations are considered as conceptually distinct sub-components; they are "structure" and "control mechanisms". As noted in Section 2.4, structure is used to describe existing organizations, agencies and practices. Water delivery systems, public health programs, and community planning could be considered as structural components of an environmental health system.

"Control mechanisms", however, is a term used to describe the organizational features of an environmental health system which may, either potentially or actually, be employed to regulate environmental health conditions. The W.H.O. has indicated that "control variables":

...whether or not they are already being regulated or are liable to be brought into play in future health planning and possible control mechanisms, are the tools with which the authorities responsible for the health system can strive to achieve the desired outcome within the given structure.

(W.H.O. 1972, pg. 333)

The W.H.O. has referred to the total environment, namely air, land and water, as the ecologic determinants of an environmental health system. When one aspect of the natural environment has been selected as a targeted area for environmental control, it could be referred to as a sub-system. A simplified model of water-control sub-system that concentrated on the structure and control mechanisms was presented:

(1) the structure of the water supply; the patterns of consumption, purification, treatment, and discharge of sewage; and the interaction of quantitative and qualitative variables with public health;

(2) the observation and control mechanisms through which the performance of the system can be optimized, as judged by acceptable social and medical criteria. This includes the monitoring of outfalls, bacteria counts in the water supply, and legislative regulations. The criteria for optimization can be regarded as external constraints on the system, i.e., as variables in an economic or social sub-system.

(W.H.O. 1972, pg. 333-334)

The structural plant of an environmental health system, whether it be hospital or water treatment facilities, can only be distinguished from control mechanisms in a theoretical sense. The W.H.O. emphasizes that, in practice, structure and control mechanisms may be the same, e.g. water treatment facilities. It is only in the conceptual discussion that they can be considered as distinct factors.

#### 2.4.2 *Control Mechanisms*

Two distinct levels of environmental control mechanisms have been identified by the W.H.O.: primary and secondary control systems. (See Figure 1.0). The primary control mode is concerned with "localized" environmental protection activities confined within a specific geographic location (i.e. a community). Environmental health matters that are regarded as primary control methods are associated with sanitary measures such as: potable water supply, solid waste management practices, and wastewater treatment facilities. (W.H.O. 1972, pg. 334)

The primary control component is generally directed toward potential health hazards that are visibly apparent. An inoperative sewage treatment plant would be an obvious example. Raw sewage can be identified by direct observation; laboratory confirmation is not required.

An important aspect of primary control is the close

relationship among representatives of health and environmental agencies within the community:

In...a primary control system, the response of the regulatory agent (whether an agency of the health authorities, or an automatic device) is rapid, and carefully defined or prescribed by the system planning...

(W.H.O. 1972, pg. 334)

Routine operations conducted on a "day-to-day" basis characterize primary control activities. Interaction among environmental health-orientated institutions, concerned with primary control, will be on a regularized basis.

#### 2.4.3 *Secondary Control Mechanisms*

Secondary control mechanisms involve regional, national or global environmental health matters. The secondary control system:

...will be guided by a set of general principles rather than by exact rules. The principal behavior of the secondary control component is to monitor the behavior of the primary control systems and adapt the performance of the latter to secular, long-term changes in the health sub-system. It must, in addition, evaluate the efficiency of the primary control system's performance and alter the direct control mechanisms in accordance with the overall objectives of the human ecosystem.

(W.H.O. 1972, pg. 334-335)

The secondary control mechanism is separate from the immediacy of local environmental conditions. As a mechanism for the overall control of environmental factors, it has an

executive function which includes the overall coordination of environmental and health agencies.

Situations or problems which cannot be adequately addressed by either the primary control mechanism or by the local health system, can be referred to the secondary control component. In the event of a major emergency, for example, regional or national resources of the secondary control system would be utilized to respond to aspects beyond the local capacity or capability.

The secondary control system would also involve inter-agency planning, prioritizing and direction. The W.H.O. has delegated the secondary control system with:

...The objective...to stimulate and guide the implementation of overall programmes for the control and management of the interrelationships between the environment and human health. We shall consider the human ecosystem primarily in terms of the potentialities for detection, analysis, warning, and control, as they apply to the field of public health.

(W.H.O. 1972, pg.335)

## 2.5 Synthesis of Environmental Health Control Mechanisms

The effect of the secondary control system is dependent on two factors: the identification of control variables and coordination of environmental health agencies. For monitoring purposes, the W.H.O. has identified the critical need to distinguish changes in the level of environmental and health factors. In order to establish "targets of optimization",



control variables must be observable:

...the amelioration of the health of all individuals in a community cannot be observed or measured directly because of prohibitive costs and delays. As a result, systems theory distinguishes a particular class of effectively observable variables from other variables. The observable variables are the elements in the information flow by which the state of the system to be controlled is determined.

(W.H.O. 1972, pg. 338)

Unusual changes in environmental conditions such as floods or other disasters cannot be fully assessed in terms of anticipated impact on human health without reference to control variables.

The identification of control variables is only effective if there is communication between primary and secondary control systems. The W.H.O. has noted that one problem with the development of institutional arrangements has been with respect to the evaluation of systems.

...Because the workings of the health sub-system are so inadequately understood, the primary control component may be inadequate for this purpose. It may prove necessary, therefore, to operate on the system itself, e.g., to alter the distinction between the structural and control parts of the system, to modify components of the existing structures, and the primary and perhaps even the secondary control methods and mechanisms. It is the task of the secondary control component both to plan and to execute changes in the organization and operating procedures of both control components.

(W.H.O. 1972, pg. 336)

By establishing a central coordination centre within the secondary control system, an integrated system can be developed.

As Kueneman has observed:

...Integration, directiveness and centralization are not readily attainable for a system which does not have centralized control and communication coupled with some type of feedback process. The less autonomy that any of the parts have, the more integrated and controlled is the operation of the system.

...the actions of the various parts need to be controlled to avoid duplication or failure to provide a service. This especially is true in major emergencies and disasters where there has been serious disruption. Therefore, the boundaries of the highly organized system are evident because all parts have an explicitly stated relationship to other parts of the system. Likewise, no system can realistically evaluate its efficiency and effectiveness without a centralized communication structure and a feedback mechanism. Nor can it improve its efficiency/effectiveness without a well defined control structure to effect corrective action.

(Kueneman 1978, pg. 45)

If the secondary control system is to be able to effect optimal changes in the "organization and operating procedures" internally and in the primary control system a centralized common communication structure is critical. Conversely, a loosely defined secondary control system will not represent an organized decision-making unit and information relating to control variables may become confused. This invariably leads to a reduction of the environmental health systems effectiveness and efficiency in the provision of critical service or resources.

## 2.6 Summary

In conclusion, environmental health literature revealed the application of systems analysis as a method for the examination of the interaction between agencies responsible for environmental health matters. Control variables and the communication of environmental health information were observed as critical features in the operation of environmental health systems.

The fragmentation of environmental health-related services has placed greater emphasis on the need for inter-agency coordination. The administrative separation of environmental control services from health institutions had been cited as a potential source of communication problems (W.H.O. 1972). In order to avoid duplication of services and eliminate gaps, a high degree of coordination is necessary.

The present environmental health system responsible for northern Manitoba Indian reserve communities has experienced difficulties in the control of environmental health problems.

Concern has been expressed toward the effectiveness of northern Manitoba environmental health problems:

...Many departments and agencies, federal and provincial, have co-operated in various programs, generally aimed at improved living conditions and economic opportunity. There is, however, considerable evidence to show that conditions in the communities have not substantially improved, in spite of the millions of dollars and obvious good intentions.

(Gavin 1982, pg. 3)

## CHAPTER III

### ENVIRONMENTAL HEALTH AGENCIES

#### 3.1 Introduction

This chapter identifies the major government agencies and services responsible for matters concerning environmental health in northern Manitoba Indian reserve communities by mandate. Agencies that have been identified as part of the environmental health system have been grouped into three categories: federal, provincial, and ancillary. The third category describes agencies which have input into environmental health matters, but have limited direct responsibility for environmental health services. The provincial Emergency Measures Organization is one example. Included in the ancillary category are several federal and provincial agencies.<sup>1</sup>

The federal departments considered primarily responsible for environmental health are: Indian and Inuit Affairs Branch, Department of Indian Affairs and Northern Development; Medical Services Branch, Department of Health and Welfare; and Environmental Protection Service, Department of Environment.

Although jurisdictional responsibility for Indian reserves is assigned to the federal government, by virtue of constitutional authority over the administration of Indian lands, there has been

<sup>1</sup> Only the first two categories, federal and provincial, will be discussed in this chapter.

arguments that there are no legal constraints restricting provincial governments involvement with matters concerning the residents of reserve lands (Ponting 1980, pg. 7). Provincial involvement on reserves has occurred through working agreements between the federal and provincial governments. Hence, provincial agencies involved with environmental health matters on reserves will also be identified. Two provincial departments have been included in this chapter; they are the Department of Health and the Department of Environment.

A third category comprising several federal and provincial agencies contributes a variety of services and resources related to environmental health. These agencies complement the activities first two categories. These agencies are: (federal) - Department of Public Works; Inland Waters Directorate, Department of Environment; Department of Regional Economic Expansion; Department of Supply and Services; Emergency Planning Canada; (provincial) - Department of Northern Affairs; Emergency Measures Organization, Department of Government Services.

### 3.2 Federal Environment Health Agencies

#### 3.2.1 Department of Indian Affairs and Northern Development

##### 3.2.1.1 *The Indian Act* R.S., 1974-75-76, c. 48.

This Act establishes the Department of Indian Affairs and Northern Development (D.I.A.N.D.). The Indian and Inuit Affairs Program of the Department administers the statutory responsibilities of the Minister of Indian Affairs and Northern Development towards status Indians living on reserve lands.

The Indian Act includes provisions that:

- define Indian status;
- define legal rights of Indians;
- establish responsibilities for education, reserves, band government, and managers of money;
- incorporates many of the provisions of treaties; and
- establish responsibilities for Indian administration...

...In effect, the Indian Act establishes a direct legal and administrative relationship between the federal government and status Indian people. For Indian people living on reserves, the department is responsible for activities normally performed by provincial and municipal governments such as education, welfare, local fire, police and environmental protection, and the development of community services.

(Benner 1982, pg. 5)

Two distinct sections contain reference to environmental health considerations. Section (73) deals with the authority of D.I.A.N.D. concerning the delivery of municipal services. Section (81) describes the responsibilities which may be assumed by an Indian Band Council. The actions of the Band, firstly, must comply with the intent of the Indian Act, and secondly, must be promulgated through the incorporation of by-laws.

Potable water services, solid waste management and wastewater treatment facilities are the responsibility of the Indian and Inuit Affairs Programs. The provision of these services has considerable impact on community public health and environmental conditions. As

the federal department responsible for utilities delivery, D.I.A.N.D. is considered a major component of the northern Manitoba environmental health system.

The responsibility of D.I.A.N.D. for municipal services on reserve land is not clearly identified in the Indian Act. The only reference to municipal services is in Section (73) which refers to sanitary conditions. This section empowers the Governor in Council to make regulations for a variety of local government considerations, including public health:

73. (1) The Governor in Council may make regulations...

- (f) to prevent, mitigate and control the spread of diseases on reserves, whether or not the diseases are infectious or communicable;
- (g) to provide medical treatment and health services for Indians;
- (h) to provide compulsory hospitalization and treatment for infectious diseases among Indians;...
- (k) to provide for sanitary conditions in private premises on reserves as well as in public places on reserves...

(2) The Governor in Council may prescribe the penalty, not exceeding a fine of one hundred dollars or imprisonment for a term not exceeding three months, or both, that may be imposed on summary conviction for violation of a regulation made under subsection (1)...

Section (73) of the Indian Act identifies health and safety matters which may be regulated by the Governor in Council. There is no provision in the Act requiring the establishment of public health or environmental control standards. Only the enabling authority to incorporate regulations currently exists. There are two sets<sup>1</sup> of regulations which have been promulgated under this Act. However, only the Indian Reserve Waste Disposal Regulations C. 960 (see Appendix "E" and Section 3.2.1.1.) can be enforced by the Minister of Indian Affairs and Northern Development.

Section (81) of the Indian Act includes a description of the powers of the Indian Band council. Included in this section are parallel responsibilities to those outlined in Section (73). The major distinction between the two sections is the allocation of responsibilities; Section (73) defines federal jurisdiction, while Section (81) defines the jurisdiction of the Band council.

Included in Section (81) is a wide array of activities which could be considered local government or municipal matters, such as "health and safety", "traffic", "construction", and "public games". Environmental health matters are defined in three paragraphs of Section (81), they are:

- (a) to provide for the health of residents on the reserve and to prevent the spreading of contagious and infectious diseases;...
- (b) the regulation of the construction, repair and use of buildings, whether owned by the band, or by individual members of the band;...
- (c) the construction and regulation of the use of public wells, cisterns, reservoirs, and other water supplies...

<sup>1</sup> The Indian Health Regulations C. 955 established under the authority of the Indian Act are administered by the Department of National Health and Welfare.



In order to exercise the authority defined in Section (81) the Band is required to create by-laws. Unless the Band initiates action that would result in the introduction of by-laws, areas defined in this section represent potential as distinct from actual authority of the Band.

In a recent report prepared for D.I.A.N.D. it was noted that:

At present the existence of such by-laws is probably rare. However with the establishment of building codes, presently being developed by the Department for consideration and implementation by Indian Bands, it is expected that the use of appropriate by-laws will increase...

(Holden, 1981, pg. 8)

In a similar vein, the authority outlined in Section (73) of the Indian Act empowers the Governor in Council to "make regulations". With respect to environmental health matters, only two sets of regulations have been promulgated, they are: the Indian Health Regulations C. 955; and the Indian Reserve Waste Disposal Regulations C. 960.

#### 3.2.1.2. *The Indian Reserve Waste Disposal Regulations C. 960*

These regulations were promulgated under the authority of the Indian Act (see Appendix "E"). The practice and control of solid and liquid waste on Indian reserve lands is defined in these regulations. Provisions are included for the establishment of a permit system:

5. The Minister or the council of a band, if authorized by the Minister pursuant to section 8, may issue to any person a permit authorizing that person

- (a) to operate a garbage dump in a reserve;
- (b) to use land in a reserve for the disposal or storage of waste; or
- (c) to burn waste on any land in a reserve.

6. A permit shall

- (a) specify the land in respect of which the permit is issued; and
- (b) specify the manner in which the activity authorized therein shall be exercised.

7. Subject to section 11, a permit shall expire on December 31st next following the date of issue thereof.

8. The Minister may, in writing, authorize the council of any band to issue a permit in respect of land in the reserve of that band and shall, in the authorization, specify the manner in which the activity to be authorized in the permit shall be exercised.

In principle, these regulations would apply to any person (or persons) engaged in activities that would generate either solid or liquid wastes.

In the event that the regulations are violated, the Minister of Indian Affairs and Northern Development (or the Band Council if section (8) has been exercised), can issue an order of compliance. Should the person who has been given a clean up order fail to do so, a charge may be issued. Section (14) of the regulations outlines the penalties:

14. Every person who violates these Regulations is liable on summary conviction to a fine not exceeding \$100 or to imprisonment for a term not exceeding three months, or to both.

The Indian Reserve Waste Disposal Regulations do not outline solid waste management practices, nor does it provide physical specifications and environmental standards. In order to regulate waste disposal regulations, environmental standards and sanitary practise codes outside the terms of the regulations must be utilized. Typically provincial health and environmental standards are employed.

### *3.2.2. Department of National Health and Welfare*

#### *3.2.2.1. The Department of National Health and Welfare Act, R.s.c. 1970. c. R-4.*

Under the authority of this Act, the Department of National Health and Welfare is established. This Act provides the Department with the legal mandate to administer various aspects of federal health and welfare programs. The Minister of National Health and Welfare has been assigned either total or partial responsibility for twenty-one statutes.

The duties of the Minister of National Health and Welfare are outlined in section (5) of this Act:

...The duties, powers and functions the Minister extend to and include all matters relating to the promotion or preservation of the health, social security and social welfare of the people of Canada over which the Parliament of Canada has jurisdiction, and, without restricting the generality of the foregoing particularly the following matters:

- (a) the administration of such Acts of the Parliament of Canada and of orders or regulations of the Government of Canada as are not by law assigned to any other department of the Government of Canada or any minister thereof relating in anyway to the health, social security and welfare of the people of Canada;

Three functions, assigned to the Minister of Health, have special relevance to environmental health matters; they are:

- (b) investigation and research into public health and welfare,....,
- (g) subject to the *Statistics* Act, the collection, publication and distribution of information relating to the public health, improved sanitation, and social and industrial conditions affecting the health and lives of the people, and,
- (h) cooperation with provincial authorities with a view to the coordination of efforts made or proposed for preserving and improving the public health and providing for the social security and welfare of the people of Canada...

In 1945, the Minister of Indian Affairs, formally transferred Indian health responsibilities to the Minister of National Health and Welfare (Ponting, 1980, pg. 15). The Department of Indian Affairs had previously assumed the responsibilities for the provision of health services on Indian reserves. Indian Health Services had been the administrative branch of the Department of Indian Affairs and Northern Development charged with health matters on reserve land.

The transfer of responsibilities was accomplished by Orders-in-Council, Chapter 955, Indian Health Regulations. While the Department of National Health and Welfare does not have a formalized mandate other than the regulations promulgated under the Indian Act (R.S., c. 1-6, 1974-75-76, c. 48), it does have considerable authority. In a report prepared for the Indian and Inuit Affairs Branch of D.I.A.N.D., it was observed that:

...Indian Health Regulations does however provide NH&W some authority concerning sanitation in that our Department "shall take the advice of a medical officer as defined in the subject chapter..."

(Holden, 1981, pg. 13)

An understanding of convention has been adopted between the two departments. While the Indian Act empowers the Minister of Indian Affairs and Northern Development with executive powers concerning the administration of the Act, Indian Health Regulations are the exclusive responsibility of the Minister of National Health and Welfare.

#### 3.2.2.2. *Indian Health Regulations C. 955*

These regulations are promulgated under the authority of the Indian Act (see Appendix "C"). Prior to 1945, D.I.A.N.D. had the legal responsibility for the provision of health care to all residents on Indian reserves, non-Indians included. In 1945, health responsibilities of D.I.A.N.D. were transferred to the Department of National Health and Welfare. While the enabling legislation for the Indian Health Regulations remains with the Indian Act, the administrative responsibility is now vested with the Minister of National Health and Welfare.



The Indian Health Regulations have two parts. The first part outlines the application of these regulations to three categories in section (3):

3. This Part applies to

- (a) every Indian who ordinarily resides on a reserve;
- (b) every Indian who follows the Indian mode of life whether or not he ordinarily resides on a reserve; and
- (c) every person other than an Indian who resides on a reserve.

(Persons who are not identified in any part of section (3), e.g., an Indian who resides off-reserve are considered in Part II.)

Section (4) defines the application of the regulations with respect to those persons subject to Part I. This section states that:

4. Every Indian who is subject to this Part shall comply with all laws and regulations in force within a province relating to health or sanitation, except such laws or regulations as are inconsistent with this Part.

This section identifies the significance of provincial legislation and its application on Indian reserves. Except for specific matters concerning the control of infectious diseases provincial standards and legislation would apply. The focus of the exception is primarily directed toward administrative purposes, not environmental standards or sanitary standards.

Part II of these regulations, which applies to Indians who are not identified in section (3) has no deviation from provincial codes. Section (20) expressly states that:

20. Indians to which this Part applies shall comply with all laws and regulations in force within a province relating to health or sanitation.

In effect, individuals considered as coming under Part II of the regulations would be subject to only the provincial health codes and standards.

### 3.2.3 *Department of the Environment*

#### 3.2.3.1 *The Government Organization Act R.S.C. 1979 c. 13*

The Department of the Environment (D.O.E.) was established under provisions included in this Act. In principle, this Act charges the Minister of the Environment with the authority to monitor and recommend policy, with respect to environmental quality within the jurisdiction of the federal government. Section (5) (a) (vi) delegates the Minister with the responsibility for:

...the coordination of the policies and programs of the Government of Canada respecting the preservation and enhancement of the quality of the natural environment.

However, the jurisdiction of the Minister of the Environment has been restricted to matters:

...not by law assigned to any other department, board, or agency of the Government of Canada.

(Section (5) (a) (vi))

In this regard, D.O.E. must not infringe on any federal department, board, or agency which has either preceding or overriding authority.

One of the difficulties in determining the authority of D.O.E. to become involved with environmental matters on reserve lands is the vague distinction of jurisdiction between D.I.A.N.D. and D.O.E. Although the Indian Act as well as the general literature demonstrates the jurisdiction of D.I.A.N.D. and Band council over municipal services, very little is said about environmental control. While D.O.E. involvement on reserve lands has been questioned and is not easily stated, there is little evidence to suggest that a conflict of mandate has occurred.

Several factors would seem to indicate that D.O.E., specifically the Environmental Protection Service (E.P.S.), has justification to be involved with environmental control activity on Indian reserve lands. Prior to the establishment of E.P.S. in 1972, the Public Health Engineering Section of Medical Services Branch (D.N.H.W.) was responsible for environmental protection activities on reserve lands. With the creation of D.O.E., the Public Health Engineering Section was terminated and the majority of staff were transferred to E.P.S. Included in the transfer of personnel was the understanding, between the Minister of National Health and Welfare and the Minister of the Environment, that E.P.S. would continue to monitor environmental conditions on reserve lands (Personnel Communication, H. Gavin, E.P.S. Winnipeg, August, 1982).



Subsequently, on June 8th, 1972, the cabinet announced a decision whereby the D.O.E. would be delegated with the responsibility of administering a special pollution control program. The program became known as the Federal Activities Cleanup Program. In theory, the D.O.E. would assess the operations of all federal departments, boards, and agencies with the purpose of identifying existing and potential sources of pollution. In the event that a problem was identified, D.O.E. would assist in development of pollution control practice. The Minister of Indian Affairs and Northern Development, at the time, had supported the program as well as the mandate of D.O.E. to investigate environmental factors on reserve lands (see Chapter 4) for further discussion.

Under the assumption that D.O.E. does not infringe on the legal mandate of D.I.A.N.D., section (6) of the Act would apply. Section (6) states that,

6. (1) The Minister of the Environment in exercising his powers and carrying out his duties and functions under section 5, shall
  - (a) initiate, recommend and undertake programs, and coordinate programs of the Government of Canada, that are designed
    - (i) to promote the establishment or adoption of objectives or standards relating to environmental quality, or to control pollution,
    - (ii) to ensure that new federal projects, programs and activities are assessed early in the planning process for potential adverse effects on the quality of the natural environment and that a further review is carried out of those projects, programs, and activities that are found to have probable significant adverse effects, and the results thereof taken into account, and
    - (iii) to provide to Canadians environmental information to the public interest;

(b) promote and encourage the institution of practices and conduct leading to the better preservation and enhancement of environmental quality, and cooperate with provincial governments or agencies thereof, or any bodies, organizations or persons, in any programs having similar objects; and

(c) advise the heads of departments, boards and agencies of the Government of Canada on all matters pertaining to the preservation and enhancement of the quality of the natural environment.

(2) For the purpose of carrying out his duties and functions related to environmental quality, the Minister of the Environment may, by order, with the approval of the Governor in Council, establish guidelines for use by departments, boards and agencies of the Government of Canada and, where appropriate, by corporations listed in Schedule D to the *Financial Administration Act* and regulatory bodies in the exercise of their powers and the carrying out of their duties and functions.

With respect to environmental health matters, section (6) enables the D.O.E. to investigate and report on environmental conditions in areas considered federal jurisdiction.

Section (6) also empowers the Minister to enter into agreements with provincial governments. Subsection 6(3) states that:

(3) The Minister of the Environment may, with the approval of the Governor in Council, enter into agreements with the government of any province or any agency thereof respecting the carrying out of programs for which the Minister is responsible.

The Minister of the Environment has exercised this power on occasion, primarily through the signing of federal-provincial accords.

3.2.3.2 *Canada-Manitoba Accord for the Protection and Enhancement of Environmental Quality*

In 1975, the Minister of the Environment, on behalf of the Government of Canada entered into an accord with the Province of Manitoba. The Canada-Manitoba Accord for the Protection and Enhancement of Environmental Quality established an understanding of environmental protection between the federal and provincial governments. The application of the Accord was stated as:

1. This Accord applies to federal-provincial relationships involved in the protection and enhancement of the environment to a desired quality. This would generally encompass environmental assessment, design, protection, enhancement, and related research.
2. The objectives of the Accord are:
  - (a) to provide a more effective overall effort on the solution of pollution problems through better co-ordination of the activities of Canada and the Province; and
  - (b) to provide a broad framework within which specific agreements can be designed to cope with particular problems

The accord includes provisions for the development of environmental quality criteria and objectives. Section (9) states that:

- (9) Canada, after consultation with the Province and all other provinces, agrees to develop national baseline effluent and emission requirements and guidelines for specific industrial groups and specific pollutants...

Existing environmental standards and objectives would be applied equally by both parties. Subsequently, section (12) states:

- (12) The Province agrees to establish and enforce requirements at least as stringent as the agreed national baseline requirements. Such requirements would be applied at start-up for all new installations or for installation undergoing major plant modifications. In all other cases, the national baseline requirements would be applied as a minimum as rapidly as possible to meet agreed objectives and time schedules.
- (13) Canada and the Province agrees to appoint officers designated by either government to facilitate inspections for compliance with national effluent and emission requirements. Appropriate arrangements for either federal or provincial inspection of federal facilities would be determined by specific agreements.

Both governments also agreed to undertake a cooperative monitoring and surveillance program.

### 3.3 Provincial Environmental Health Agencies

#### 3.3.1 *Department of Health*

The Minister of Health is responsible for the administration of the Public Health Act R.S.M. 1975, c. 42, s. 44. Under the authority of this Act, the Minister is responsible for the following as defined in section (3)(1):

3(1) The minister has the supervision of all matters relating to the preservation of life and the health of the people of the province, and of all matters relating to the prevention of injury to life and limb not specifically dealt with under some other Act of the Legislature; and, without limiting the generality of the foregoing, he shall

- (a) make or cause to be made investigations and inquiries respecting the causes of disease, ill health, and death, in the province, and the causes of injuries to life or limb the prevention of which is not specifically dealt with under some other Act of the Legislature, and the steps that may be taken to reduce the causes of disease, ill health, death and such injuries;

- (b) advised the government and officers of the government on matters relating to public health and safety in matters not dealt with specifically under some other Act of the Legislature:
- (c) cause to be inspected all public or private institutions for the care or treatment, or both, of persons suffering from mental or physical disability or disease for the purpose of maintaining proper sanitary conditions therein and conformity with this Act and the regulations; and
- (d) for and on behalf of the government, enter into agreements with health units, municipalities, municipal districts, local government districts, and school districts in unorganized territory, for the supply of medical or nursing services and inspection staff by the government.

Provision for the appointment of public health inspectors and public health nurses are also included.

The Minister of Health recently introduced changes to the disease control regulations promulgated under this Act. The control and prevention of communicable disease outbreaks has been administrated through Manitoba Regulation 14/80 (See Appendix "F".)

#### 3.3.1.1 *Manitoba Regulations 14/80*

These regulations are promulgated under the authority of the Public Health Act. The definition of communicable disease is included as well as a listing of those diseases considered notifiable communicable diseases. Section 2(1) expressly states that:

- 2(1) On becoming aware that any person is suffering from a notifiable disease, or any other disease that may be dangerous to the public health, a duly qualified medical practitioner shall forthwith report particulars of the case as required in section 3, 4, 5 or 6 to

- (a) the medical officer of health of the municipality in which the patient resides; or
  - (b) the director, if the patient resides in an area in which there is no medical officer of health.
- 2(2) The superintendent or other person in charge of every hospital shall submit to the director, monthly, on Form VI in the Schedule, a report of patients treated in the hospital for any communicable disease including those listed in sections 3, 4 and 5 and including rheumatic fever (390-382) and poststreptococcal glomerulonephritis (580).
- 2(3) Every person in charge of a clinical laboratory who in the examination of any specimen derived from a human body finds microscopical, cultured, immunological, serological or other evidence of a notifiable disease listed in section 3, subsections 4(1) or 4(3) or section 5 shall within 7 days report the nature of that evidence to the Director together with the name and address of the person from whom the specimen was taken and the name and address of the duly qualified medical practitioner, if any, who is, or has been, attending the person from whom the specimen was taken.

In principle, the procedures described in section (2) are considered in effect on Indian reserve lands and have been adopted by the Department of National Health and Welfare.

### 3.3.2 *Department of the Environment*

#### 3.3.2.1 *The Clean Environment Act R.S.M. 1981 c.41. s.1*

This Act does not identify pollution as such, but does identify what is considered "contaminants". Section 1 (d) contains the following statements:

- 1 (d) "contaminant" means any solid, liquid, gas, waste, odour, heat, sound, vibration, radiation, or a combination of any of them that
- (i) is foreign to or in excess of the natural constituents of the environment; or
  - (ii) affects the natural, physical, chemical, or biological quality of the environment; or
  - (iii) is or is likely to be injurious to the health or safety of a person; or
  - (iv) is or is likely to be injurious or damaging to property; or
  - (v) is or is likely to be injurious or damaging to plant or animal life; or
  - (vi) interferes or is likely to interfere with visibility; or
  - (vii) interferes or is likely to interfere with the normal conduct of business; or
  - (viii) interferes or is likely to interfere with the comfort, well-being or enjoyment of a person;
- and "contaminant" has a similar meaning.

The Clean Environment Act provides the Province of Manitoba with a mechanism to control pollution. Pollution is interpreted as the discharge of contaminants in levels exceeding provincial standards.

Sections (3), (4) and (5) of this Act enable the province to establish "prescribed limits" prohibiting the discharge of any elements considered a contaminant which exceeds provincial standards. Limits of contamination have been established through the creation of regulations.

## CHAPTER IV

### NORTHERN MANITOBA ENVIRONMENTAL HEALTH ARRANGEMENTS

#### 4.1 Introduction

No single government agency, federal or provincial, has exclusive jurisdiction over environmental health matters concerning Indian reserve communities in northern Manitoba. In Chapter III, federal and provincial departments and agencies which have responsibilities for environmental health matters were identified. Three federal departments as well as two provincial departments were recognized as having environmental health responsibilities.

This chapter will focus on the organizational and administrative arrangements made between the various parties considered part of the overall environmental health system. Two issues that will be discussed are: a) "What are the existing arrangements between the environmental health agencies which serve Indian reserve communities?", and, b) "Do the various agencies coordinate their activities, and if so, to what extent?"

The issues this practicum addresses were raised during the preparation of a report submitted to Environmental Protection Service (D.O.E.), Manitoba District. The report entitled, "A Report on Environmental Concerns for the Communities of Cross Lake, Nelson Lake, Nelson House, Norway House, Split Lake, and York Landing," (see Appendix "A") included concerns expressed by representatives



of the various environmental health agencies and Band officials. Concerns reflecting organizational and administrative factors included in the 1981 report will be presented in this chapter.

#### 4.2 Components of the Environmental Health System

Operational features of an "idealized" environmental health model conceptualized by the World Health Organization were discussed in Chapter II. This section will identify the programs and approaches practiced on Indian reserve communities in northern Manitoba.

##### 4.2.1 *Indian Health Services, D.N.H.W.*

The transfer of Indian Health Services to the Department of National Health and Welfare (D.N.H.W.) in 1945 was part of the major federal reorganization of federal health and welfare services. By 1977, five district health branches had been established within D.N.H.W. Indian Health Services was joined by seven other agencies to form the Medical Services Branch.

The federal government has continued to assume responsibilities for the provision of health services on Indian reserves. As Soderstrom points out, Indian Health Services:

- provides or arranges for health care and public health services for registered Indians living in the provinces. This service is responsible for making available to these people health services comparable to those available to other Canadian residents. Being

a resident of a provinces, these people are entitled to the benefits of their province's medical care and hospital insurance plans. But in areas where provincial or other conventional health services (i.e. dentists, hospitals, physicians) are not available, they are supplied by the services. Thus, it operates a series of nursing stations, health centers, hospitals and other facilities for Indian Tribes. It assists Indian tribes in arranging transportation and obtaining drugs and protheses. The Service also provides various public health services.

(Soderstrom 1975, pg. 190)

Public health services can be broken down into three separate programs; they are: 1) Community Health Services, 2) Environmental Health and Surveillance, and, 3) Community Health Representatives.

#### 4.2.1.1 *Community Health Services*

Public health and prevention programs constitute the major thrust of Community Health Services. The program includes an integration of public health nurses, health education programs and physician services. The 1980 Annual Review of Manitoba Region observed that,

...Ongoing primary treatment services were provided by nurses in Nursing Stations and, despite the shortage and inexperience of the recruits in 1980, the program was maintained.

Physician services were provided by physicians through contracts with individual physicians, private clinics, and the Northern Medical Unit (NMU), University of Manitoba (U of M).

Whenever possible, arrangements were made with general practitioners residing in the north and who were closer to the northern communities. Services were therefore provided by physicians from Thompson, Lynn Lake, Churchill and from Winnipeg where services from northern communities could not be arranged. For the most part, the specialist services such as obstetrics, pediatrics, psychiatry, etc., were provided by specialists from Winnipeg.

(Medical Services Branch, 1980,  
pg. 10)

Communicable diseases control is a significant function of community health services. In the event of serious outbreaks, Environmental Health Officers are notified. One such example was reported in the annual review:

...Intestinal infections were notable high during 1980 due to outbreaks of Shigellosis in Garden Hill, St. Theresa, Wassagamack, Ebb and Flow, Nelson House and Norway House that resulted in intensive investigation by our Environmental Health Officers and the Cadham Provincial Laboratory. The findings confirmed that there was a widespread outbreak of shigellosis - no specific source was found.

(Medical Services Branch, 1980,  
pg. 9)

The Community Health Services are the mainstay of the northern environmental health system. The provision of hospitals, nursing stations and health stations for Indian reserve communities are administered through this program. In the event of a communicable disease outbreak, it is typically the nursing station staff or hospital staff <sup>1</sup> who would first recognize and respond to the event.

<sup>1</sup> Only one hospital exists on a reserve community in northern Manitoba (Norway House). In most other communities nursing stations are provided and staffed twenty-four hours a day for emergencies as opposed to health stations which are staffed only several times a week.

Additional functions conducted by Community Health Services include:

- Health Education
- Nutritional Counselling
- Maternal and Child Health Services
- Immunization Programs

In some locations where the community is large enough to warrant the additional staffing position full-time public health nurses will be employed. However, this situation is not typical and in many instances nursing staff must administer several programs in addition to routine health care services.

Although the community populations are not greater than 1500 persons in most instances and rarely exceed 3000; the number of citizens hospitalized per 1000 is significantly greater than the provincial average. In a review of hospitalization rates of five communities (see Figure 2)- it was observed that the northern Indian reserve communities were approximately two and a half times greater than the provincial average. It is within this context that the Community Health Services must function.

#### 4.2.1.2 *Environmental Health and Surveillance*

The Environmental Health program has four main objectives concerning environmental conditions on Indian reserves;

- 1) In accordance with Treasury Board Occupational Health and Safety Policies, Standards and Guides, assists in the development, implementation, enforcement and application of a comprehensive program of health standards affecting all property under Federal control.

2) Develops and maintains water quality controls, sewage disposal control, rodent and insect control and solid and chemical waste control programs on all Federal properties and jurisdictions, which includes Federal Camps, National Parks, rural Post Offices, Canal Systems and Railways, Airports, Bus Depots.

3) Develops and implements a comprehensive program to monitor the environment on Native peoples' reserves, advises on implementation of improvements of said environment and instructs community leaders and individuals on good public health practice in order to improve overall public health conditions in these communities.

4) Develops, produces and provides educational and training information and assistance to individuals and groups in the Public Service, Federal enterprises, Native peoples communities and the general public.

(Medical Services Branch, 1980,  
pg. 1)

In practice, Environmental Health Officers (E.H.O.'s) represent an extension of Community Health Services. In the event of a communicable disease outbreak, E.H.O.'s would be responsible for the investigation of environmental factors. Normal duties include surveillance of environmental factors concerning:

- water supplies
- sewage
- garbage disposal
- stores and food outlets
- schools
- hostels and hotels
- public buildings

In the event that a situation investigated reveals a potential health hazard, the incident will be reported to the Band as well as the

FIGURE 2

SELECTED STATUS INDIAN HOSPITAL UTILIZATION, 1977 TO 1980/81

YEAR		YORK LANDING BAND - #A035	CROSS LAKE BAND - #A043	SPLIT LAKE BAND - #A038	NELSON HOUSE BAND - #A030	NORWAY HOUSE BAND - #A042	MANITOBA, ALL RESIDENTS
HOSPITAL CASES	1977	141	506	250	666	585	165,087
	1978/79	118	726	279	711	596	161,998
	1979/80	130	532	281	742	583	156,750
	1980/81	106	622	334	604	536	155,254
HOSPITAL PATIENT DAYS	1977	1,855	3,961	1,888	4,899	3,756	1,758,255
	1978/79	770	4,653	1,657	5,880	3,917	1,762,436
	1979/80	700	3,803	2,311	5,450	3,693	1,715,555
	1980/81	596	3,384	2,342	3,922	3,131	1,842,509
HOSPITAL CASES PER 1,000 POPULATION	1977	350.7	246.1	222.2	360.4	247.0	151.2
	1978/79	296.5	346.0	235.8	378.0	247.1	147.7
	1979/80	316.3	247.0	230.0	386.9	238.5	142.2
	1980/81	257.9	288.8	273.3	314.9	219.3	140.8
PATIENT DAYS PER 1,000 POPULATION	1977	4,614	1,927	1,678	2,651	1,586	1,610
	1978/79	1,935	2,218	1,401	3,126	1,624	1,607
	1979/80	1,703	1,766	1,891	2,482	1,511	1,556
	1980/81	1,450	1,571	1,917	2,045	1,281	1,671

Medical Services Zone Director, Thompson, Manitoba for northern Manitoba.

The two Environmental Health Officers responsible for the surveillance of all Indian reserve communities and federal facilities in northern Manitoba are stationed out of the Medical Services Zone Office in Thompson, Manitoba. In addition to routine visits to reserve communities, the E.H.O.'s assist the community health representatives.

#### 4.2.1.3 *Community Health Representatives*

The Community Health Representative program (C.H.R.) predominantly employs natives who have been resident in a community and are familiar with local conditions. C.H.R.'s assist public health nurses and Environmental Health Officers in the surveillance of environmental health conditions. In a review of the C.H.R. program, Medical Services noted that,

C.H.R.'s are...employed in communities, to determine those things that affect health and lifestyle and to provide information on personal health practices and on the use of health services. In 1980 as many as 72 C.H.R.s were employed in Manitoba Region; by December this number had dropped to 64. All C.H.R.s are employed by Bands except seven that are longtime employees of the federal government. The training of the C.H.R.s at the Keewatin Community College and the ongoing monitoring of the program is carried out primarily by C.H.R. Advisors in Regional and Zone Offices. The Advisors are all Indian people making the program almost totally controlled and operated by the Indian people.

(Medical Services Branch, 1980,  
pg. 21)

There are approximately 30 C.H.R.s working within various northern Manitoba Indian reserve communities. One of the essential services conducted by C.H.R.s is the collection of community surface water quality samples collected regularly for laboratory analysis. The C.H.R.s<sup>1</sup> are the only local environmental health personnel who regularly collect community water samples. While Environmental Health Officers or public health nurses may take samples, they do not do so on a routine basis.

#### 4.2.2 *Indian and Inuit Affairs Branch, D.I.A.N.D.*

Provision of community services such as safe drinking water supplies and water delivery systems are provided to many Indian reserve communities through this branch of the Department of Indian Affairs and Northern Development. Two sections of the Indian and Inuit Affairs Branch have the primary responsibilities concerning environmental health matters on reserve communities; they are:

- Program Planning and Review Section
- Engineering and Architecture Section

<sup>1</sup> Problems have been encountered in the delivery of water samples to laboratory. See Section 4.3.1.



#### 4.2.2.1 *Program Planning and Review*

This section administers three programs: community planning, program planning, and the management of the federal government responsibilities for the Northern Flood Agreement. A major objective of this section is to provide a rational policy development function for the Manitoba Region of D.I.A.N.D. The development of community safe drinking water supplies program was, in part,<sup>1</sup> administered through this section.

In principle, Program Planning and Review is technically a subcomponent of the secondary environmental health control system (as discussed in Section 2.4.3). However, this section must rely on available information which may limit the overall effectiveness of identifying accurately environmental health problems. (Problems with information are discussed in Section 4.3.1.) Discussions with members of this section indicate that, in future, the Program Planning and Review section could fulfill a strong role in an integrated environmental health system. At present, their relationship with other agencies is on an informalized basis and does not extend equally to all affected parties.

<sup>1</sup> Community Planning also worked with Department of Regional Economic Expansion in the Manitoba/Canada Western Northlands Agreement.

#### 4.2.2.2 *Engineering and Architecture*

The actual design and implementation of community services, such as safe drinking water supplies and waste treatment plants, is carried out through this branch. The responsibilities of the Engineering and Architecture Branch are outlined in a D.I.A.N.D. policy directive known as DINA DD 100. The directive states that Engineering and Architecture are responsible for:

- a) the planning, design, construction, operation and maintenance of facilities located on reserves;
- b) the development of technical policies, standards, guidelines and advisory services for a proper and effective level of engineering and architectural activities.

(Holden 1981, pg. 9)

In fulfilling the second objective, the Engineering and Architecture Branch established a comprehensive set of departmental reference manuals. The Indian Housing Infrastructure Standards listed in DRM 10-7/67 states that,

It is the objective of the Department to assist Indian Bands, within the resources appropriated to it, in establishing a safe potable water supply, a proper means waste disposal, community roads and electrical power services. The general aim is to enable Indian communities to acquire infrastructure equivalent to that enjoyed by similar non-Indian communities in the same geographic areas. However, the level of infrastructure provided will ultimately depend on technical and economic considerations.

(Benner 1982, pg. 16)

The Engineering and Architecture Branch have adopted the water quality standards set by the Department of National Health and Welfare. In a review of the utilities delivery guidelines set

by D.I.A.N.D, it was stated that,

All domestic water systems shall provide potable water of a quality stated in the Canadian Drinking Water Standards and Objectives, 1968, Department of National Health and Welfare, Canada.

(Benner 1982, pg. 16)

Five levels of sewage disposal are recognized by the Engineering and Architecture Branch. Level S1 is basically pit privy system; basic guidelines are established at this level for the disposal of human wastes. Level S2 is used to describe the removal and disposal of quantities of domestic sewage. Typically, limited quantities of <sup>1</sup>sewage are stored in containers and removed at regular intervals. The standards adopted by Engineering and Architecture for Level S2 are:

a) The quality of sewage to be removed shall be based on water consumption figures. This should range from 25 to 90 L (5 to 20 gallons) per capita per day.

b) Homes shall have a storage tank size based on the estimated daily volume of sewage generated and frequency of pump-out. The recommended minimum storage tank size is 1100 L (250 gallons).

(Benner 1982, pg. 20)

A pressurized system, known as Level S3, can service homes where a high volume of water is available. Two variations of Level S3 are identified. Level S3A is a sewage disposal system that involves a septic tank and disposal field system. Level S3B can be a piped collection system or a centralized sewage treatment and disposal field system. Level S3B can be a piped

<sup>1</sup> Level 2S are non-pressurized systems which produce low volumes of waste as opposed to pressurized high volume systems.

collection system or a centralized sewage treatment and disposal system. Sewage standards used for Level S3A systems have been expressed as:

- a) These systems shall meet provincial septic tank standards or CMHC Septic Tank Standards, whichever is more stringent where provincial standards are not available CMHC Septic Tank Standards shall be used.

(Benner 1982, pg. 20)

Effluent standards used for Level S3B systems are:

- a) Effluent from sewage treatment facilities shall meet the minimum requirements of DIAND standard DRM 10-7/68.2.1, Effluent Quality and Wastewater Treatment Standards for Indian Reserves.

(Benner 1982, pg. 21)

Environmental control responsibilities on reserve lands have been assumed by the Engineering and Architecture Branch. Water quality standards, which adopt a universally recognized document<sup>1</sup> can be utilized by the various environmental health agencies who are involved with Indian reserve communities. However, sewage effluent standards do not follow a consistent formula which would be uniform in measurement and interpretation. When provincial or C.M.H.C. standards are adopted, environmental or health agencies can also aid in monitoring programs. However if Departmental Manuals or D.R.M.s are adopted, there are distinctions and differences from provincial standards.

<sup>1</sup> The Canadian Drinking Water Guidelines, 1979, published by the Department of National Health and Welfare, reflect a set of guidelines developed by a joint federal-provincial working group with representatives from environmental control and public health agencies.

A problem commonly encountered with respect of environmental control matters of community services is the various types of agreements that Engineering and Architecture have entered into with Band councils. While the responsibilities of the Engineering and Architecture includes water delivery and sewage treatment in many instances, the Band has assumed the management of both services either in part or complete. The records of such agreements are not routinely available to field personnel representing health and environmental programs. In some cases, the Band operator is not informed of the specific responsibilities. This situation has led, in some instances, to a breakdown in the reporting of environmental problems. Technical problems encountered in a sewage treatment plant are in some cases mistakenly reported to the wrong parties. In Appendix "A", several cases were reported where considerable lengths of time were spent before the appropriate party was contacted and responsibilities fulfilled.

#### 4.2.3 *Environmental Protection Service, D.O.E.*

This branch of the Department of the Environment had originally assumed the responsibilities of the Public Health Engineering Section of Indian Health Services in 1972. The Federal Activities Cleanup program (see Section 3.2.3) included provisions for the response to identifiable environmental problems. In addition to the "Cleanup Program", a routine inspection of community services was to be provided including the monitoring of community drinking water supplies, petroleum storage, waste treatment facilities and solid waste management grounds.

Between 1972 and 1979, the assumed responsibilities changed. The first shift in direction was the Cleanup Program:

The Cleanup Program was a means of transferring funds to other departments for improvement or installation of waste treatment and disposal facilities. Although these programs became apparent that Indian Reserves were almost in a class by themselves in their lack of waste treatment facilities and that existing malfunctioning facilities were actually contributing to pollution of water supply sources already contaminated by hastily developed community enterprises funded through the numerous economic and social development programs. Much catch-up remedial work was initiated and completed by E.P.S.; unfortunately, the Cleanup fund only provided capital and did not extend to operating and maintenance funding. The result of this oversight was that many new waste treatment facilities never did become fully operational; in addition, the cleanup program, in the face of decreasing success in addressing existing and new problems, was considered to be ineffective and was abandoned in 1976.

(Gavin 1982, pg. 4)

The environmental control monitoring programs also experienced a change. A recent report noted that,

Reorganization of E.P.S., resource constraints and the need to address additional major environmental issues, such as toxic substances control, led to a cut-back in field inspections and assessments on Indian Reserves and, in effect, a return to the drawing board to redesign the Federal Activities program in Manitoba. In 1979, a review of records relating to pollution problems on Indian Reserves was made, which showed that most treatment facilities were not adequately maintained, for many reasons, and that there were significant water sources contamination problems.

(Gavin 1982, pg. 5)

The rise and the fall of the E.P.S. Indian reserve environmental control program meant that the agency shifted from routine monitoring of conditions to a response to environmental emergencies. Environmental Protection Service now only responds to reported problems such as oil spills and sewage plant failures.

E.P.S. still maintains an informal link with Engineering and Architecture and reviews proposed community services such as sewage treatment facilities for any possible environmental problems. However, this is done on an informal basis and is not always carried out.

#### 4.2.4 *Manitoba Department of Health*

The Department of Health can become involved with environmental health matters originating on Indian reserve lands in one of two ways. The most direct route is through the transfer of patients to provincial hospitals within existing health arrangements between the province and federal government. On reserve, the federal government assumes the direct cost for medical expenses. However in the event that a patient is transferred to a provincial hospital, the federal and provincial government cost share services on a 50/50 basis.

The Medical Public Health Services monitors public health situations throughout the province including Indian reserve communities. Illnesses which are listed in Manitoba Regulation 14/80 are considered notifiable diseases. The listing includes communicable diseases subject to immediate public health review. In the event an illness listed in Manitoba Regulation 14/80 occurs, the Director of Medical Public Health Services is to be notified either by special forms or immediately, depending on the condition outlined concerning the illness.

#### 4.3 Environmental Health Controls

The identification and recognition of environmental health problems is the critical function associated with primary environmental health controls. When a sewage plant is found to be defective, the immediacy

of repair is based on how quickly the problem was discovered. On Indian reserve communities in northern Manitoba, several problems have been encountered on a recurring basis. The monitoring of environmental conditions, the reporting of notifiable diseases, and the cooperative organization of environmental health resources were reported as three problem areas expressed by representatives of various environmental health agencies. Without accurate information and effective coordination of activities, the secondary environmental health controls advocated by the World Health Organization cannot be successful.

#### 4.3.1 *Monitoring of Environmental Conditions*

Monitoring of environmental conditions on Indian reserve communities has been conducted in a segmented and loosely defined process. In many instances<sup>1</sup>, the monitoring of sewage effluent as well as solid waste management has not been in a comprehensive fashion. The water monitoring program undertaken by the C.H.R.s has had serious problems. Samples taken from standpipes, and water trucks must be analysed within a twenty-four hour time frame. Under the current arrangements, this is often not possible. Transportation of samples to laboratories often takes up to one week; therefore, the data is useless. The majority of water samples are taken from surface water, e.g. lakes and streams. Untreated water is unacceptable for human consumption, as indicated by the Guidelines for Canadian Drinking Water Quality. This program continues to test water before treatment while treated water stored in the homes is not sampled.

<sup>1</sup> This was observed by the author in the collection of data included in Appendix "A" and was confirmed by the provincial Department of Health and the federal Departments of Environment and National Health and Welfare. An absolute figure could not be calculated.



#### 4.3.2 *Reporting of Notifiable Diseases*

A problem similar to the monitoring of environmental conditions has affected the reporting of notifiable diseases. Difficulties in the transportation of laboratory samples from Indian reserve communities to laboratory facilities in Winnipeg, prevent accurate and early indications of public health problems. There is controversy as to what proportion of suspected communicable diseases go officially unconfirmed, as opposed to the official statistics. However, under the present environmental health system arrangements, it is not likely that an appropriate forum has been established to address this issue.

#### 4.3.3 *Overview of Environmental Health System*

This research identified the mandates of an array of government agencies which have responsibilities for environmental health matters. Nowhere was it found that a formalized ongoing mechanism existed where problems concerning environmental health matters could be jointly discussed. This was especially apparent with the information problems. It would be outside the terms of this research to say, e.g. that all water monitoring data was inaccurate. However, it would be appropriate to indicate that a great deal of uncertainty as to the validity of that and similar information is rampant throughout the environmental health system. The real problem is not the issue of the validity of data, but why such an organizational problem was never discussed and corrected?

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Summary

Indian reserve communities in northern Manitoba are served by an environmental health system, which includes a collection of federal and provincial agencies as well as individual Band programs. This study identified three federal departments and two provincial departments that have major responsibilities in the delivery of environmental health services. Under the present circumstances, there is no administrative vehicle available to provide for an integration of environmental health services in a coordinated fashion. While the components of an environmental health system exist and continue to serve the residents of northern Manitoba Indian reserve communities, they do so in a segmented manner.

#### 5.2 Conclusions and Recommendations

The environmental health system observed in northern Manitoba was characterized as highly informal in structure and operation. One of the most apparent features of the system was a general lack of coordination between the inter-agency management of agencies. This situation is representative of the relative isolation between agencies who have common interest over environmental health matters affecting northern Manitoba Indian reserves. While decisions are made, funds are allocated, and problem areas are identified; these functions are done in isolation of the other components of the total environmental health system.

The capability of individual components, such as the Indian Health Services of the Department of National Health and Welfare (NHW) was considered exemplary. However, it was observed that nursing staff and medical officers often require services outside the resources of NHW, such as logistical support in the transport of water quality samples out of remote regions to laboratories. With the current lack of formalized relationships between agencies, recognition and response toward environmental health problems has become impeded.

In the event that an individual representative of an agency perceived an environmental health concern, there is no structured means to forward this concern to other agencies. Under such conditions, environmental health hazards which could be reduced, are not. The present lack of established procedures among agencies raises a serious issue - the environmental health system in northern Manitoba, also, has no designated coordinating agency. The individual components of the systems do not have an on-going forum to raise management concerns and coordinate efforts. With respect to this deficiency, I recommend that:

- 1) The Government of Canada, through such agencies as the Medical Services Branch of the Department of National Health and Welfare, and the Department of Indian Affairs and Northern Development, and similar agencies of the Province of Manitoba jointly appoint a special task force in 1983 to identify and assess the current management arrangements of agencies involved in the delivery of environmental health services.

During the preparation of the report included in Appendix "A", it became apparent that in the event of a problem which had environmental health consequences, e.g. sewage plant breakdown, there were no single phone number that a representative of the community may call for assistance. In order to provide northern communities with immediate response to problems as they arise, there must be one phone number identified which has direct access to the resources of all environmental health agencies. By establishing a focal point linking access from the northern communities to government agencies, I recommend that,

- 2) The special task force be identified as a response function for northern communities. One telephone number should be listed whereby problems affecting environmental health conditions can be given immediate action.

The identification of existing government services has also been a problem. In some cases problems exist, not because of inadequate resources, but due to a lack of understanding between agencies of those resources which are available. Many northern residents were unfamiliar with the Manitoba Emergency Measures Organization emergency twenty-four hour phone number. In order to minimize this in future, I recommend that,

- 3) The special task force should include representatives from the federal Departments of National Health and Welfare, Indian Affairs and Northern Development and Environment Canada. The provincial departments should have representatives from the Departments of Health, Environment and Northern Affairs. Coordination can be conducted with the assistance of the existing emergency planning agencies of the provincial and federal governments.

The functioning of such a task force should be coordinated by the key government services involved. However, it is also essential that local elected representation be included in the more long term planning process. It would be expedient to establish an Advisory Board to assist in the direction and guidance of the multi-agency task force and ensure, on the completion of the task force's assignment, an on-going executive coordination body in place.

- 4) This Advisory Board should include senior department officials from the Department of National Health and Welfare and the Department of Indian Affairs and Northern Development, similar agencies of the Province of Manitoba, and an Associate Members Committee consisting of elected representatives from either the Bands or assess the need for including other senior representatives from government services to be accredited to the components of the overall Board.

The identification of responsibilities assumed by the various agencies of the federal government proved difficult due to the overlap of mandates. While the Medical Services Branch of National Health and Welfare has clear jurisdiction over health care on Indian reserves, the responsibilities for environmental health is not as clearly distinguished. Further confusion is added when Reserve Waste Disposal Regulations C. 960, which technically allocated responsibility for waste management, are considered. These Regulations are not enforced by D.I.A.N.D. in Manitoba. Under the current arrangements, E.P.S. and D.I.A.N.D. "share" responsibilities for certain environmental protection activities in Manitoba with no reference to D.I.A.N.D.'s assigned authority. The federal agencies which have responsibilities for environmental health should,

- 5) Develop a memorandum of understanding among National Health and Welfare, Department of Indian and Northern Development, and Department of Environment that would delineate responsibilities for environmental health matters as well as identify available resources and expertise in a more systematic fashion.

At present there is no common understanding of indicators. Water quality information, health statistics and northern engineering design requirements are not interpreted equally by all affected parties. Medical Services Branch of National Health and Welfare express concern for sub-clinical cases of water-borne diseases which do not show-up on the official health statistics. Such practices are not always apparent to other interested parties including the Band, and the Department of Indian Affairs and Northern Affairs. Either the special task force or government agencies must,

- 6) Assess the data requirements of an integrated environmental health system and develop an operational system which would provide improved information on environmental health factors.

Government agencies in conjunction with Band councils have the opportunity to improve environmental health conditions on northern Indian reserves without the start-up costs of a new agency. The expertise and resources necessary for such strategy are currently available. It is with respect to the coordination and direction of those resources that changes are required. An integrated environmental health delivery system could be the vehicle to undertake the coordination of those resources. Without such a strategy the only possible outcome will remain; this relative planning in isolation is currently endemic in the northern Manitoba environmental health delivery system.

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APPENDIX "A"

A REPORT ON ENVIRONMENTAL CONCERNS  
FOR THE COMMUNITIES OF  
CROSS LAKE, NELSON HOUSE, NORWAY HOUSE,  
SPLIT LAKE, AND YORK LANDING.

October, 1981

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For:  
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## 1.0 INTRODUCTION

This report is a compendium of environmental concerns that have identified potential sources of environmental problems in five northern Manitoba Indian reserve communities: Cross Lake, Nelson House, Norway House, Split Lake, and York Landing. (See Figure 1).

The objective of the project was to identify and report on environmental concerns that were clearly visible and could be considered possible environmental health hazards. The focus of this report was on four areas<sup>1</sup> of potential pollution sources:

- 1) Petroleum Products - Storage Handling and Distribution
- 2) Solid Waste Management
- 3) Wastewater Management
- 4) Water Supply Treatment

In many instances storage, handling and distribution of petroleum products was observed to be environmentally inappropriate. Insufficient protection was found in most above-ground storage container installations; in the event of an oil spill, nearby rivers, lakes and streams are not protected. Subsequently, oil spills may result in the elimination of sewage treatment facilities and water treatment operations. This, ultimately, may interrupt safe drinking water programs.

<sup>1</sup>The four subject areas examined were identified as areas of concern to serious pollution problems, potential and actual, in a 1980 report prepared by Gail Shaver, John Marczyk, Lorraine Russell, Don Scott, and Linda Smith for Environmental Protection Service Manitoba District, entitled, An Inventory of Environmental Problems in Selected Communities in Northern Manitoba.



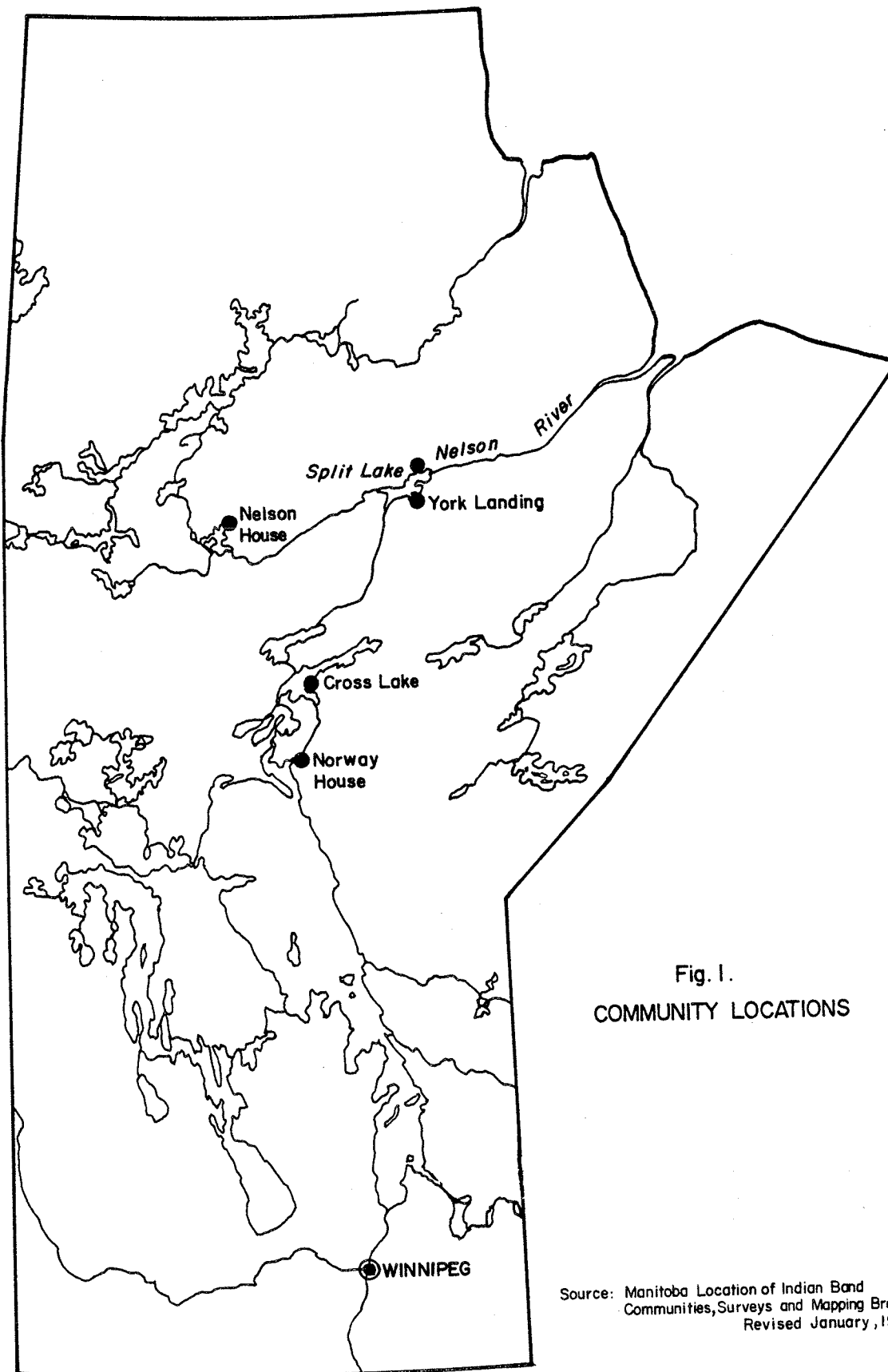


Fig. 1.  
COMMUNITY LOCATIONS

Source: Manitoba Location of Indian Band  
Communities, Surveys and Mapping Branch.  
Revised January, 1980.

With the exception of Nelson House, the collection and disposal of solid waste was not regularly practiced. Garbage was often found indiscriminately strewn throughout the communities surveyed. Many of the Band's representatives, residents and health workers expressed concern for the possible health hazards associated with the lack of solid waste management facilities.

Inappropriate engineering design, a lack of spare parts and vague operational and maintenance responsibilities plagued the operation of several wastewater treatment plants. Serious management problems were observed impacting on the operation of many sewage treatment plants. In several cases, plants were observed in totally non-functional states awaiting either spare parts or a maintenance technologist.

In general, the water supply in the communities visited was inadequate. The total proportion of the communities served, represented only small percentages of the total population. Standpipes were reported to be ineffective in winter months. Residents reported that in many instances untreated surface water was the only option.

## 2.0 METHODS

The project team was briefed during a three week period by representatives from both provincial and federal agencies, as well as private organizations, in an intensive training program. Professionals representing the fields of health, engineering, northern planning and emergency planning

contributed their time and effort to the project teams training. Environmental technologists with Environmental Protection Service took the project team on several field trips where site inspection of wastewater treatment facilities and water treatment concerns were discussed.

## 2.1 Data Gathering

Field observations complemented by non-structured interviews were the primary data gathering techniques. Interviews with Band officials, health representatives, as well as organizations responsible for water quality management, wastewater management, solid waste management, and petroleum products handling and storage were recorded. The project team members located in a community for sufficient time to contact those who were directly involved in the management and delivery of service aspects of the listed environmental concerns.<sup>1</sup>

Field observations were conducted after seeking advice and direction from the Chief and representatives of the Band Council. Available documentary information was collected to supplement data gathering.

<sup>1</sup>It was not the intent nor the direction of the researchers to contact anyone other than those directly involved within the area of environmental management concerns unless directed to individuals on the suggestion of Band officials.

Time spent in the communities ranged from three days to three weeks depending on the size of the community and complexity of environmental concerns. The study team always worked in pairs.

The study team followed up the concerns expressed by the Band Chiefs and Councils, service personnel, and health representatives. Frequent contact was made with the Engineering and Architecture Division of D.I.A.N.D. Winnipeg.

### 3.0 CROSS LAKE

Cross Lake is a community of approximately 2,800 people located at the south-western end of Cross Lake. This includes approximately 400 non-treaty persons. The community is divided by water into a mainland section and Wapak Island. The two regions are connected by a cable ferry. Since construction of the Jenpeg Generating Station during the mid-70's upstream of the community, water levels have dropped substantially and are also subject to considerable fluctuation in level.

#### 3.1 Environmental Concerns

##### 3.1.1 *Water Supply*

There are four pumping stations in the community, each equipped with chlorinators. These are located at:

- (a) Reuben's Point on Wapak Island (Natimak)
- (b) Wapak School Site
- (c) Northlands Station on HBC Point
- (d) Albert Lake



Figure 1  
Reuben's Point  
Water Pump  
Station -  
Cross Lake

All but the Albert Lake site pump water from the Nelson River. The best water source in the community is Albert Lake, a spring-fed lake about 100 metres from the northeastern area of the town (see map). This is mentioned in the "Preliminary Engineering Feasibility and Cost Study on Water Supply and Distribution System for Cross Lake Indian Reserve - Manitoba" (1977) by M.M. Dillon Ltd., consulting engineers and planners.

The report also states that:

"Water samples taken 23 August 1977 and subsequently analyzed indicated substantially higher than acceptable limits of colour, turbidity and iron in the Nelson River water. This requires more sophisticated treatment than the Albert Lake water..."

However, at the time of this writing the Nelson River water at Cross Lake received the same level of treatment as Albert Lake water, i.e., chlorination. A more recent analysis (August 1981, E.P.S.), indicated that Albert Lake would require only chlorination while the Nelson River would require both filtration and chlorination to be an acceptable potable water source.

The Northlands station is administered by the non-treaty community. It provides running water to the R.C.M.P. station, the Band Office, the Community Council office, non-treaty community standpipes, the Old Folks Home, the Nursing Station, the Hudson's Bay store and residences, and Charlie's Inn.

### 3.1.2. *Water Delivery*

The rest of the treaty community is serviced by water delivery trucks, three in total, one of which was broken down when we were there (July 1981). The Band's three trucks consist of a 1981, a 1980, and a 1978 model truck. Each of the trucks are equipped with a 750 gallon (2,400 litre) water tank. The 1978 tank of the 1980 model truck leaks. We were not able to find out what pumping system this truck has. The 1981 truck has a 1976 water tank equipped with a three horsepower pump. According to the Band, it requires at least a seven horsepower pump in order to do an effective job.

There is no adequate garage facility for any of these trucks. The water delivery truck operator for the mainland section pointed out to us that there are enormous maintenance problems with the trucks, especially in the winter. When not in use they are stored at the homes of the water delivery operators. The tanks are left full at night in case they are needed to fight fires. Should a fire occur during the daytime, the trucks may have to be refilled which, for example, requires at least thirty minutes at the Albert Lake Station.





*Figure 2     Albert Lake Water Pump Station - Cross Lake*

The Albert Lake station has only two  $1\frac{1}{2}$  horsepower pumps so fire protection, as well as the efficiency of water delivery in general, is hindered as a result of low pumping capacity. Currently, the remaining two trucks take approximately two days to deliver water to 400 homes and two additional days to deliver water to the schools.

Poor access to some homes on the reserve has prevented the delivery of treated water. Consequently residents rely on water hauled from the lake. This situation raises a health concern because the quality of surface water in the lake is unacceptable for human consumption. Many children who swim in the lake develop skin rashes. This was brought to our attention by nurses at the nursing station. Disease type was not stated.





Figure 3 1981 Truck Filling Water Barrels - Cross Lake

Homes receiving treated water, store it in two 45 gallon (205 litres) galvanized water barrels. This water holding system invites contamination from the air and from continuous water scooping out of the barrels by various people. Although encouraged to do so, many residents do not clean out their water barrels regularly. It has been suggested by a number of people in the community, including the Community Health Representatives, that there be a comprehensive water-testing system to include these storage barrels. This would help to determine exactly how much contamination of water occurs in the barrels and may indicate a need for a more septic storage system.

Due to fluctuating water levels in the Nelson River, there have been problems with the intake line of the Northlands water pump house. In order to deal with this difficulty and to increase the general efficiency of obtaining potable water, the province installed a wet well. The wet well is filled by gravity feed from an intake line extending well into the Nelson River. Water is then pumped from the well to the pump house for chlorination and distribution to the community.



Figure 4 Northlands Wet Well - Cross Lake

When the wet well was put into operation it became apparent that the water was contaminated by a gasoline-like substance. Water samples were taken and the results confirmed that there was a substantial amount of gasoline in the water of the wet well. Excavation and testing along the trench, which contains pipes linking the wet well and the pumphouse, showed that much of the soil in the surrounding area contained gasoline; however, test holes drilled by the province last summer and fall gave no indication of gasoline in the soil. Engineers responsible for the construction of the wet well suggested that leakage of the gasoline into the wet well may have been caused by the dissolving of ram-neck gaskets which are soluble in gasoline.

Attempts are not being made to rectify the situation. The trench around the water line is to be sealed off with a clay blanket which should allow the gasoline in the soil to be diverted to the land south (upstream) of the wet well where it is expected to disperse. Leaks in the wet wells pipe connections will be sealed off and protected with an epoxy coating.



### 3.1.1.3 Solid Waste Disposal

There are two landfill sites in the community of Cross Lake. One of the sites is used largely by the residents of the non-reserve community who are serviced by garbage pick-up twice a week. The other site is primarily for use by the reserve. The reserve landfill site is a short distance from the main road in the northern section of the community. The site is quite small and poorly fenced.

Garbage is a major environmental problem in the community because the reserve section has no garbage pick-up. Each home is responsible for the removal of their own garbage. Since many people in Cross Lake have no access to a vehicle, the reserve disposal site is used only intermittently. While many homes incinerate their garbage, much of it is dumped indiscriminately within the community. It is unrealistic to expect the garbage problem in Cross Lake to be resolved until a regular pick-up service for the reserve is installed. Presently, residents would be required to carry their garbage distances which range in excess of 1 - 5 km. on foot.

Figure 5 Solid Waste Management - Cross Lake



Perhaps the best example of poor garbage management in the community can be seen on Wapak Island. Behind one residence, there is a large swampy area full of garbage and a few old car shells. Nurses at Cross Lake expressed a specific concern over the potential health hazards that this particular situation could have. The problem is compounded by the fact that the Wapak School is very near. So far no one has assumed responsibility for the clean-up of this situation. The problem has advanced to a stage where heavy equipment may be needed to complete an effective clean-up operation.

#### 3.1.4 *Wastewater Treatment*

The Nursing Station and associated trailers are serviced by an RBC sewage treatment plant which was installed and maintained by Health and Welfare Canada. The design capacity of the plant is 14,000 litres per day. The plant is situated across from the Band Office approximately 100 metres from the bank of the Nelson River. The effluent discharge line extends into the Nelson River and runs north along the east bank. The effluent is discharged upstream of the Wapak School water intake line on the west bank of the river; apparently this has had no noticeable effect on the water quality at Wapak. This may be due to the fact that the Nelson River has such a rapid flow and that the two facilities are on opposite sides of the river.





Figure 6  
RBC Plant  
for  
Nursing  
Station -  
Cross Lake

Initial plans proposed that the RBC plant be located closer to the Nursing Station and that the discharge line run directly to the Nelson River. These plans were not carried out as there was some difficulty in securing suitable land where the discharge line could run.

The provincial government is presently considering plans to install a new RBC plant in Cross Lake that would have a design capacity of 63,645 litres per day. This facility would be able to service approximately 500 people which is less than 20% of Cross Lake's total population. This would include the new non-treaty school and residences in the the non-treaty community. It would also service the Hudson's Bay Company store and residences, and Charlie's Inn, provided they are willing to finance the work required to tie into the proposed system.

Plans call for the effluent discharge line from the new RBC to join the one presently used by the Nursing Station RBC. This would substantially increase the volume of effluent being discharged into the Nelson River upstream of the Wapak water intake. An official of the Manitoba Water Services Board (W.S.B.) confirmed that construction contracts on the water and sewer lines for the project

were tendered August 7, 1981. The representative of W.S.B. indicated that the effluent of the new RBC plant alone would not exceed the provincial guideline for fecal coliform levels discharged upstream of a potable water source. It was also noted that the quality of the combined effluent of the new plant and the Nursing Station plant is not a provincial concern. The Regional Technical Services Officer of Medical Services, who is responsible for the Nursing Station RBC, similarly claimed that the quality of the combined effluent is not a federal concern. The writer was not able to ascertain who, if anybody, is assuming responsibility for the levels of fecal coliforms and other contaminants that will be discharged into the Nelson River upstream of the Wapak water intake station when the new RBC plant has been completed.

D.I.A.N.D. Winnipeg is planning construction of a new school at Natimik on Wapak Island. Wastewater treatment at this site will be provided by a lagoon. The lagoon's discharge line be one and one half miles (two and one half kilometres) so that it will not discharge in an area that will affect the community.

The old Nursing Station at Cross Lake which has been converted into an Old Folks Home, is serviced by two septic tanks and a tile field. The adjacent residence is occupied by the manager of the H.B. Company who complains that the tile field is inefficient and overflow from the septic tanks has created an unpleasant odorous swamp in his back yard. This specific problem was also brought to our attention by the proprietor of Charlie's Inn as he had pumped out the septic tanks at the Old Folks Home. He discontinued the service as he was having trouble getting payment for his services. It is unknown who, if anyone, is pumping out these septic tanks as it is essential that these tanks be pumped out whenever necessary.

The residents of both the treaty and non-treaty sections of Cross Lake use pit privies for sewage disposal. The Wapak School is the only school serviced by an extended aeration plant. The rest of the school sites have septic tanks and tile fields. When the writer was on location, one of the Wapak School's extended aeration plants aerators was not working. The plant operator had reported the problem more than once to D.I.A.N.D. Winnipeg but was unable to get the problem solved. They used the standby aerator for the duration of the breakdown. The operator claimed that the plant did not operate as effectively with the standby system. Also, they do not presently have a back-up system in the event of further malfunctions.



Figure 7  
Extended  
Aeration Plant  
Wapak School  
Site -  
Cross Lake

Concern was expressed over the poor operation of the tile field at the Heko Pak School site which services all the toilets. The maintenance person indicated that the field was not draining properly. He reported the problem to the school principal who in turn reported it to D.I.A.N.D. Winnipeg; no response or remedial action was provided.



### 3.1.5 *Petroleum Storage*

The present storage of fuel oil in the D.I.A.N.D. storage tanks at the Wapak School site in Cross Lake is well fenced but it is not surrounded by a suitable berm. Concerns were expressed over the amounts of spillage at this storage site during the fuelling of vehicles. One June 23, 1981, a representative of the Environmental Protection Service noted a puddle of fuel oil approximately two metres by three metres with a maximum depth of about 16 cm. The maintenance supervisor for the school said that approximately 20,450 litres (4,500 gallons) of fuel oil remained in the tanks. Once this fuel has been used the tanks would not be refilled, thus, the situation should be resolved.



Figure 8  
Petroleum  
Storage and  
Spillage at  
Wapak School  
Site -  
Cross Lake

The Band Chief and the Band Manager said that there was an agreement between the Band and D.I.A.N.D. which disallowed D.I.A.N.D. to store more than 45,450 litres (10,000 gallons) of fuel oil on the reserve.



#### 4.0 NELSON HOUSE

Nelson House, accessible by an all-weather road, is located 75 kilometres west of Thompson. The community of over 2,500 is widely dispersed along the shore of Three Point Lake, a widening of the Burntwood River. The terrain is a mixture of outcrops and muskeg.

#### 4.1 Environmental Concerns

##### 4.1.2 *Water Supply*

The raw water supply for the Nelson House community is taken from Footprint Lake. A single lift station pumps water to a treatment plant where an alum and soda ash treatment process is used.



Figure 9  
Water Supply  
Lift Station

The treated water is chlorinated before distribution to the following locations: the laundromat, cafe, Hudson's Bay store manager's residence, the "temporary" school buildings, nursing station, Band Office, and a building formerly used a Band Office. Two trucks are used to deliver water to individual residences where it is typically contained in open 205 litre (45 gallon) drums.



Figure 10      Water Delivery Truck



#### 4.1.3 *Wastewater Treatment*

There are two extended aeration plants at Nelson House. The original plant now functions as a back-up system. Buildings serviced include the laundromate (which comprises a major part of the load), the Band Office, Nursing Station, temporary school buildings, the former Band Office, and a cafe. The H.B.C. store manager's residence has a septic field located directly behind the house on a sloping bank of Footprint Lake, approximately eight metres from the water's edge.



Figure 11 Hudson's Bay Company Manager's Residence Septic Field  
on Bank Sloping Down to Footprint Lake

The plant's two operators received three weeks of training in Winnipeg. Most homes are serviced by pit privies.



*Figure 12     Privy on Bank - East Slope*

Due to a shortage of space for relocation and construction of new privies, many of the existing privies are located close to the Lake on steeply sloping and/or eroding hillsides adjacent to the shore.



#### 4.1.4 *Solid Waste Management*

Nelson House has a satisfactory sanitary landfill site in a rock quarry approximately two kilometers from the town site. Refuse is picked up throughout the community by a recently acquired, privately owned truck. Varying amounts of garbage were scattered about at some private residences, but overall impression of the community in the respect was good.



Figure 13     *Garbage Disposal Site*



Figure 14  
Petroleum  
Storage  
Tank

#### 4.1.5 Petroleum Storage and Handling

The following is a summary of the petroleum storage and handling information for the community:

<u>Number of Tanks</u>	<u>Location</u>	<u>Capacity</u>	<u>Spillage/ Leakage</u>	<u>Berms</u>	<u>Fence</u>	<u>Usage</u>
2	H.B.C. Store		Some	None	None	
2	Temporary School Bldg.		None	Good Cond.		
1	Wastewater Treatment Plant		Some	None	None	
1	Band Office			None	None	

#### 4.1.6 Water Quality

Water quality was one of the main concerns expressed by the Band Council. Usually the water samples from the lift-station have very low coliform counts, and are safe (according to individuals in the community). Data provided by the Cadham Provincial Laboratories

(i.e., Sample Analysis Report April 23/79) showed that high coliform levels, above the levels accepted for water safety, are occasionally determined from samples taken from the individual storage tanks within the home. Several possible sources of contamination were suggested by the Band Council:

1. Water contamination within the delivery truck water tanks. The water truck's tanks need regular cleaning to prevent contamination; but, according to Band Council members, this is not done as often as could be thought prudent.
2. The hose used to pump water from truck to homes is thought to contain dust or other contaminants as it is not cleaned regularly enough to safeguard against this problem.
3. The open 45 gallon (205 litre) drums within each home represents a source of potential contamination by being in continual use and continually open.

The monitoring of water quality caused much concern. The process by which samples are taken and analyzed (and later returned to the community) involves too much time for an effective response. Samples taken by Community Health Representatives are sent to the Provincial Lab in Winnipeg. (Note: samples must be received within 24 hours of collection for results to be accurate). Data is then sent to Medical Services Thompson, Community Health Representatives, and Provincial Records. Necessary remedial action could be taken if problems had been detectable in the original samples. Overall, concern was voiced from all areas of the community, including the Band Council, Nursing Officials and Community Health Representatives.

#### 4.1.7 *Wastewater Treatment*

Though not operational at the time of our visits (due to a parts malfunction) the wastewater treatment plant was clean and well maintained. The Band-appointed operators were fairly confident with their understanding of the plant. The major concern which they expressed was over the difficulty in obtaining necessary parts from the D.I.A.N.D. office in Thompson.

#### 4.1.8 *Housing*

Many members of the community felt that housing changes are required immediately and are essential to good health. The director of the nursing station sees a real problem in respiratory-related diseases. In many of the homes, heating is provided by a central stove or furnace which creates extreme heat near the surface, but leaves the outer rooms (i.e., bedrooms) cold. Many cases of respiratory-related illnesses are reported, particularly among infants who are extremely susceptible to this form of infection. Overcrowding is commonplace; and, according to the Band Office, ten to fourteen people occupying the same small home is not unusual. Houses are in a poor state of repair, while some home sites were scattered with refuse. Concern for improved housing was expressed at almost all levels in the community.

#### 4.1.9 *Mercury Levels*

Concerns repeatedly expressed by the Band Council and other individuals in the community focused on mercury levels. Many residents believe that information provided by the Department of Fisheries and Oceans on mercury levels is too brief and beyond



the understanding of the layman. A report prepared by the Water Quality Branch of Environment Canada (September 28/79) showed increasing levels of mercury in their samples taken from Nelson House residents from 1976 - 1979 ("A Summary of All Available Mercury Data for the Southern Indian Lake - Rat - Burntwood River System"). The residents expressed a desire to see more complete, straight-forward reporting that would be available to the general public.

#### 4.1.10 *Erosion*

A major area of concern for the Band Council and residents is bank erosion caused by continually changing water levels. In a consultant's report (A. Baracos; Report on Nelson House Shoreline Slope Protection, Sept. 79), it is noted that "Scarp formation is occurring and movement will occur for many years, making the banks unsafe for buildings, roads, etc.". The entire shoreline area in Nelson House is affected, and the waters close to the shore are always turbid with eroded silt.



Figure 15  
*Shoreline  
Erosion*

This rapid erosion could have effects other than the relocation of certain facilities within the community: "mercury levels per se in source materials is not important, but leaching of soil and shoreline erosion after impoundment may generally lead to increased concentrations of mercury in fish..."

(Bodaby and Hecky 79 - Fisheries & Oceans Report 1).



Figure 16      Evidence of Erosion Taken Near  
Water Supply Lift Station



#### 4.1.11 Cemetery

Further concerns were voiced over erosion affecting the two cemeteries, which are situated on banks sloping down to the lake. Some graves were fairly close to the water's edge (approximately eight metres or twenty-five feet away). The bank appears to be steadily eroding, creating concern among residents for the quality of the nearby water. Some construction has been undertaken to limit the extent of erosion by means of rip-rap boundaries, but even the rip-rapped bank showed evidence of sliding (A. Baracos: Nelson House Shoreline Slope Protection Report: September 1979).



Figure 17 Cemetery on Bank of Footprint Lake

#### 4.1.12 *Dogs*

There are an unusually high number of dogs in Nelson House, creating some sanitation problems. Apart from their excretions (which contribute to the overall contamination problem caused by spring run-off polluting the lake), many of the dogs run wild and spread garbage throughout the community. The Thompson R.C.M.P. will come on request to shoot dogs (as well as local control attempts) however, large numbers still persist.

#### 4.1.13 *Petroleum Storage*

Of all the facilities with petroleum storage tanks that we observed, only the schools' two tanks were fenced-off, locked, and surrounded by a berm. There did not seem to be much concern in the community (by those surveyed) regarding petroleum and storage practices. The potential for future problems still exist.

### 4.2 Specific Environmental Problems

#### 4.2.1 *Oil Spill*

On October 28, 1980, the D.I.A.N.D. School at Nelson House was destroyed by fire. The fuel oil supply to the school was not closed off after the school had been destroyed. For approximately one day, an unknown amount of oil escaped from the oil line at the school site. Oil began draining into the extended aeration sewage treatment plant with some oil eventually passing through the plant and entering Footprint Lake. D.I.A.N.D. Winnipeg did not receive information concerning the problem until approximately December 17, 1980 although members of the Nelson House Council state contact was made with D.I.A.N.D. Thompson as soon as the problem was detected (in early November). The treatment plant effluent outlets were then

closed to prevent further oil-contaminated discharges from entering Footprint Lake. On Friday, May 22, 1981, D.I.A.N.D. Thompson, reported an oil slick which had been observed through the ice on Footprint Lake (approximately 230 metres by 140 metres in dimension). Since the time of the initial release of the oil in the early months of 1981, the Band Council stated that once again attempts were made to contact D.I.A.N.D. Thompson on this matter. D.I.A.N.D. Thompson then coordinated clean-up operations by means of "OSCAR" equipment but they later reported that a week-end storm had "washed the ice flow and oil slick out into Footprint Lake". It could no longer be located.

#### 4.2.2 *Wastewater Treatment Plant*

At the time of our first trip to Nelson House (June 8 - 11/81), the new wastewater plant was not functioning; it had not worked for two weeks due to the need of a new pump solenoid and chlorinator diaphragm. None of the equipment was running, and an unusual odour was obvious. The operators informed us that the wastewater was being rerouted to the old wastewater treatment plant, however, no aeration was taking place and only chlorine was being added to the wastewater. The operators (via the Band office) contacted D.I.A.N.D. Thompson when the problems were first noticed, but the Band stated that numerous calls were necessary for action to be initiated. Within the Thompson office there were some problems in communication as discrepancies concerning the Nelson House situation were noted. The maintenance person informed us that the necessary part had been on order for some time, while another D.I.A.N.D. Thompson representative had stated that there was no problem at Nelson House at all. Upon revisiting Nelson House two weeks later (June 22 - 26/81), it was noted that an incorrect part had been sent, and the

Nelson House community was still without a wastewater treatment plant, and the effluent (untreated except for the addition of chlorine) was being discharged into the same area as the intake for the Water-Intake Lift Station. This was creating an increasing health concern for the community.

## 5.0 NORWAY HOUSE

Norway House is situated 480 air kilometres north of Winnipeg which serves as its primary service centre. It is accessible by road, boat and plane. The community of over 4,000 is widely dispersed along the east shore and two of the larger islands of Little Playgreen Lake, a widening of the Nelson River. The terrain is a mixture of rock outcrops and muskeg. Norway House encompasses the Norway House Indian reserve and the Non-Registered Indian community.

### 5.1 Environmental Concerns

#### 5.1.1 *Water Supply*

On the Norway House Indian reserve, the Department of Indian and Northern Affairs Winnipeg is responsible for the works and operation of the water and wastewater treatment facilities in Rossville. Drinking water is currently provided to many residents in the community by four water trucks, of which three are equipped for fire-fighting. The filling point for the water trucks is the Rossville water treatment centre.



*Figure 18      Water Truck at New Garage in Rossville  
                         (with Rossville Water Pump Station in  
                         Background)*

The 2.954 litre (650 gallon) water trucks which are scheduled for cleaning every two months deliver water on demand to the houses here water is stored in 568 litre (125 gallon) plastic containers. Water delivery of the reserve began in November, 1980.





Figure 19  
Water Truck  
Delivering  
Along  
Jack River -  
Norway House

On the adjoining Metis community, obtaining potable water is the responsibility of the individual households. As a result, the majority of the community obtains water directly from the river.

Often, when it rains, road conditions deteriorate sufficiently so that it is impossible for the water trucks to reach all of the homes that are usually serviced by water delivery. When water delivery is impossible, residents can obtain water from community standpipes. However, a more convenient and popular alternative is to obtain water directly from the river. People who do not have suitable access roads, do not received water delivery.

Over the next five years (1981 - 85), the Band intends to build 22 miles of access roads. This will provide driveways for 200 homes in Norway House which do not have suitable access. (There are approximately 350 houses on the reserve.) Better roads will make water delivery and fire protection less vulnerable to poor weather conditions. Nine or ten access roads were scheduled



to be built in 1981. This target was not realized since the funding arrived late. The Federal Treasury Board asked that the original application for funding (drawn up by the Engineering and Architecture Division of D.I.A.N.D. Winnipeg) be resubmitted with additional information. Construction was originally planned to start on June 1, 1981. Subsequent funding for this project must be re-applied for annually.



Figure 20  
Makeshift  
Access Road  
in Norway  
House

After completion of this road construction program, only the forty housing units on Mission Island will be without water delivery as they are isolated from the main community. The Band<sup>1</sup> has been requesting a bridge from the provincial government for the last seven years to link Mission Island with Fort Island. The Band,

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<sup>1</sup> The provincial government has agreed to assume responsibility for roads in Norway House.

through the Northern Flood Agreement, received two acres of land for every acre of land used for construction of the Jenpeg road, and one acre for every acre used in providing an internal road system. The road to Norway House is an extension of the provincially built Jenpeg road. A Band agreement and a federal Order-in-Council has made the major roads in Norway House a provincial responsibility.

#### 5.1.2 *Water Quality Monitoring*

Water quality sampling is the responsibility of the Community Health Representatives (CHRs). The location of the sites for water sampling is recommended by the Environmental Health Officer (EHO) in Thompson. The CHR, who does most of the water testing, and the hospital maintenance supervisor suggested the testing sites be altered. They said that it would make more sense to test upstream and downstream of effluent discharge lines. The CHR also recommended that the sampling program be extended to include samples in the homes and the water trucks. This would determine how much contamination occurs in the tanks of the homes and the water trucks.

#### 5.1.3 *Wastewater Treatment*

There are three mechanical sewage treatment plants at Rossville: the R.C.M.P. Station on Fort Island, the Health and Welfare Hospital on Fort Island, and the Jack River School. The Rossville wastewater treatment plant originally serviced the Rossville School and its accompanying teacherages. Since then, more teacherages, a 22-bed home for the aged, the Band Office, the United Church and associated residences, the Hudson Bay Store and approximately 27 town-site residences have been tied into the Rossville plant.

Cadham Lab results indicate that the Rossville plant's effluent has a high coliform level. During heavy use periods, the sewage treatment plant cannot handle the volume of incoming wastewater. According to the Systems Technologist, Engineering and Architecture Division D.I.A.N.D. Winnipeg, The system is organically underloaded. The Engineering and Architecture Division of D.I.A.N.D. plan to repair the leaks in the collection lines in order to cut down on infiltration by ground water. Present plans are to do this in 1981. The problem of hydraulic overload was documented by flow studies conducted by Wardrop in 1977, and May 1975 (File 01240, 207-1). The entrance of groundwater through nine breaks in the sewer system further dilutes the already weak effluent. Once this remedial work is complete, the actual flow can be determined. Based on this information, plans for modifying the system will apparently be made. Upgrading of the Rossville wastewater treatment plant will improve its operation. However, the utility will not be extended beyond those buildings already being serviced.



*Figure 21      The Rossville Extended Aeration Plant*

Currently, D.I.A.N.D.'s sole employee on the reserve is responsible for the water and sewage treatment plants at Rossville. The consequence of this arrangement is that when a relief worker is required to assume this position, contractual arrangements must be drawn-up in Winnipeg. This results in a time lag between when a replacement is required and when a replacement is available. For adequate year-round operation of these facilities, two trained operators are, therefore, necessary. The operator, at time of study, said that he was not aware of information needed to monitor effluent quality. Records maintained could ensure ongoing monitoring of the plant's operation.



The province intends to build a sewage lagoon to service the local non-reserve community. The R.C.M.P. extended aeration plant has become hydraulically overloaded through increased use. Plans are underway to alleviate this problem and modifications supervised by the Federal Department of Public Works are being planned so that the R.C.M.P. station sewage facility can be hooked up to the lagoon when the latter becomes functional.

There are also extended aeration sewage plants at the Jack River School and at the Health and Welfare hospital. These facilities appear to be operating well.

Both the reserve and non-reserve community expressed much concern over the sewage disposal practices at the Playgreen Inn. In the spring of 1981, there was a sewage spill onto the ice over the Nelson River from the Playgreen Inn which, many people in the community felt, had contaminated the river (their source of drinking water). This particular spill area was treated with lime to the satisfaction of officials from E.P.S. and the Provincial Public Health Inspector (Environmental Management Division).

In late June, 1981, we were directed to a downhill flow of wastewater just beyond the Playgreen Inn property and parallel to the road. It was clear that the source of the wastewater was the Playgreen Inn's septic field. By late July, 1981 the flow of wastewater had evidently been recently halted, and lime had been spread over the spill area.



Figure 22  
Site of  
Sewage  
Spillage  
(with lime)  
from  
Playgreen Inn  
(July 1981)

The owner of the Playgreen Inn withdrew his original proposal to the Clean Environment Commission for a new mechanical sewage treatment plant in July, 1981. He has opted instead to follow the recommendations made by the Provincial Health Inspector which would upgrade his present system. This would allow him to keep his present system functioning. These remedial measures involve converting to low water use facilities, installing a larger holding tank, and pumping out the excess loading which the septic field cannot absorb.

In the future, the Manitoba Water Services Board plans to put in a central servicing lagoon with a low-pressure system. When this is built, the Playgreen Inn hopes to tie into it.

#### 5.1.4 *Solid Waste Disposal*

Regular garbage pick-up is available to residences of the reserve. The new solid waste disposal site is located approximately 10 km. from the Rossville townsite on the Jenpeg Road at a location recommended by D.I.A.N.D. Winnipeg. The site is two years old and is being filled rapidly. There is

no trench or burial of solid wastes, although the site has a good fence and a gate. The Chief expressed concern that people off the reserve were dumping garbage along the roadside rather than using the disposal site properly. This forces the Band to use some of their limited sanitation funds for clean-up operations.

The present municipal landfill site on Fort Island will be closed this year. A new dump will be located on West Island and a bridge connecting the two islands is now under construction. The new site will include a trench.

## 5.2 Specific Areas of Concern

### 5.2.1 *Housing*

Housing is an environmental concern due to its direct impact on health and the provision of basic services such as water delivery and waste disposal. Currently, the Norway House Indian reserve has a housing shortage due to growing demand, deterioration of present housing stock, and a limited land base created by large areas of muskeg. The only remaining land in developed area is on Fort Island where there is a potential for approximately 100 more housing units. Twenty-three new homes are to be built this year (1981). The Band Council has tentative plans to develop a new townsite at Sea Falls, approximately 15 km. north of Rossville.

### 5.2.2 *Road Dust*

Concern was expressed about the amount of dust generated by vehicle traffic in Norway House. Representatives from the Band and the medical staff indicated that, since the crushed rock surface roads had been introduced, there had been a dramatic change in the amount of road dust in the community. The Public Health Unit at the Norway House hospital felt that this had lead to an increase in the amount of respiratory problems, particularly among children. Especially during summer months, periods of dry weather were usually accompanied by complaints of a number of respiratory problems. It was suggested that some means of control would be desirable, i.e., oiling or watering the roads.

### 5.2.3 *Two-Mile Channel*

Two-Mile Channel is located approximately 18 kilometres south of Rossville. The channel connects the northern end of Lake Winnipeg with South Playgreen Lake. The Chief and members of the Council of Norway House expressed concern over fluctuations in the flow of water associated with the channel. Under normal conditions, water flows in a northerly direction from Lake Winnipeg through the channel into Playgreen Lake.



With the construction of the Jenpeg power generating station, fluctuations in water levels have been experienced. The fishermen of Norway House have said that, on certain occasions, there has been a reversal in the direction of water flow in Two-Mile Channel. The variation in flow direction has reportedly resulted in a reduction in the fish harvest. At the present time, there is a lack of technical evidence to validate the claims of the fishermen. However, the concern expressed indicated that a significant amount of fish stocks have been affected. The Band feels that further investigation should be initiated.

#### 6.0 SPLIT LAKE

Split Lake Indian reserve is located 135 kilometres northeast of Thompson. The bulk of the community is situated on a 2 kilometre peninsula which juts out from the north shore of Split Lake. The resident population of 1,200 is served by a Band Office building, three stores, a pool hall, a nursing station and a church. The community is accessible by all-weather road and by ferry in summer.

## 6.1 Environmental Concerns

### 6.1.1 *Water Supply*

The community of Split Lake receives its water supply from Split Lake by a lift station located at the southern edge of the town site. The station provides water for the schools, teacherages, and community standpipes. The Band-appointed operator has operated the plant for nine years, as well as working as a janitor in the new school. The operator attended a training seminar from August 4 - 22, 1981. Without a back-up plant operator, the plant was left unattended, which is a potential for problems.



Figure 23      *Water Lift and Treatment Plant*

Since the lake level was lowered, lake water must now be pumped to the lift station rather than being gravity fed. The water is then chlorinated at the lift station. The chlorine input line has been moved down the system, past the filters, so that chlorine is added after the filters rather than before. There is no rubber seal for the chlorine input line connector (hence, a poor connection). This means the filter can act as a site for bacterial growth. According to the operator, repeated calls to D.I.A.N.D. Thompson have not produced the necessary part. Although it has not yet occurred, the treated water supply for the community would be cut off if the primary pump breaks down as there is no backup pump.

Split Lake is a fast growing community, and increased numbers will further strain currently stressed facilities beyond their maximum capacity. The water distribution system needs to be upgraded, and it will have to be extended to include future development.

Another concern voiced by the operator was over the lack of chlorine test kits, which he has been requesting for several months. One of the main problems, he thought, was not in getting D.I.A.N.D. Thompson representatives to observe the plant on regularly scheduled visits or during major breakdowns, but in obtaining items necessary for simple maintenance.

The residents receive water by means of a total of twenty standpipes situated throughout the community. According to the Band Council, not all will be operational at any given time. Inadequate pressure is especially apparent in the new development where the distance from the pump house to the standpipes is almost two kilometres.



Figure 24  
Water Standpipe

D.I.A.N.D. Thompson states the lack of operating standpipes in the community is due to vandalism. The Band Council acknowledge that this is true in some cases, but feels the majority of breakdowns are due to the effects of harsh winter weather combined with almost continual use. There is an increased number of leaks in winter.

When used in the cold, the outside tap freezes and the copper spout breaks off. Residents then remove the outer casing of the standpipe and the insulation to get at the internal water pipe. Water then drips into the electrical workings causing the heat-tracing circuit to short out and the standpipe to freeze and become inoperative.

There is a leak between standpipes 19 and 20 in the new west section of the town and D.I.A.N.D. Thompson has been informed of this. The furthest standpipe stops functioning in October. At the operating standpipes leaking water freezes and creates an ice pool around the standpipes. In time, a coning effect occurs as ice builds up against the box. In an extreme situation last winter, one person had to use a dipper under the tap to scoop water into a bucket as the ice had built up so near the tap. Under normal conditions, residents will haul water (from the standpipes to their homes) over a distance of up to 250 metres. However, during the winter, it is not uncommon for only one standpipe to be working. Once or twice a year all the community pumps are inoperative and all the residents must then obtain drinking water from the nursing station which has its own water supply. Having potable water available at only one site means residents are forced to haul water over a long distance. Given this prospect, some residents choose to consume the nearer lake water, and hence are consuming untreated water of questionable quality. Both the Band Council and D.I.A.N.D. Thompson are aware that not all standpipes are functioning at any one time.



Water is stored by residents in 45 gallon (205 litre) drums, plastic containers, pails or whatever else is available. This can create problems in water quality and sanitation. The open containers are subject to contamination by air-borne micro-organisms. Continual use of this water can lead to even swifter contamination as bacteria are washed off hands, etc. According to the nursing station, the Community Health Representation, and the Band Council, there is a consistent problem with spring runoff polluting the water. The nurses noted this is exemplified by an increase in gastroenteric disorders in the spring.



Figure 25  
Wastewater  
Treatment  
Plant -  
Note:  
Exposed Lift  
Lines'

The wastewater of Split Lake's schools and teacherages is treated by a single extended aeration plant located beside the school. The water intake and sewage outfall lines are on opposite sides of the peninsula, so contamination of the school water supply is unlikely. The plant is operational, but several specific concerns

were expressed by the operator (who also runs the Water Treatment Plant). First, the lines of the wastewater lift-pump are exposed to the elements. It is not uncommon for them to freeze in the winter. Secondly, the lift-station was an object of concern, as some articles needed for maintenance (i.e., rope, heater, etc.) were purchased by the operator from his own personal funds after he was unable to obtain them through the regular channels of D.I.A.N.D. Thompson. Finally, the operator pointed out the lack of communications between the Thompson D.I.A.N.D. maintenance staff and the community. For example, a part (the function still unknown to him) was installed during his vacation without any explanation. There had been no back up operator in his absence.

The homes all have pit privies, but many relocations over the years have left little room for new sites. Split Lake is a densely populated settlement. The close proximity of pit privies to each other and to home is an unsanitary condition which will worsen due to the increasing population of the community. This can only contribute to the problems associated with spring run-off (see Water Supply).

#### 6.1.2 *Solid Waste Disposal*

There is no Band operated garbage removal service due to a lack of funding for a pick-up truck, and until recently, the extremely poor conditions of the roads. However, a garbage dump does exist at the end of the abandoned aircraft runway. Garbage is usually burned and carried to the dump, but this is an individual responsibility. As there is no proper trench, garbage is spread over a considerable area of the dump. A new solid waste

disposal site, north of the present one, (planned by the Band Council), is being cleared this summer in connection with the road works. For the first time there will be a community fall clean-up to inaugurate the new landfill site. This will be in addition to the annual spring clean-up.



*Figure 26      Garbage Site at End of Abandoned Runway*



According to the Band Council, garbage tends to accumulate throughout the community during the winter. People take garbage out onto the frozen lake, increasing the polluting effect of spring runoff. A nurse stated that another consequence was that children received severe lacerations due to broken glass in the lake and along the pathways. There were several foundations of burned out buildings filled with garbage. However, as part of the road construction agreement, they will be filled in. If this is done, a community health and safety hazard will be reduced.



Figure 27      Building Foundation Filled with Garbage

### 6.1.3 Petroleum Storage

There are only three petroleum storage areas in Split Lake: the Hudson's Bay Company store, the school, and the Nursing Station. The HBC has two 45,450 litre (10,000 gallon) tanks, one 22,726 litre (5,000 gallon) tank as well as approximately thirty 205 litre (45 gallon) drums. The area is not fenced in; containers are situated on a hillside that slopes down towards the lake. There is no berm except for a few mounds of dirt and gravel on the shoreline side of the tanks, but the capacity of these mounds to contain a spill is questionable. The major site of petroleum storage is at the new school which has four above-ground 45,450 litre (10,000 gallon) tanks. The valves were removed to prevent vandalism, but according to the janitor, the fence surrounding the tank farm is a target for mischief. It is vandalized as soon as it is re-built. The 'berm' for these tanks is actually a shallow grassy ridge within the "fenced" compound. The tanks are on a slight gradient which slopes across the road towards the nearby lake. This suggests better safeguards are warranted (such as an alarm or additional lighting).



Figure 28  
Tank Farm,  
Schools  
and  
Wastewater  
Treatment  
Plant



## 6.2 Specific Areas of Concern

### 6.2.1 *Six-Plex School*

Conditions related to the Six-Plex Junior Elementary School at Split Lake are a major community concern. The six room school was built on swampy land, just downhill from a leaking standpipe. There is a semi-permanent pool of stagnant water under and around the school. Continual rotting of foundation and floor boards causes a physical hazard. In winter, the wood freezes and cracks. Sanitary conditions in the school are poor. On occasion, students have been sent home because the stench of sewer backup in the toilets was severe. Construction of a new school has been set back from the fall of 1980 to 1985 by the Education section of D.I.A.N.D. If the building deteriorates further, the Council will consider condemning it.



Figure 29 *Flooded Area Under and Around Six-Plex School*

At present, the combined capacity of the two schools is insufficient for the growing population of Split Lake. This is accentuated by the deteriorating condition of the Six-Plex Junior Elementary building.

#### 6.2.2 *Communications*

There is one party telephone line in Split Lake. One phone is located in the Band Office and two are situated at places along the roads. In the middle of August, 1981, the line had not been working for a week. These breakdowns are not infrequent. Manitoba Telephone System has informed the residents that it intends to put in a local exchange system in December, 1983.

The nursing station is linked by radiophone to Medical Services (Department of Health and Welfare) Thompson. This system is limited because there are times when the connection can't be made due to variable weather conditions, limited equipment, and the fact that Medical Services can't be reached outside office hours. In the event of a medical emergency requiring outside assistance, the nurses communicate with Thompson through one of the community phones.

#### 6.2.3 *Internal Roads*

The internal roads were upgraded dramatically in the summer of 1981, although the work was started late. Road construction, filling in of the old school site, and the clearing of a new garbage dump was contracted to the Smook Brothers of Thompson. The funds for the project were provided by Engineering and Architecture D.I.A.N.D.

The residents felt that unless the finished surface can be laid by the end of the summer, there exists the threat of damage by frost and spring thaw.

#### 6.2.4 *External Roads*

This summer a road has been built connecting the Split Lake reserve with the Split Lake-Odei River ferry dock. This provided year round access to the existing road to Thompson. A barge runs between the communities of Split Lake and York Landing three times a week. This connects the provincial (Thompson) road and the Split Lake community proper.

#### 6.2.5 *Fire Protection*

Fire protection is limited to domestic fire extinguishers and smoke detectors which have been issued to every home. The extinguishers are only useful in stopping a small fire or a fire in its early stages, while full scale blazes completely destroy a structure quickly. In response to the Band Council's request for a fire truck, the regional fire safety officer (D.I.A.N.D.

Winnipeg) has scheduled delivery of a trailer pump, auxiliary equipment, and training of a volunteer fire-fighting force for the 1983 fiscal year.



Figure 30  
Shell of  
Burned-out  
Building

#### 6.2.6 Housing

The housing situation is a major concern of Split Lake Residents. Conditions are crowded; two or even three families occupying the same space (6 x 7 metre) home is not uncommon. Most homes are in a declining state of repair, and funds are not available to repair the deterioration. According to the nurses, respiratory-related illnesses can be traced back to the living conditions. Many of the homes have a poorly designed

central wood heater which, to keep the other rooms warm, is kept extremely hot. Residents are then caught between two extremes: the extreme heat of the home, and the bitter cold of the outside environment. This creates excellent conditions for the development of respiratory-related illnesses (e.g., pneumonia). It affects the very young in particular, as they are most susceptible to this sort of infection.

The rate of home construction lags behind the rate of new family formation and replacement of existing shelter.

A particular problem for Split Lake is the numbers of non-treaty persons living on the reserve. Funding is allocated for housing, etc. on the basis of treaty persons, but none the less, non-treaty persons live and function within the community. Non-treaty persons use the same facilities as treaty Indians, however, their numbers are not included in the calculation of funding required. Hence, already strained facilities are taxed even further. The Split Lake Council has repeatedly expressed desire to retain all reserve lands, but the only method through which the provincial government will fund housing for non-treaty persons is on the condition the Band Council will surrender sufficient lands.

## 7.0 YORK LANDING

York Landing is located near the confluence of the Aiken River and Split Lake. The resident population of 200 is serviced by a medical centre, a school, a community hall, a church, a store, and an airport. The community is accessible by road and then barge from Split Lake, as well as by air.



## 7.1 Environmental Concerns

### 7.1.1 Water Supply



*Figure 31 Single Standpipe*

The entire community of York Landing (other than the Health Centre, school and teacherages) is serviced by a single standpipe. According to the Band Council, the water treatment plant is not functioning well enough to consistently provide potable water. An inspection of the plant on July 22, 1981, revealed two leaks in the treatment system. According to the school janitor, one break occurred during the first week of July in the pipe from the first water container to the chlorinator, while another leak occurred



along the seam of the pressure tank furthest from the motor. There is also a leak in the water line between the treatment plant and the community. As of August 12, 1981, these leaks had not been repaired. As a result, water pressure often varies at the stand-pipe. Since pressure is usually weak, some residents may choose to consume raw lake water or that from a nearby spring.

One of the water plant's two pumps has been malfunctioning since its installation. A maintenance person from D.I.A.N.D. Thompson was at the plant in mid-July (for routine maintenance) after the leaks had occurred. On August 12, 1981 neither pump was working properly. A Medical Services Tradesperson (on site to install a water line to the new Health Centre) was unable to repair either pump due to a lack of tools, though it was not his responsibility to service the pumps.

The water intake line was floating on the surface of the Aiken River and a section was uncovered on land because of the low, fluctuating water level. Much concern was expressed by the plant operator that freezing of the exposed line will cut off the water supply. D.I.A.N.D. Winnipeg Engineering and Architecture Division was informed of this situation on July 31, 1981.



*Figure 32      Exposed and Floating Intake Line*

The school janitor has maintained the water treatment plant as an added responsibility to his janitorial duties for the past six years. In August, 1981, the plant was left unattended while he took a mandatory D.I.A.N.D. sponsored course in Thompson. There is no trained operator to serve as back-up.

### 7.1.2 *Solid Waste Disposal*

There are two landfill sites for the community. One (which is being phased out of use) is located by the airport, and the other is situated just northwest of the townsite. Garbage is widely dispersed over both sites.



Figure 33      *Garbage Disposal Area*

The Band's \$2,500 a year budget for sanitation is inadequate to provide maintenance of the dump or a community-wide collection service, but youngsters on probation work off their time by temporarily providing garbage pick-up for the community. There is no community-owned equipment to undertake these tasks. Solid waste management is a top environmental priority of the Band.

#### 7.1.3 *Wastewater Treatment*

The school, teacherages and Health Centre have indoor plumbing with septic tanks and tile fields. In the summer of 1981, holding tanks for the school and teacherages were to be put behind the buildings where the septic fields are being re-located. The indoor plumbing does not always work due to uneven pressure (as discussed in Water Supply). The remainder of the community has pit privies. A York Landing priority is community-wide wastewater treatment facilities, a priority the Band feels is technically feasible as the houses are relatively close together.



## 7.2 Specific Areas of Concern

### 7.2.1 Health Centre and Functions



Figure 34 Incompleted Nursing Station

The new Health Centre was scheduled to be completed by the fall of 1980. The Centre has not been finished, and remains unoccupied (as of August, 1981). No one in York Landing was aware of any timetable for completion. The Regional Technical Services Officer of Medical Services in Winnipeg stated the Centre would be finished by the end of August, 1981. The trailer, now used as a Health Centre, will be converted into accommodation for visiting Medical Services staff. Presently there is a resident Community Health Representative (CHR), a nurse who comes in from Split Lake once a week, and a doctor who visits from Thompson monthly.

The CHR samples water regularly from both tanks at the treatment plant, the tap at the Medical Services trailer, the school water supply, and the community standpipe. Samples are sent directly to the provincial lab in Winnipeg but they often do not arrive within the 24 hours necessary for accurate analysis. There is no lab closer to York Landing where samples could be processed more quickly. The CHR reports that the results of the testing arrive back in about a week. The coliform counts show higher levels during the spring runoff which suggests poorer water quality during this period. Sampling was suspended during the recent postal strike (July, 1981).

#### 7.2.2 *Communications*

The population of over 200 people is serviced by two radio-phones and five telephones on a single party line which do not always work. Not only is this inconvenient for residents but it means there are frequent occasions when they cannot contact anyone outside the community. In an emergency, given York Landing's limited amenities, lack of access to and communication with outside resources would prove critical. The Manitoba Telephone System is planning to put in a phone exchange network in November, 1983.

#### 7.2.3. *Fire Protection*

In response to requests from the Band, financial provisions have been made by the Regional Fire Safety Officer (D.I.A.N.D. Winnipeg) for a 450 gallon (2035 litre) pumping

trailer, auxiliary fire fighting equipment and training for a six person volunteer fire brigade to be ready by March 31, 1982. At present, a home will burn down completely within a half hour as large scale fires burn unchecked.

#### 7.2.4 *Mercury Levels*

The Chief expressed concern about the mercury levels in the lake's fish. This concern is due to the possible contamination of an important community food supply and the quality of the fish is indicative of the lake water quality. Two years ago, 10% of the community was sampled for mercury but this year, under court order, the whole community is being tested. The Council would like to see the complete results of this year's sampling in a form comprehensible to them.

#### 7.2.5 *Dogs*

There was concern about the large number of dogs running around loose in the community. They create not only a nuisance problem but also a potential health hazard from the spread of their excrement and garbage that they scatter about the area.

SYNOPSIS OF ENVIRONMENTAL PROBLEMS  
IN  
SELECTED NORTHERN MANITOBA COMMUNITIES  
(EXTRACTS FROM RECENT EPS SURVEY)

<u>CROSS LAKE</u>	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
1) <u>Water Supply</u>			
A) <u>4 Pump Stations</u>			
1. Reuben's Point	Nelson River		Requires filtration and chlorination
2. Wapak School site	Nelson River		Requires filtration and chlorination
3. Albert Lake site	Albert Lake		Requires chlorination
4. Northlands Station	Nelson River	RCMP Station, Band office, community council office, old folks home, nursing station, HB store and residences, Charlie's Inn	Requires filtration and chlorination; intake line poorly located - water level of Nelson fluctuates
B) <u>Water Delivery Trucks</u>		Non-treaty community standpipes, individual residences	Truck maintenance, poor road access, underpowered pump, 46 gal. storage barrels
C) <u>Water Pails</u>	Nelson River	Individual residences (seasonal basis)	No road access for delivery trucks
2) <u>Waste Water Treatment</u>			
A) <u>RBC Sewage Treatment Plant</u>		Nursing station and trailers	Discharge Nelson River upstream, Wapak water pump system; aerator system not working properly
B) <u>(New RBC Planned)</u>		Non-treaty school (Wapak), non-treaty residences, HBC Store & Residences, Charlie's Inn.	Significant increase in discharge level from the combining of the two systems
C) <u>(New Lagoon Planned)</u>		New school at Natimik	



	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
<u>CROSS LAKE (continued)</u>			
	D) <u>Septic Tank and Field</u>	Old folks home	No reliable pumpout schedule, overflow affecting general area
	E) <u>Septic Tank and Field</u>	All school sites (except Wapak)	Poor aeration tile; field Heko Pak School site draining improperly
	F) <u>Pit Privies</u>	Residences in both treaty and non-treaty sections	Not filled on a regular basis; used for garbage disposal
3)	<u>Solid Waste Management</u>		
	A) <u>Two Landfill Sites</u>		
	1. Municipal	HB store, Riverside band stores, non-treaty residences, nursing station, school and band office (Garbage pickup twice weekly)	Poorly fenced, raw sewage being dumped at the site
	2. Saggitawack	Prov. conservation office, Man. Hydro, treaty residences. (No regular garbage pickup)	Garbage dumped in the townsite; no gates or regular maintenance at either waste disposal site.
<u>NELSON HOUSE</u>			
1)	<u>Water Supply</u>		
	A) <u>Pump Station</u>	Footprint Lake	Laundromat, cafe, HB store and residence, nursing station, band office, school buildings
	B) <u>Water Delivery Trucks</u> (two)	Individual residences	Stored in 45 gal. drums

	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
<u>NELSON HOUSE (continued)</u>			
2) <u>Waste Water Treatment</u>			
A) <u>Two Extended Aeration Systems</u>		Laundromat, band office, nursing station, school buildings, cafe	
B) <u>Septic Tank and Field</u>		HB store and residence	
C) <u>Plt Privies</u>		Individual residences	Shortage of space for new privies; many existing privies located near the lake on steep, eroding land areas
3) <u>Solid Waste Management</u>			
A) <u>Landfill Site</u>	The community	Regular pickup service	Some garbage strewn around individual residences
<u>NORWAY HOUSE</u>			
1) <u>Water Supply</u>			
A) <u>4 Pump Stations</u>			
1. Rossville School	Nelson River	School, teacherage, senior citizens home, HB store, band office	Low river levels create problems- change in water flows from the Jenpeg dam
2. Jack River School	Nelson River	School, teacherage, R.C. mission	
3. Hospital	Nelson River	Hospital, Man. Hydro, Man. Telephone System	
4. Rossville Area	Nelson River	4 standpipes	Seasonal (freezing)
B) <u>Private Pump Houses</u>	Nelson River	Some individual residences	Not chlorinated

	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
<u>NORWAY HOUSE (continued)</u>			
C) <u>Water Delivery Trucks</u> <u>- Four</u>	Nelson River	Individual residences with access roads (150 homes)	Access roads (seasonal)
D) <u>Water Pail</u>	Nelson River	Standpipes or river system, no access roads (200 homes)	
2) <u>Waste Water Treatment</u>			
A) <u>4 Sewage Treatment Plants</u>			
1. Rossville School	Extended aeration system	Rossville School teacherages, band office, senior citizens home, HB store, United Church and residence, 27 individual residences	Aeration incomplete, system is overloaded with new additions, infiltration of ground water
2. Jack River School	Extended aeration system	Jack River School, 13 teacher- ages, RC Mission	
3. Hospital	Extended aeration system	Hospital complex, nurse's residences	
4. RCMP	Extended aeration system	RCMP	Hydraulically overloaded
B) <u>(New Lagoon System Planned)</u>		(Individual residences, non- reserve community) (Hook-up RCMP sewage facility with the new lagoon) (Possible hook-up with Playgreen Inn)	
C) <u>Septic Tank and Field</u>		Playgreen Inn	Recent overflows and spills, possible contamination of river system

	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
<u>NORWAY HOUSE (continued)</u>			
D) Pit Privies		Individual Residences	
3) <u>Solid Waste Management</u>			
A) <u>2 Landfill Sites</u>			
1. Fort Island (officially closed, but still in some use)			
2. Jenpeg Road		Reserve and non-reserve residences - regular pickup at reserve residences	Garbage dumped along roadside off reserve
3. (New site planned on West Island)			
<u>SPLIT LAKE</u>			
1) <u>Water Supply</u>			
A) <u>3 Pump Stations:</u>			
1. Nursing Station	Split Lake	Nursing Station	
2. Mission	Split Lake	Hudson Bay Co., RCMP and Mission	
3. Community Pump Station	Split Lake	Schools, teacherages and 20 community standpipes	Water level has dropped, lift station required.
B) <u>Water Pails</u>	Split Lake	Individual Residences	Majority inoperative during winter; water supply untreated, questionable quality; water stored in 45 gal. drums - open containers. Subject to contamination by airborne micro-organisms. Spring runoff pollutes the water sources, creating increased incidences of gastro-enteric disorders.

<u>SPLIT LAKE (continued)</u>	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
2) <u>Waste Water Treatment</u>			
A) <u>Extended Aeration Plant</u>		School and teacherages	Lines are exposed, freezing problem in winter. Maintenance not adequate. Lack of communication DIAND.
B) <u>Septic Tank and Field</u>		Nursing Station	
C) <u>Septic Tank and Field</u>		RCMP Trailer, Hudson Bay Co. store	
D) <u>Pit Privies</u>		Individual Residences	Concentrated in limited land area, old holes not properly landfilled, health problems during spring runoff
3) <u>Solid Waste Management</u>			
A) <u>2 Landfill Sites</u>			
1. Near Airstrip		No regular garbage pickup	Garbage strewn throughout community
2. North of Airstrip			- placed in abandoned privy holes - placed on the lake during the winter, creating spring runoff problems - no fence around old site, no all-season access road
<u>YORK LANDING</u>			
1) <u>Water Supply</u>			
A) <u>Pump Station</u>	Alken River	School, teacherage, nursing station, a community standpipe	Two leaks resulting in low pressure drop in water level have exposed intake lines, creating freezing problems - particulate contamination in standpipe

YORK LANDING (continued)

	<u>SOURCE</u>	<u>SERVING</u>	<u>ENVIRONMENTAL PROBLEMS</u>
B) <u>Water Pails</u>	Alken River Springs	Individual Residences	Untreated water
2) <u>Water Treatment</u>			
A) <u>Septic Tanks and Fields</u>		School, teacherage, nursing station	Low water pressure creating problems with sewage system
B) <u>Pit Privies</u>		Individual Residences	High concentration of privies in townsite area; problems during spring runoff
3) <u>Solid Waste Management</u>			
A) <u>Two Landfill Sites</u>			
1. Near Airport		No regular garbage pickup	No maintenance at landfill site; garbage dumped in area near townsite; problems during spring runoff
2. North of Airport			

APPENDIX "B"

DISCUSSION OF  
BACTERIAL CONSIDERATIONS AND  
ENVIRONMENTAL CONTROL  
OF WATER QUALITY<sup>1</sup>

<sup>1</sup>This appendix is an excerpt from a publication prepared for the Environmental Protection Service Northwest Region by J.B. Bell, W. Macrae, G. Elliot, J.F.J. Zaal, and T. Youmans entitled, The Microbiology of the Red River in Manitoba, Canada, April 1979. The excerpt represents a literature review discussing illnesses and water supply considerations applicable to northern Manitoba.



## LITERATURE REVIEW

### Bacterial Considerations and Water Quality

Normally, when one thinks of water associated disease one thinks of diseases such as cholera, typhoid fever, infectious hepatitis, amebiasis and, to a lesser extent, shigellosis. These are normally associated with a failure in the water supply. They may also be a reflection of sanitary habits, facilities, general hygiene or the quality and quantity of the local water supply. Community health improves with the availability of a good water supply and an effective sanitary waste disposal system (1).

However, recreational use of water is of considerable importance, and consideration is especially needed in high density population areas. Microbiological criteria has usually been based upon the probable presence of enteric pathogens, such as *Salmonella* or *Shigella* by the use of a set of indicator organisms, coliforms, fecal coliforms and fecal streptococci. Selection of standards was normally based upon a "negative epidemiological approach" where a set of guidelines are developed in the absence of reported enteric disease, caused by any particular type of water use for which a hazard is presumed to exist due to the existence of a disease reservoir (2). Positive epidemiology is often impractical due to the logistics of following a population at risk. One of the few epidemiological studies of diseases associated with swimming was conducted by Stevenson and published in 1953 (3). Stevenson found that there was an overall increase in the illness of swimmers compared to nonswimmers and that there was a significantly higher increase in illness among swimmers using waters with coliform counts greater than 2,300 per 100 ml. A significant increase in gastrointestinal disturbances did not appear until the coliforms reached 2,700 per 100 ml. Controversy has existed regarding the statistics of Stevensons studies and much controversy has surrounded the use of coliform standards for recreational waters (4). Most standards are now based upon fecal coliforms.

Recent epidemiological evidence presented by Cabelli et al. (5), showed that the rate of gastrointestinal (GI) symptoms was higher among swimmers relative to non-swimmers. They also found that there was a close relationship between GI symptomology and the *E. coli* and enterococcus densities. There was a GI differential attack rate of 3.8% when the *E. coli* density exceeded 200 per 100 ml in the water. In all

probability few, if any, of the cases involved would be reported to public health authorities except in the case of an outbreak situation. Thus Cabelli et al., clearly showed that there are measureable health effects associated with swimming in sewage polluted waters.

In the last year or two the most commonly reported bathing associated illnesses were leptospirosis, swimmers itch (a bird schistosome), wounds infected with *Aeromonas hydrophila*, *Vibrio* species and skin rashes caused by *Pseudomonas aeruginosa* (6). Despite previous claims that you need to practically swim in raw sewage in order to pick up an enteric infection (7) such infections are still being reported in bathers.

An outbreak involving 45 cases of *Shigella sonnei* were traced to swimming in a polluted section of the Mississippi River (8,9). Hawley et al. (10) isolated Coxsackie virus B in the recreational waters of a boys camp where there was an epidemic of this virus. These authors pointed out that virus present in lake swimming water may play an important role in some enterovirus outbreaks. Fresh water wound infections have been reported by swimmers infected with *Aeromonas hydrophila* (11). This organism will quite often appear as a typical coliform on the isolation media (12) and its presence was thought to invalidate this test, however, the role of *Aeromonas* in human infections now suggests that further attention should be given to this pathogen (13,23).

*Pseudomonas aeruginosa* is a pathogen being given serious consideration for inclusion in water quality standards (14). Infections have usually been associated with swimming pools (15,16,17), although epidemiological evidence for recreational lakes suggests that there may be a relationship between *Pseudomonas* infections and levels of the organism as low as 10 per 100 ml (14). *Pseudomonas aeruginosa* appears to be ubiquitous in clinical environments (18,19) and causes numerous infections including tracheal infections (20) and has also been incriminated in epidemic diarrhea in newborns (21). Most recently, water beds used in a hospital have been shown as a potential source of *Pseudomonas aeruginosa* (22).

Consideration of diarrheal disease due to enterotoxigenic *E. coli* may also be of importance for recreational waters. *E. coli*'s which

are normal inhabitants of the GI tract are now being found which produce enterotoxins, which in turn produce diseases similar to clinical cholera (24,25,26). Fecal coliform standards would help reduce the environmental cycling of this important group of pathogens.

In summary, there appears to be justification for fecal coliform and fecal streptococci standards for recreational waters based on epidemiological evidence. Numerous other infections, notably those from *Pseudomonas aeruginosa* and *Aeromonas*, lend support to a need for bacterial standards and the possibility of the dissemination of viral pathogens should not be discounted. Although not previously mentioned in this section there is also evidence that polluted streams can contribute to the incidence of infectious hepatitis (27) in a community.

#### 4.2 Waterborne Infections and Potable Water

Perhaps one of the worst consequences of a polluted water supply was the resultant pandemic of cholera in London, 1866. Fortunately, the events as discussed in detail by Lucin (28) had a decisive impact on water treatment policies that lead to great reductions in the spread of waterborne disease. The role of water in the spread of infectious diseases has been known since the time of Dr. John Snow (circa-1850) yet despite the knowledge amassed since that time, populations are still at risk, perhaps more often than acceptable (29). For example, the situation in Quebec is not good with many communities reporting positive coliform results in their treated water supplies (30).

Unfortunately, there are still outbreaks of diseases such as typhoid in Canada. The mechanisms of the breakdown of potable water supplies cannot be discussed in detail here, what is important is that failures still occur and possibly large parts of the population are at risk. Typhoid occurred in Bouchette, Quebec where 40 cases were reported out of a total population of 1,000. These cases were attributed to drinking contaminated Gatineau River water (31). In Kingston, Ontario, 42 individuals including 24 children contracted typhoid from a contaminated well (32). In treatment of the disease a comparison of treatment with chloramphenicol and high dose ampicillin, two drugs of choice was made. High dosage ampicillin had no therapeutic advantage over low doses of chloramphenicol and excretion of *S. typhi* continued

up to 2 weeks irrespective of antibiotic treatment (33). The most recent large waterborne epidemic of typhoid occurred in Saint Gabriel de Brandon, Quebec, where 160 cases developed from drinking contaminated water supplies (34).

Waterborne outbreaks were clearly on the decline during the years 1940-1960 in the U.S. (35). However, reviews for the past fifteen years (up to 1974) show that the number of waterborne disease outbreaks is on the increase in the U.S. (36,37). Unfortunately, Canadian statistics are not published with the U.S. statistics but if these were available, likely the same trends would be in evidence.

Waterborne illness is not restricted to typhoid. There is increasing concern for *E. coli* infections, in particular, enterotoxigenic strains which have been known to cause epidemic diarrhea (38,39,40). *Shigella* outbreaks have also been reported involving in excess of 1,200 cases (41) and others involving a few hundred cases (42,43). There should also be some concern for the increasing number of outbreaks involving *Giardia lamblia*. These have been occurring particularly in the western United States (44, 45,46). In an eastern outbreak in Rome, New York 10.6% of the population were infected from its water supply (47). Bacterial concerns in the published data range from isolated cases of children contracting typhoid from drinking contaminated water in a stream (48) to large epidemics involving several thousand people (49,50). The isolation of *Klebsiella* in the chlorinated water supplies of Chicago also leads one to speculate upon the role of water in the dissemination of this opportune pathogen, a pathogen of major environmental concern (51).

Perhaps one of the greater concerns for the future is that of virus in water supplies. A great deal of attention must focus on the role of water in the dissemination of infectious hepatitis. For example, only about 33% of the cases of infectious hepatitis can be accounted for by contact, parenteral drug abuse or transfusion, leaving 67% without a known transmission route (52). Mahdy suggests that there is an association between the occurrence of hepatitis A, the water supply, and its quality (52). Although infectious hepatitis is the only virus with a clearly demonstrated waterborne route, water may also play an important role in the dissemination of other viruses producing sub-clinical disease (53).

Perhaps the best known outbreak of infectious hepatitis due to contaminated water was the New Delhi, Indian epidemic of 1955-56 where there were 28,745 reported cases (54). Certainly, though, a number of other documented waterborne outbreaks have occurred (55,56,57,58).

The evidence for waterborne polio is more tenuous. There were, however, two outbreaks reported to be waterborne; one occurring in Edmonton, Alberta and the other in Lincoln, Nebraska (54). These instances and recent isolations of poliovirus type 2 from a well by Mack et al., (63) and isolations of wild poliovirus type 1 in Ottawa sewage, particularly at a time when immunity against poliovirus is declining, should give rise to serious concern by those involved in the management of water resources and community health (ie. vaccination) programs (59).

McDermott (60) pointed out that virus in drinking water falls into the category of risk due to ill defined problem. However, he showed that 56% of the potable water systems in the U.S. had physical deficiencies including poorly protected groundwater sources, inadequate disinfection capacity, inadequate clarification capacity and/or inadequate system pressure. In terms of disease statistics he felt there was a large gap as a result of inadequate reporting or inadequacies in the "Specified Notifiable Disease" list. For example, during the 1961-1970 period there were definitely 26,546 cases of gastroenteritis attributable to water yet this disease is not on the list. There has also been a gap in the tracing of the cause of diseases as shown on Table 17.

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TABLE 17      REPORTED CASES OF SPECIFIED NOTIFIABLE DISEASES:  
UNITED STATES 1961-1970 (McDermott (60) 1975).

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Disease	Total Cases Reported Causes Undetermined	Cases Reported and Attributed to Drinking Water
Infectious hepatitis	400,000	903
Shigellosis	125,000	1,666
Typhoid	4,500	104
Salmonellosis	175,000	16,706
Amebiasis	30,000	39
Giardiasis		176
TOTAL	734,500	19,594

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Some evidence that may support the theory of waterborne viral problems is the disparity between the typhoid rate and the viral hepatitis rate (61). It is understandable why the typhoid rate declined as a result of better sanitation and controls such as vaccination and disinfection. The question, however, remains, how do we explain the infectious hepatitis estimates, 400,000 with cause undetermined?

Some interesting observations were made by Hudson (62) when he examined the infectious hepatitis incidence in relation to the water quality of the finished supply of 12 U.S. cities. Basically, the incidence of infectious hepatitis increases as the turbidity increased in the finished water supply and those cities with higher infectious hepatitis rates did not meet one or more quality criteria. Distinct associations were also shown between the clarity of filtered water and bacterial quality.

Gerba et al (64) summarized the problem quite well by stating that many waterborne viral diseases (except infectious hepatitis) are not recognized as being waterborne. A person may contact a viral infection by drinking contaminated water and the virus may actively multiply in his upper respiratory tract and intestine without his developing overt symptoms of the disease. He can then act as an effective carrier to a large segment of the population. The other part of the problem is that epidemiological techniques are not sufficiently sensitive to detect low level transmission of virus through water.

Regardless, good quality potable water can be delivered. There are five principles which are of great assistance in the delivery of pure water in relationship to water management as developed by Okun (65) and his fourth and fifth principles are noted here: a) Potable water should be drawn from protected rather than polluted sources and, b) the management of water supply and water pollution control should be integrated. Part of Okun's reasoning for the protected supply is due to the threat from synthetic organic chemicals; however, it might also be stated that in the event of a water treatment plant failure the risk to the population is greatly reduced if the water supply is of good quality to start with.

Although it is not the intent of this literature review to discuss organics or carcinogenic substances in drinking water, it must be stated that this is a concern. Harrison et al (66) have reviewed the role of polynuclear aromatic hydrocarbons (PAH) in raw, potable and wastewaters and have concluded that there is an acute need for some fundamental studies to examine the chemical changes that occur upon chlorination of these compounds. The views concerning carcinogens are widely divergent. For example, Stokinger's (67) evaluations of EPA data in chlorinated organics and in particular chloroform in drinking water is that in order to produce neoplasia from the quantities reported an individual's required intake of water would result in a drowning first. Nevertheless, it has been shown, for example, that the incidence of cancer mortality has been clearly linked to the use of the Mississippi River water for drinking (68). These concerns must be addressed in the near future. Ember (69) summarized the other extreme by stating man will "quickly have to learn to prevent pollutants from entering his environment and, in all, make a better accommodation with his surroundings ...or he will be doomed to quietly poison himself."

#### 4.3 Salmonella in the Environment

Salmonellosis is considered to be an increasing problem throughout the world (70). In the western world, the spread of this organism is largely through contaminated foods. Detailed reviews of the possible modes of contamination have been provided by others in which the possible role of water in the dissemination of *Salmonella* to vegetables, crops, birds and other forms of wildlife and domestic animals with subsequent transmission to man, has been shown (71, 72, 73, 74, 75, 76).

The major waterborne species of *Salmonella* is *S. typhi*. This organism is usually associated with waterborne outbreaks of typhoid, water often being the mode of widespread epidemics throughout a community. The control of typhoid in the developed countries is due largely to the purification of potable water supplies, the purification of waste-waters which threaten such supplies and vaccination programs. The

world situation is not good, there being 500 million cases of waterborne disease and 5 million infant deaths annually due to waterborne infections (77). Although water supplies are well protected in North America sporadic outbreaks still occur. Typhoid has occurred in recent years through contaminated drinking water: in Dade County, Florida 210 cases were reported (78,79), and three Canadian outbreaks have already been referred to. Although *S. typhi* is usually associated with water borne epidemics, it is not always the causative organism. In 1965, a large waterborne outbreak of *S. typhimurium* in Riverside, California affected 18,000 people. This organism was isolated from the water supply system in 6 separate samples even though the coliform levels met the U.S.P.H.S. Standards (80). The Riverside epidemic demonstrated that serotypes of *Salmonella* other than *S. typhi* can be waterborne and shows the threat to large communities if their water treatment system either fails or their potable water supply is heavily contaminated.

The environmental cycling of *Salmonella* is a complex subject for study and it is often difficult to demonstrate the role of water in this cycle. The investigative mechanisms are usually not pursued beyond preliminary work which normally ends with the incrimination of a food product. Two cases serve to illustrate the problems in tracing sources. In 1966, 300 people were infected with *S. java* in 12 separate outbreaks in New York, New Jersey and Pennsylvania. The common food source was smoked whitefish. Subsequent investigations traced a possible *S. java* source to contaminated river water in Hay River, N.W.T. The investigators concluded that either the *Salmonella* were in the fish originally, or were in the river water used for washing the fish. When conditions favourable to the proliferation of *Salmonella* occurred during shipping, numbers of organisms suitable for infectivity resulted (81). The second case was the Aberdeen typhoid outbreak of 1965 where 515 cases of typhoid and three deaths occurred as a result of infected canned corned beef. The contamination of the corned beef was shown to have taken place during the cooling process which used sewage contaminated water near the city of Rosairo, Argentina (82).

Many studies have shown *Salmonella* to be widespread in the environment. How these organisms are disseminated is a matter for some speculation and specific routes are difficult to determine. It would seem, however, that some have been fairly well established. Surface waters can act as a reservoir of *Salmonella* and many are contaminated



with a wide variety of these pathogens (75,83,84,85,86,87,88,89,90,91). Relationships have been shown between contaminated creek water and infected cows, and subsequently man (72), and similar relationships have been shown between milk cows, contaminated water and human infections of paratyphoid (92). In fact, many domestic animals have become reservoirs of *Salmonella* (93,94,95,96,97,98,99,100), some becoming infected initially from a contaminated water source. The major source of domestic animal contamination seems to be feedstuffs and often control measures are implemented at this point (101,102,103,104). In some cases, domestic animals have become infected through grazing on contaminated pastureland (105,106,107).

In addition to domestic animals, a wide variety of wild animals, birds, rodents, pets and fish have been shown to be reservoirs of *Salmonella* (108,109,110,111,112,113,114). Unfortunately, the role of water in the dissemination of *Salmonella* to wildlife is difficult to demonstrate, although it would seem obvious that animals drinking contaminated water could become infected. Similarly, birds such as gulls which are associated with water, could easily become infected from contaminated surface waters. Loften et al. (71), from studies of *Enterobacteriaceae* in a large number of Colorado mammals and birds, noted that many black-birds nest near the watering holes of wild animals, other birds and domestic animals and emphasized the importance of such reservoirs.

Indeed *Salmonellosis* has been shown to be an environmental health problem involving much zoonosis and transfer of the salmonella organisms between different hosts and environments. Man, domestic and wild animals, birds, water, meatpacking plants and waste materials all play a role in the cycling of these organisms and breaking the cycle must be the aim of environmental protection (115, 116, 117, 118, 119, 120).

#### 4.4 Antibiotic Resistance & Resistance Transfers in the Environment

The indiscriminate use of antibiotics has long been recognized as a practice resulting in the selection of antibiotic resistant strains of bacteria (121,122). Antibiotic resistant and multiresistant bacteria have been reported from a wide variety of sources, including clinical sources (123), human and animal sources (124), sewage (125,126), river water (127,128), estuarine water (129), animals and livestock (130,131), and lake sediments (132). In many instances the antibiotic resistant organisms, particularly those of the *Enterobacteriaceae*, display a capacity to transfer their resistance by resistance transfer factors (R+) to other organisms (123,124,125,126,127,128,129,130,131).

Drug resistance can be mediated, either by genetic changes as a result of mutation, or by R factors, these being extrachromosomal nucleic acid elements called episomes. R factor resistance can be for as many as eight antibiotics at a time, as well as for phages, heavy metals, colicines and UV light, whereas chromosomal resistance occurs less frequently and usually is for one antibiotic at a time (133,134). Unfortunately, bacteria carrying R factors have been found to transfer their resistance to sensitive populations not only in the human gut, but also to populations in sewage treatment plants (125,126,135,136).

The development of multiresistant pathogens, as a result of contact with R+ coliforms or other R+ bacteria, has had serious implications. Baldwin (137) reported that the transfer from animal to man of *Salmonella typhimurium* carrying transferrable drug resistance resulted in 6 human deaths. More dramatic was a pandemic of R+ *Shigella dysenteriae* in South America where 12,500 deaths were recorded in Guatemala alone during the 1st year (138).

A high incidence of R+ bacteria in sewage and receiving waters is often associated with urban environments (139) and is frequently mediated by R+ coliforms. The increase in the number of multiresistant bacterial pathogens and the ramifications of resistance transfer, particularly by R+ coliforms in sewage, has led to demands for advanced purification of wastewaters entering the environment, and for a re-evaluation of the coliform standard (126, 127, 128, 129, 134, 135, 140). This increasing concern led to an editorial in the New England Journal of Medicine

stating; "It appears that unless drastic measures are taken very soon, physicians may find themselves back in the pre-antibiotic Middle Ages in the treatment of infectious diseases" (141).

#### 4.5 Sources and Control

When point source or non-point source control of effluents is sought one has to balance the benefits, risks and expenses. There is no panacea for wastewater treatment, especially when the treatment includes disinfection.

Environmental control practices 50 to 75 years ago had the primary objective of preventing disease, in addition to the protection of biological life, recreation and aesthetics (142). Somewhere along the line, the primary objectives have become lost. Some advocate the protection of public health is best done at the water treatment plant and in advocating the European systems ask if the public health is better protected in North America with wastewater disinfection than in Europe without (143). The answer is emphatically yes. The European situation is not good. The quality of German surface waters is so poor that purification of water supplies restricted to the killing of pathogens is no longer appropriate (144). Kampelmacher (207) has tied contaminated surface waters directly to the cycling of *Salmonella* in Europe. *Salmonella* infections are maintained by cycles in which the polluted environment, especially contaminated surface water, plays a major role and this may also be the case with other organisms. European rivers and in particular the river Meuse and the river Rhine, are extensively contaminated by effluents entering these rivers. The *Salmonella* in the contaminated surface waters, in turn, enter the *Salmonella* cycle and contribute to the epidemiology of *Salmonella* in Europe. The return of cholera to Europe can be directly linked to poor sanitation, inadequate waste treatment, contaminated shell fish growing grounds, contaminated surface waters and inadequately purified drinking water including bottled water (145,146,147,148).

Water producers cannot rely on the bacteriological quality of the wastewater treatment, nor that of the potable water supply, and adequate disinfection must remain the last line of defence (149). That municipal sewage is a major source of bacterial and viral pathogens is beyond dispute (150). Recent interest in viruses led to the isolation of poliovirus and enteroviruses from sewage, pointing to the inadequacies of conventional treatment for viral removal (151, 152, 153, 154, 155).

A significant source of microbial pollution is storm water drains and these are contaminated with bacterial pathogens as well as large numbers of indicator organisms (156, 157, 158). Combined sewer overflow poses a problem and also contributes significantly to the bacterial and chemical levels in storm sewer discharges (159, 160). The problem is seasonal (161) and may be affected by storm frequency but not necessarily time between storms (162). During periods of dry weather storm drains may not be an important source.

The sediments may also be a source of microbial pollution, particularly during periods of scouring. Dredging, for example, has been shown to significantly increase the levels of fecal coliforms (163) which appear chiefly at the surface of the sediment (164). Hendricks (165) found that the recovery of *Salmonella* was greater in stream sediments than from surface waters and this was confirmed by Van Donsel and Geldreich (166). Matson et al (167) have amplified the importance of sediments as a reservoir by identifying the possibility of growth or extended survival and subsequent resuspension in the water column. They have also pointed to sediments for the provision of potential health hazard information in the absence of such information from water analyses. Enteroviruses have also been shown to survive for prolonged periods in sediments (168).

Land runoff is one of the 'non-point' sources most difficult to control and again poses the greatest threat to water resources during or after periods of rainfall. Farm land contaminated by animal manure or cattle feedlot operations produces large numbers of enteric indicators as well as pathogens in the runoff water (169, 170, 171).

Control of bacterial discharges has usually meant chlorination which can effectively eliminate the bacterial load given proper design and operation (172, 173). The control of viruses is not so easy and alternate control technology is needed for effective reduction of this important group of disease causing agents (174). Control of viruses can be achieved, and sewage reclaimed to drinking water standards by the use of technology such as lime treatment, high pH (11.5) followed by carbon contact stabilization and chlorination (175).

The disinfection of sewage effluents can have a positive effect on the removal of bacterial pathogens from the receiving water. This has been adequately demonstrated by Brezenski et al (176), who showed the elimination of *Salmonella* and *Shigella* in sewages and receiving waters in relationship as a result of chlorination. When the post chlorination was discontinued the *Salmonella* reappeared in the receiving water. This however does not resolve the contribution from storm drains and non-point sources during wet weather. There are solutions to the storm drain question and solutions sought within Winnipeg, judging by the preliminary results of studies on the Southdale/Baldry drainage systems suggest that storm water retention ponds may be workable (177).

The problems of chlorination have raised serious environmental concerns with regard to fish toxicity. Low levels of residual chlorine in secondary effluent (0.045 mg/l) has toxic effects on fathead minnows and levels as low as 0.033 mg/l can retard their growth. Dechlorination or disinfection with ozone have been shown to have no ill effect on their survival and growth (178). A major fish kill was reported in the James River, Va., due to chlorinated effluent (179). Proof of this fish kill was later challenged on the basis of insufficient scientific evidence and the validity of caged fish bioassays. In fact the previously reported general avoidance by fish of the river reach receiving chlorinated wastewater plant effluent was not considered (180). Joly (181) has most definitely raised some valid questions concerning the formation of chlorinated organic compounds during wastewater disinfection and clearly additional research is needed on their ultimate fate in the environment. At present the chief concern seems to be with the formation

of chlorinated compounds during water treatment and in this regard the biomass or organic carbon in the water supply would be of importance.

At present alternative disinfection processes are being researched, including ozone (182, 183, 184, 226), ultraviolet light (185), iodine (186), radiation (187, 188), bromine (189, 190) and to some extent lime (191). There are problems with some of the alternative methods in terms of cost and to some degree little is known of the compounds formed during the processes (191, 192). Certainly one solution to the toxicity from chlorination is dechlorination.

Karaganis (193), as a result of interviews with a large number of scientists working in the field, suggests that the maximum elimination of disease causing organisms must be at the source. He concluded that it is impossible to place a cost on the benefit of removing these disease risks. Complete collection of human fecal waste is a problem that must be addressed contemporaneously with adequate treatment and disinfection. It seems prudent to disinfect on a case by case basis but when the receiving water is used as a potable water supply or for recreation then disinfection should be employed.

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## CHAPTER 955

### INDIAN ACT

#### Indian Health Regulations

#### REGULATIONS RESPECTING THE PROVISION OF MEDICAL TREATMENT AND HEALTH SERVICES FOR INDIANS

##### Short Title

1. These Regulations may be cited as the *Indian Health Regulations*.

##### Interpretation

2. In these Regulations,  
"Department" means the Department of Indian Affairs and Northern Development; (*ministère*)  
"health officer" means the Provincial Medical Officer of Health of any municipality or Health District or area in which any person subject to these Regulations is resident, and includes the provincial health authority charged with the administration of the provincial health regulations and empowered to ensure the enforcement thereof; (*hygiéniste*)  
"Indian Health Services" means the Indian Health Services Directorate of the Department of National Health and Welfare; (*Services de santé des Indiens*)  
"infectious disease" means any contagious or communicable disease and includes every doubtful case of communicable disease; (*maladie infectieuse*)  
"medical officer" means a graduate of a school of medicine or surgery of recognized standing who  
(a) is appointed by Indian Health Services either for full-time or part-time service, or  
(b) is designated by the Minister of National Health and Welfare  
to render medical service and assistance to Indians in the area where such Indians reside; (*médecin-fonctionnaire*)  
"medical practitioner" means a medical doctor who is licensed to practise medicine in a province and includes, in the Northwest Territories, a dentist licensed to practise dentistry in the Northwest Territories; (*praticien*)  
"place of detention" means hospital, sanatorium, clinic, lock-up, gaol, reformatory, or other place designated by the superintendent for the purposes of section 8; (*lieu de détention*)  
"reserve" means a tract of land that has been set apart for the use and benefit of a band. (*réserve*)

## CHAPITRE 955

### LOI SUR LES INDIENS

#### Règlement sur la santé des Indiens

#### RÈGLEMENT CONCERNANT LA DISPOSITION DES TRAITEMENTS MÉDICAUX ET LES SERVICES D'HYGIÈNE DESTINÉS AUX INDIENS

##### Titre abrégé

1. Le présent règlement peut être cité sous le titre: *Règlement sur la santé des Indiens*.

##### Interprétation

2. Dans le présent règlement,  
«hygiéniste» désigne le médecin-hygiéniste provincial de toute municipalité ou district ou région sanitaire où réside toute personne soumise au présent règlement, et comprend l'autorité provinciale chargée de l'administration des règlements provinciaux sur la santé et autorisée à assurer l'application dudit règlement; (*health officer*)  
«lieu de détention» désigne un hôpital, un sanatorium, une clinique, une geôle, une prison, un établissement de correction ou autre lieu désigné par le surintendant pour les fins de l'article 8; (*place of detention*)  
«maladie infectieuse» désigne toute maladie contagieuse ou transmissible et comprend tout cas douteux de maladie transmissible; (*infectious disease*)  
«médecin-fonctionnaire» désigne un diplômé d'une école reconnue de médecine ou de chirurgie, qui  
a) est nommé par les Services de santé des Indiens pour faire du service continu ou intermittent; ou  
b) est nommé par le ministre de la Santé nationale et du Bien-être social  
pour donner une assistance ou des soins médicaux aux Indiens dans la région où résident de tels Indiens; (*medical officer*)  
«ministère» désigne le ministère des Affaires indiennes et du Nord canadien; (*Department*)  
«praticien» désigne un médecin qui détient une licence l'autorisant à exercer la médecine dans une province et comprend, dans les territoires du Nord-Ouest, un dentiste autorisé à exercer l'art dentaire dans les territoires du Nord-Ouest; (*medical practitioner*)  
«réserve» désigne une parcelle de terrain mise de côté à l'usage et au profit d'une bande; (*reserve*)  
«Services de santé des Indiens» désigne la Direction des services de santé des Indiens, au ministère de la Santé nationale et du Bien-être social. (*Indian Health Services*)

## PART I

## HEALTH OF INDIANS

*Application*

3. This Part applies to

- (a) every Indian who ordinarily resides on a reserve;
- (b) every Indian who follows the Indian mode of life whether or not he ordinarily resides on a reserve; and
- (c) every person other than an Indian who resides on a reserve.

4. Every Indian who is subject to this Part shall comply with all laws and regulations in force within a province relating to health or sanitation, except such laws or regulations as are inconsistent with this Part.

5. (1) A superintendent shall enforce this Part among the Indians over whom he has superintendence, and as to matters concerning health and sanitation he shall take the advice of a medical officer.

(2) A superintendent may designate any medical practitioner or medical officer to act as a health officer.

*Infectious Diseases*

6. When a person who is subject to this Part is, or suspects himself to be, infected with an infectious disease, he shall place himself under the care of and undergo the treatment and follow the course of action prescribed therefor by a medical officer or a medical practitioner.

7. When a superintendent believes, or has reason to believe, that a person who is subject to this Part is infected with an infectious disease, he shall, with the approval of a medical officer and by serving to such a person a notice in Form 1 of the schedule, order the person to undergo a medical examination before a medical officer or a medical practitioner and to follow the appropriate treatment and course of action prescribed by the examining medical officer or medical practitioner, but such order shall not be given when the person is undergoing a treatment and following the course of action prescribed under section 6.

8. (1) Where a person who is subject to these Regulations neglects or refuses to comply with an order given in Form 1 of the schedule, the superintendent may issue an order in Form 2 of the schedule for the compulsory examination and treatment of such person at a place of detention to be designated by the superintendent upon the advice of a medical officer.

(2) The order in Form 2 of the schedule shall bear the approval of a medical officer and may be delivered to any peace officer or constable who shall convey the person named in the order to the place of detention therein described and the person in charge of such place of detention shall receive and detain, by whatever means available, the person named in the order until duly authorized to release him in accordance with subsection (4), but the person detained has the right in the meantime to be visited by his own medical practitioner.

## PARTIE I

## SANTÉ DES INDIENS

*Application*

3. La présente partie s'applique à

- a) tout Indien qui ordinairement réside dans une réserve;
- b) tout Indien qui suit le mode de vie des Indiens, qu'il réside ou non, ordinairement, dans une réserve; et
- c) toute personne autre qu'un Indien qui réside dans une réserve.

4. Tout Indien soumis à la présente partie doit se conformer à toutes les lois et règlements en vigueur dans une province en ce qui concerne la santé ou la salubrité, sauf aux lois ou règlements qui ne concordent pas avec la présente partie.

5. (1) Un surintendant doit appliquer la présente partie chez les Indiens qui relèvent de sa surintendance et, en ce qui concerne les questions de santé ou de salubrité, il doit prendre l'avis d'un médecin-fonctionnaire.

(2) Un surintendant peut désigner tout praticien ou médecin-fonctionnaire pour agir à titre d'hygiéniste.

*Maladies infectieuses*

6. Lorsqu'une personne soumise à la présente partie est, ou se croit atteinte d'une maladie infectieuse, elle doit se confier aux soins d'un médecin-fonctionnaire ou d'un praticien et subir le traitement ou suivre le mode d'action prescrit pour son cas par le médecin-fonctionnaire ou le praticien.

7. Lorsqu'un surintendant croit, ou a raison de croire, qu'une personne soumise à la présente partie est atteinte d'une maladie infectieuse, il doit, avec l'approbation d'un médecin-fonctionnaire et par la remise à cette personne d'un avis sur la formule 1 de l'annexe, ordonner à cette dernière de subir un examen médical devant un médecin-fonctionnaire ou un praticien et de subir le traitement ou de suivre le mode d'action appropriés que prescrira le médecin-fonctionnaire ou le praticien qui l'a examiné, mais un tel ordre ne doit pas être donné lorsque la personne subit le traitement ou suit le mode d'action prescrit par application de l'article 6.

8. (1) Lorsqu'une personne soumise à la présente partie néglige ou refuse de se conformer à un ordre donné sur la formule 1 de l'annexe, le surintendant peut donner un ordre sur la formule 2 de l'annexe pour l'examen et le traitement obligatoires de ladite personne en un lieu de détention qui sera désigné par le surintendant sur l'avis d'un médecin-fonctionnaire.

(2) L'ordre sur la formule 2 de l'annexe doit porter l'approbation d'un médecin-fonctionnaire et être remis à tout agent de la paix ou constable, qui amènera la personne nommée dans l'ordre au lieu de détention y décrit, et la personne en charge dudit lieu de détention doit recevoir et détenir par tous les moyens disponibles la personne nommée dans l'ordre jusqu'à ce qu'un avis de libération soit dûment donné conformément au paragraphe (4); toutefois, la personne détenue a le droit, en attendant, de recevoir la visite de son propre médecin.

(3) A person detained as provided in subsection (2) shall remain at the place of detention until his release has been authorized pursuant to subsection (4).

(4) Upon the receipt of a certificate signed by a medical officer or a medical practitioner that the person detained is not infected with an infectious disease, the superintendent shall order his immediate release.

(5) Where a person who is detained as provided in subsection (2) escapes, the person in charge of the place of detention shall

(a) report the escape to the superintendent;

(b) order the apprehension and return of the person detained by delivering an order in Form 3 of the schedule to any peace officer or constable, and such peace officer or constable shall execute the order.

(6) A person who is detained pursuant to subsection (2), and who thinks himself aggrieved thereby, may by way of a petition outlining his reasons and served upon the superintendent, appeal from the detention order to a police magistrate or to two justices of the peace, and the magistrate or justices, after hearing the evidence, may order his release if satisfied that he is not suffering from an infectious disease.

9. (1) A person who is subject to this Part and who knows or suspects that another person who is subject to this Part has an infectious disease, or has died of an infectious disease, or has escaped from a place of detention, shall give immediate notice of that fact to the nearest superintendent or to the nearest medical officer or medical practitioner who shall immediately notify the superintendent.

(2) The superintendent shall give notice of the existence of any infectious disease, of which he may have knowledge, as soon as practicable to the health officer, with a copy of his notification to the Department and to the medical officer, who shall notify Indian Health Services.

10. (1) The superintendent shall report all cases of infectious disease of which he may have knowledge to the Assistant Deputy Minister, Indian and Eskimo Affairs, of the Department, on such form as may be prescribed by the Director of Indian Health Services.

(2) A medical practitioner shall report all cases of infectious disease of which he may have knowledge to the Director of Indian Health Services in such form as may be prescribed from time to time by the Assistant Deputy Minister referred to in subsection (1).

11. The superintendent shall, with the assistance of the medical officer, proceed without delay and without further instructions, in each case of infectious disease on a reserve, to enforce isolation, quarantine, placarding or such other measures as may be prescribed by the public health regulations of the province concerned, for the control of infectious disease in such cases.

12. Where an infectious disease on a reserve occurs in premises where the occupants are resident and where complete

(3) Une personne qui est détenue comme le prévoit le paragraphe (2) doit rester au lieu de détention jusqu'à ce que sa libération ait été autorisée conformément au paragraphe (4).

(4) Sur réception d'un certificat signé par un médecin-fonctionnaire ou par un praticien que la personne détenue n'est pas atteinte d'une maladie infectieuse, le surintendant doit ordonner la libération immédiate.

(5) Lorsqu'une personne détenue comme le prévoit le paragraphe (2) s'évade, la personne en charge du lieu de détention doit

a) signaler l'évasion au surintendant;

b) ordonner d'arrêter et de ramener la personne en cause en remettant un ordre sur la formule 3 de l'annexe à tout agent de la paix ou constable, et ledit agent ou constable doit exécuter l'ordre.

(6) Une personne détenue conformément au paragraphe (2) et qui se croit lésée par une telle détention, peut, au moyen d'une requête exposant ses motifs et remise au surintendant, en appeler de l'ordre de détention à un magistrat de police, ou à deux juges de paix, et le magistrat ou les juges, après avoir entendu la preuve, peuvent ordonner la libération s'ils sont convaincus que la personne en cause n'est pas atteinte d'une maladie infectieuse.

9. (1) Quiconque est soumis à la présente partie et sait ou soupçonne qu'une autre personne soumise aux dispositions de la présente partie est atteinte d'une maladie infectieuse ou est morte d'une maladie infectieuse, ou s'est évadée d'un lieu de détention, doit donner sur-le-champ avis de ce fait au surintendant le plus voisin ou au médecin-fonctionnaire ou praticien le plus rapproché qui en informeront immédiatement le surintendant.

(2) Le surintendant doit, le plus tôt possible, donner avis à l'hygiéniste de l'existence de toute maladie infectieuse dont il a pu avoir connaissance, et remettre une copie de son avis au ministère ainsi qu'au médecin-fonctionnaire qui en informeront les Services de santé des Indiens.

10. (1) Le surintendant doit signaler tout cas de maladie infectieuse dont il peut avoir connaissance, au sous-ministre adjoint, (Affaires indiennes et esquimaudes) du ministère, sur le modèle prescrit par le Directeur des Services de santé des Indiens.

(2) Un praticien doit signaler tout cas de maladie infectieuse dont il peut avoir connaissance, au Directeur des Services de santé des Indiens, sur le modèle que le sous-ministre adjoint dont fait mention le paragraphe (1) pourra prescrire de temps à autre.

11. Le surintendant doit, avec l'assistance d'un médecin-fonctionnaire, agir sans délai et sans autres instructions dans chaque cas de maladie infectieuse constaté dans une réserve, afin d'appliquer l'isolement, la quarantaine, le placardage ou telle autre mesure que peuvent prescrire les règlements sur l'hygiène publique de la province en cause, pour lutter contre les maladies infectieuses dans de tels cas.

12. Lorsqu'une maladie infectieuse dans une réserve se déclare dans un local où résident les occupants et qu'il est

isolation cannot be obtained in one or more rooms, the whole premises shall be quarantined.

13. (1) Where a medical officer certifies that effective isolation of any case of infectious disease, or quarantine of contacts, on a reserve cannot be secured in the premises in which the person suffering from the disease resides, the superintendent may cause the removal of such person to a hospital or place of isolation.

(2) For the purposes of subsection (1), the superintendent may issue an order in Form 2 of the schedule and such order has the same force and effect and is subject to the same conditions as the detention order issued under section 8.

14. A superintendent or medical officer may enter, in the daytime, any dwelling or other premises situated on the reserve under his charge, to inquire as to the state of health of any person therein or to examine the hygienic condition of the dwelling or other premises.

15. Where a medical officer certifies that a building situated on a reserve is unfit for human habitation, the superintendent may, with the approval of the regional supervisor, or, in British Columbia, of the commissioner, order the alteration or destruction of such building.

16. (1) Except when required in the performance of his duties, a person engaged in the administration of these Regulations shall not communicate any matter respecting venereal diseases that come to his knowledge in the course of his duties.

(2) Prosecution under these Regulations with respect to venereal disease shall be conducted in camera and no report of any such proceedings shall be published.

17. (1) Every person shall obey any lawful order given by the superintendent pursuant to these Regulations.

(2) No person shall obstruct the superintendent in the performance of his duty in carrying out these Regulations.

(3) No person shall aid or assist any person who is detained under section 8 to escape, or harbour or hide the person.

#### *Penalties*

18. Every person who violates any provision in this Part is liable on summary conviction to a fine not exceeding \$100 or to imprisonment for a term not exceeding three months or to both.

### PART II

#### OTHER INDIANS

##### *Application*

19. This Part applies to all Indians to which Part I does not apply.

20. Indians to which this Part applies shall comply with all laws and regulations in force within a province relating to health or sanitation.

impossible de réaliser l'isolement dans une ou plusieurs pièces, le local entier doit alors être mis en quarantaine.

13. (1) Lorsqu'un médecin-fonctionnaire certifie que l'isolement efficace d'un cas de maladie infectieuse ou la quarantaine des contagés dans une réserve ne peut se réaliser dans le local où réside la personne atteinte de la maladie, le surintendant peut ordonner qu'une telle personne soit conduite à un hôpital ou à un lieu d'isolement.

(2) Aux fins du paragraphe (1), le surintendant peut donner un ordre sur la formule 2 de l'annexe et un tel ordre a la même force et le même effet que l'ordre de détention émis en vertu de l'article 8 et il est soumis aux mêmes conditions.

14. Un surintendant ou médecin-fonctionnaire peut pénétrer, de jour, dans toute habitation ou autre lieu sis dans la réserve placée sous sa charge, pour s'enquérir de l'état de santé de toute personne qui s'y trouve ou pour examiner les conditions de salubrité de l'habitation ou autre lieu.

15. Lorsqu'un médecin-fonctionnaire certifie qu'un immeuble sis dans une réserve est impropre à l'habitation humaine, le surintendant peut, avec l'approbation du surveillant régional ou, en Colombie-Britannique, avec celle du Commissaire, ordonner la modification ou la destruction d'un tel immeuble.

16. (1) Sauf lorsqu'elle en est requise dans l'exécution de ses fonctions, une personne qui s'occupe de l'application du présent règlement ne doit divulguer aucun fait relatif aux maladies vénériennes qui vient à sa connaissance au cours de l'exercice de ses fonctions.

(2) Les poursuites intentées par application du présent règlement en ce qui a trait aux maladies vénériennes se tiendront à huis clos et aucun rapport des délibérations ne sera publié.

17. (1) Tous doivent obéir à un ordre légitime donné par le surintendant par application du présent règlement.

(2) Il est interdit de nuire au surintendant qui s'acquitte de son devoir en appliquant le présent règlement.

(3) Il est interdit d'aider une personne, qui est détenue en vertu de l'article 8, à s'évader, ou d'héberger ou de cacher une telle personne.

#### *Peines*

18. Quiconque contrevient à quelque disposition de la présente partie est passible, sur déclaration sommaire de culpabilité, d'une amende ne dépassant pas \$100 ou d'un emprisonnement d'au plus trois mois ou, à la fois, de l'amende et de l'emprisonnement.

### PARTIE II

#### AUTRES INDIENS

##### *Application*

19. La présente partie s'applique à tous les Indiens qui ne relèvent pas de la partie I.

20. Les Indiens auxquels s'applique la présente partie doivent se conformer aux lois et règlements en vigueur dans une province en ce qui concerne la santé ou la salubrité.

## Penalties

21. Every Indian who violates any provision in this Part is liable on summary conviction to a fine not exceeding \$100 or to imprisonment for a term not exceeding three months or to both.

SCHEDULE  
(ss. 7, 8 and 13)FORM 1  
THE INDIAN ACT

Canada .....	{	Order for medical examination and treatment under the <i>Indian Health Regulations</i> .
Province .....		
County .....		

To ..... of .....  
WHEREAS the undersigned has reason to believe that you are a person subject to Part I of the *Indian Health Regulations* and that you may be infected with an infectious disease liable to endanger public health.

NOW, THEREFORE, pursuant to the authority vested in me by section 7 of the *Indian Health Regulations* made under the *Indian Act*, I, the undersigned, hereby command you that on the ..... day of ..... 19....., you present yourself to Dr ..... at ..... (address) ..... and there submit yourself to an examination by him to determine whether or not you are infected with an infectious disease; and in the event you are found to be so infected, I hereby command you to undergo the treatment and follow the course of action to be prescribed by the said doctor.

Dated at ..... this ..... day of ..... 19.....  
Approved:

.....  
Superintendent.....  
Medical Officer  
Indian Health Services.....  
Agency

Note: Failure to comply with this order is punishable with a fine not exceeding \$100 or to imprisonment of three months or to both fine and imprisonment.

## Peines

21. Tout Indien qui contrevient à quelque disposition de la présente partie est passible, sur déclaration sommaire de culpabilité, d'une amende ne dépassant pas \$100 ou d'un emprisonnement d'au plus trois mois, ou, des deux peines à la fois.

ANNEXE  
(art. 7, 8 et 13)FORMULE 1  
LOI SUR LES INDIENS

Canada .....	{	Ordre d'examen médical et de traitement par application du <i>Règlement sur la santé des Indiens</i> .
Province .....		
Comté .....		

A ..... de .....  
Le soussigné a raison de croire que vous êtes une personne soumise aux dispositions de la partie I du *Règlement sur la santé des Indiens* et que vous êtes atteint(e) d'une maladie infectieuse qui peut mettre en danger la santé publique.

PAR CONSÉQUENT, en vertu des pouvoirs qui me sont conférés par l'article 7 du *Règlement sur la santé des Indiens*, édictés pour l'exécution de la *Loi sur les Indiens*, je, soussigné, vous ordonne par la présente de vous présenter le ..... jour d ..... 19....., au Dr ..... à ..... (adresse) ..... et là, de vous soumettre à un examen par lui afin qu'il puisse constater si oui ou non vous êtes atteint(e) d'une maladie infectieuse; affirmativement, je vous ordonne de subir le traitement et de suivre le mode d'action que vous prescrira ledit médecin.

Fait à ..... ce ..... jour d ..... 19.....  
Approuvé:

.....  
Surintendant.....  
Médecin-fonctionnaire  
Service de santé des Indiens.....  
Agence

Nota: Le défaut de se conformer à l'ordre ci-dessus rend passible d'une amende ne dépassant pas \$100 ou à un emprisonnement d'au plus trois mois ou, à la fois, de l'amende et de l'emprisonnement.

## FORM 2

## THE INDIAN ACT

Canada ..... } Apprehension and Detention Order  
 Province ..... } under the *Indian Health Regulations*.  
 County ..... }

To: Constable ..... of .....  
 a peace officer in and for the district of .....  
 ..... (or as the case may be)

To: Mr. .... of .....  
 Superintendent, Manager, Director or person in charge  
 of .....

WHEREAS the undersigned has reason to believe that .....  
 of ..... is a person subject to Part I of the  
*Indian Health Regulations* and is infected with an infec-  
 tious disease liable to endanger public health.

WHEREAS the said ..... refuses or neglects  
 to submit to medical examination or treatment; and

WHEREAS the undersigned is credibly informed that the  
 said .....  
 may be moved without endangering his life.

NOW, THEREFORE, pursuant to the authority vested in me  
 by section 8 of the *Indian Health Regulations* made under the  
*Indian Act*, I, the undersigned, with the approval of the  
 Medical Officer, do hereby order you the said peace officer to  
 apprehend the said ..... and to convey him safely to  
 the ..... at .....

AND I do order and direct you the said Superintendent,  
 Manager, Director or person in charge of the ..... to  
 receive the said ..... into your custody and to detain  
 him for treatment until my further order.

Dated at ..... this ..... day of ..... 19.....

Approved:

.....  
 Superintendent

.....  
 Medical Officer  
 Indian Health Services

.....  
 Agency

## FORMULE 2

## LOI SUR LES INDIENS

Canada ..... } Ordre d'amener et de détenir par  
 Province ..... } application du *Règlement sur la*  
 Comté ..... } *santé des Indiens*.

Au: Constable ..... de .....  
 agent de la paix dans et pour le district de .....  
 ..... (ou selon le cas)

A: M. .... de .....  
 Surintendant, gérant, directeur ou personne en charge de .....

Le soussigné a raison de croire que .....  
 de ..... est une personne soumise aux  
 dispositions de la partie I du *Règlement sur la santé des*  
*Indiens*, et est atteinte d'une maladie infectieuse qui peut  
 mettre en danger la santé publique.

Ledit (ladite) ..... refuse ou néglige de  
 subir un examen médical ou un traitement; et

Le soussigné est croyablement informé que ledit (ladite) .....  
 .....  
 peut être déplacé(e) sans mettre sa vie en danger.

PAR CONSÉQUENT, en vertu des pouvoirs qui me sont  
 conférés par l'article 8 du *Règlement sur la santé des Indiens*,  
 édictés pour l'exécution de la *Loi sur les Indiens*, je, soussigné,  
 avec l'approbation du médecin-fonctionnaire vous ordonne à  
 vous, ledit agent de la paix, d'appréhender ledit (ladi-  
 te) ..... et de l'amener en sûreté à  
 ..... de .....

ET j'ordonne à vous, ledit surintendant, gérant, directeur ou  
 personne en charge de ..... de recevoir ledit (ladi-  
 te) ..... en votre garde et de le (la) détenir pour  
 traitement jusqu'à nouvel ordre de ma part.

Fait à ..... ce ..... jour d ..... 19.....

Approuvé:

.....  
 Surintendant

.....  
 Médecin-fonctionnaire  
 Service de santé des Indiens

.....  
 Agence



## CHAPTER 958

### INDIAN ACT

#### Indian Reserve Dog Regulations

##### REGULATIONS FOR THE TAXATION, CONTROL AND DESTRUCTION OF DOGS ON INDIAN RESERVES

###### *Short Title*

1. These Regulations may be cited as the *Indian Reserve Dog Regulations*.

###### *Interpretation*

2. In these Regulations,  
"Assistant Deputy Minister" means the Assistant Deputy Minister, Indian and Eskimo Affairs, of the Department of Indian Affairs and Northern Development;  
"dog" means any dog, male or female;  
"dog registration officer" means the person designated as such by the Assistant Deputy Minister;  
"Minister" means the Minister of Indian Affairs and Northern Development.

###### *Registration*

3. The head of each family and each person living alone desiring to keep a dog shall apply to the dog registration officer for permission to do so and shall obtain a permit for such dog upon payment of a tax, the amount of which shall be established by the council of the band, and such permit shall be for one year and the issue and renewal thereof shall be at the discretion of the dog registration officer.

4. With the consent of the council of the band, the head of each family and each person living alone may keep one dog free of any tax if the registration of such dog is made in accordance with these Regulations.

5. Notwithstanding sections 3 and 4, an Indian may keep, with the consent of the council of the band, not more than five work dogs free of any tax; all work dogs all be chained or confined in a suitable enclosure when not in use.

6. (1) The dog registration officer shall keep a book for the registration of all dogs upon the reserve which registration shall show the name of the owner, the name of the dog and its age, sex and description; the tax payable shall be collected at the time of registration.

(2) Upon registration the dog registration officer shall issue a registration tag free of charge to the owner, which shall be

## CHAPITRE 958

### LOI SUR LES INDIENS

#### Règlement concernant les chiens des réserves indiennes

##### RÈGLEMENT SUR LA TAXATION, LE CONTRÔLE ET LA SUPPRESSION DES CHIENS DANS LES RÉSERVES INDIENNES

###### *Titre abrégé*

1. Le présent règlement peut être cité sous le titre: *Règlement concernant les chiens des réserves indiennes*.

###### *Interprétation*

2. Dans le présent règlement,  
«chien» s'entend d'un chien mâle ou femelle;  
«Ministre» désigne le ministre des Affaires indiennes et du Nord canadien;  
«préposé à l'immatriculation des chiens» signifie la personne désignée comme telle par le sous-ministre adjoint (Affaires indiennes et esquimaudes);  
«sous-ministre adjoint» désigne le sous-ministre adjoint (Affaires indiennes et esquimaudes), ministère des Affaires indiennes et du Nord canadien.

###### *Immatriculation*

3. Le chef de toute famille et toute personne vivant seule qui désirent garder un chien doivent en demander l'autorisation au préposé à l'immatriculation des chiens et obtenir un permis pour un tel chien contre paiement d'une taxe, dont le montant sera établi par le conseil de la bande et ce permis sera valable pour un an et la délivrance et le renouvellement seront laissés à la discrétion du préposé à l'immatriculation des chiens.

4. Avec l'assentiment du conseil de la bande, le chef de toute famille et toute personne vivant seule peuvent garder un chien qui sera exonéré de toute taxe, pourvu que l'immatriculation de ce chien soit conforme au présent règlement.

5. Nonobstant les articles 3 et 4, un Indien peut garder, avec l'assentiment du conseil de la bande, au plus cinq chiens d'attelage exonérés de toute taxe. Tous les chiens d'attelage doivent être tenus attachés ou en réclusion dans un enclos approprié, lorsqu'ils ne sont pas au travail.

6. (1) Le préposé à l'immatriculation des chiens devra avoir un registre où il sera tenu compte de tous les chiens de la réserve, l'inscription devant indiquer le nom du propriétaire, le nom du chien et son âge, son sexe et sa description et la taxe due sera perçue au moment de l'immatriculation.

(2) Le préposé à l'immatriculation des chiens remettra, au moment de l'inscription et sans frais pour le propriétaire, une

attached to the dog at all times; any change of ownership of any registered dog shall be entered in the register.

#### *Destruction*

7. Any dog found by the council of the band to be a nuisance shall be reported to the dog registration officer who may enter upon the premises where the dog is and may destroy such dog.

8. No unregistered dog shall be harboured or kept by any person and any dog not registered may be seized and destroyed by the dog registration officer.

#### *Penalty*

9. Any person harbouring or keeping a dog that is not registered shall be liable on summary conviction to a penalty not exceeding \$10 or to imprisonment for a term not exceeding 10 days, or to both.

#### *Application*

10. These Regulations shall only apply to such Indian reserve or parts thereof as may be specified in writing by the Minister.

plaque matricule, qui devra se trouver en tout temps sur le chien et tout changement de propriétaire d'un chien immatriculé devra être porté au registre.

#### *Abattage*

7. Tout chien qui, de l'avis du conseil de la bande, sera cause d'incommodité, devra faire l'objet d'un rapport au préposé à l'immatriculation des chiens, lequel est autorisé à pénétrer sur les lieux où se trouve un tel chien qu'il pourra abattre.

8. Personne ne pourra héberger ni garder un chien non immatriculé, et tout chien non immatriculé sera saisi et supprimé par le préposé à l'immatriculation des chiens.

#### *Peine*

9. Quiconque héberge ou garde un chien non immatriculé encourra, sur déclaration sommaire de culpabilité, une amende d'au plus \$10 ou un emprisonnement d'au plus 10 jours, ou à la fois l'amende et l'emprisonnement.

#### *Application*

10. Le présent règlement ne s'appliquera qu'aux réserves indiennes ou aux parties de celles-ci que le Ministre peut désigner par écrit.

## CHAPTER 960

### INDIAN ACT

#### Indian Reserve Waste Disposal Regulations

##### REGULATIONS RESPECTING WASTE DISPOSAL IN INDIAN RESERVES

###### *Short Title*

1. These Regulations may be cited as the *Indian Reserve Waste Disposal Regulations*.

###### *Interpretation*

2. In these Regulations,
- "Minister" means the Minister of Indian Affairs and Northern Development;
- "permit" means a permit issued pursuant to section 5;
- "reserve" means a reserve as defined in the *Indian Act*;
- "waste" includes garbage, liquid and semi-liquid substances, land-fill and scrap of all kinds and any combinations of any of the foregoing.

###### *Prohibitions Respecting the Disposal or Storage of Waste*

3. No person shall
- (a) operate a garbage dump in a reserve, or
- (b) use any land in a reserve for the disposal or storage of waste
- except under the authority of a permit issued pursuant to paragraph 5(a) or (b) and in the manner specified in the permit.

4. No Indian who is lawfully in possession of any lands in a reserve and no person to whom reserve lands have been leased or who lawfully occupies, uses, resides or otherwise exercises rights on land in a reserve shall permit any person to operate on that land a garbage dump or use any part of that land for the disposal or storage of waste unless a permit to carry on that action on that land has been issued pursuant to paragraph 5(a) or (b) and is still valid.

###### *Permits*

5. The Minister or the council of a band, if authorized by the Minister pursuant to section 8, may issue to any person a permit authorizing that person
- (a) to operate a garbage dump in a reserve;
- (b) to use land in a reserve for the disposal or storage of waste; or
- (c) to burn waste on any land in a reserve.

## CHAPITRE 960

### LOI SUR LES INDIENS

#### Règlement sur la destruction des déchets dans les réserves indiennes

##### RÈGLEMENT CONCERNANT LA DESTRUCTION DES DÉCHETS DANS LES RÉSERVES INDIENNES

###### *Titre abrégé*

1. Le présent règlement peut être cité sous le titre: *Règlement sur la destruction des déchets dans les réserves indiennes*.

###### *Interprétation*

2. Dans le présent règlement,
- «déchets» comprend des ordures, des substances liquides ou semi-liquides, de la terre et des rebuts de toutes sortes, ainsi que toute combinaison de ce qui précède;
- «Ministre» désigne le ministre des Affaires indiennes et du Nord canadien;
- «permis» désigne un permis délivré conformément à l'article 5;
- «réserve» désigne une réserve telle qu'elle est définie dans la *Loi sur les Indiens*.

###### *Restrictions concernant la destruction ou le dépôt des déchets*

3. Il est interdit
- a) de tenir un dépotoir d'ordures dans une réserve, ou
- b) de détruire ou de déposer des déchets dans une terre de réserve,
- si ce n'est en vertu d'un permis délivré conformément à l'alinéa 5a) ou b) et de la façon indiquée dans ledit permis.

4. Il est interdit à un Indien qui a la possession légale d'une terre de réserve, ainsi qu'à toute personne qui a obtenu la location à bail d'une telle terre ou qui occupe, utilise ou habite légalement une telle terre ou qui y exerce des droits, d'autoriser une autre personne à tenir un dépotoir d'ordures dans cette terre ou à utiliser une partie de cette terre pour la destruction ou le dépôt de déchets, à moins qu'un permis pour l'exercice d'une telle activité sur cette terre n'ait été délivré conformément à l'alinéa 5a) ou b) et que ce permis soit encore valide.

###### *Permis*

5. Le Ministre ou un conseil de bande autorisé par le Ministre conformément à l'article 8 peut délivrer à une personne un permis qui autorise cette personne
- a) à tenir un dépotoir d'ordures dans une réserve;
- b) à détruire ou déposer des déchets dans une terre de réserve; ou
- c) à brûler des déchets dans une terre de réserve.

## 6. A permit shall

(a) specify the land in respect of which the permit is issued; and

(b) specify the manner in which the activity authorized therein shall be exercised.

7. Subject to section 11, a permit shall expire on December 31st next following the date of issue thereof.

8. The Minister may, in writing, authorize the council of any band to issue a permit in respect of land in the reserve of that band and shall, in the authorization, specify the manner in which the activity to be authorized in the permit shall be exercised.

9. The revocation of an authorization given by the Minister pursuant to section 8 does not affect the validity of any permit issued under that authorization.

*Burning of Waste Prohibited*

10. No person shall burn any waste on any land in a reserve except under the authority of a permit issued pursuant to paragraph 5(c).

*Orders and Cancellation of Permits*

11. If the holder of a permit issued pursuant to section 5

(a) operates a garbage dump in a reserve,

(b) uses land in a reserve for the disposal or storage of waste, or

(c) burns waste on any land in a reserve other than in the manner specified in the permit, the Minister or the council of the band, whoever issued the permit, may cancel the permit and order the holder of the permit to close and clean up the garbage dump or to clean up the land in the reserve, as may be applicable, in a manner satisfactory to the Minister or the council.

*Violation of Sections 3 and 10*

12. Where a person is convicted of

(a) operating a garbage dump in a reserve or using land in a reserve for the disposal or storage of waste except under the authority of a permit issued pursuant to paragraph 5(a) or (b), or

(b) burning waste on land in a reserve except under the authority of a permit issued pursuant to paragraph 5(c),

the Minister may order that person to close and clean up the garbage dump or to clean up the land, as may be applicable, in a manner satisfactory to the Minister.

*Compliance with Orders*

13. Any person who has been ordered by the Minister or the council of a band to do anything pursuant to section 11 or section 12 shall comply with that order without delay.

## 6. Tout permis doit

a) spécifier la terre qui en est l'objet; et

b) spécifier de quelle manière doit être exercée l'activité qu'il autorise.

7. Sous réserve de l'article 11, tout permis expire le 31 décembre qui suit la date de sa délivrance.

8. Le Ministre peut autoriser par écrit le conseil d'une bande à délivrer un permis visant des terres de la réserve de cette bande et doit, dans cette autorisation, préciser la façon dont doit s'exercer l'activité autorisée par le permis.

9. Le retrait d'une autorisation accordée par le Ministre conformément à l'article 8 n'entraîne pas l'annulation des permis délivrés en vertu de cette autorisation.

*Interdiction de brûler des déchets*

10. Il est interdit de brûler des déchets dans une terre de réserve si ce n'est en vertu d'un permis délivré conformément à l'alinéa 5c).

*Ordres et annulation de permis*

11. Si le titulaire d'un permis délivré conformément à l'article 5

a) tient un dépotoir d'ordures dans une réserve,

b) utilise des terres de la réserve pour la destruction ou le dépôt des déchets, ou

c) brûle des déchets sur une terre de réserve autrement que de la façon précisée au permis, le Ministre ou le conseil de la bande, selon celle de ces deux autorités qui a délivré le permis, peut annuler le permis et ordonner à son titulaire de fermer et de nettoyer l'emplacement du dépotoir d'ordures ou de la terre de la réserve, selon le cas, d'une manière qu'il juge satisfaisante.

*Violation des articles 3 et 10*

12. Quiconque est accusé

a) de tenir un dépotoir d'ordures dans une réserve, d'utiliser des terres de la réserve pour la destruction ou le dépôt des déchets, ou

b) de brûler des déchets sur une terre de la réserve

sans l'autorisation à cet effet visée aux alinéas 5a), b), ou c), peut recevoir du Ministre l'ordre de fermer et de nettoyer l'emplacement du dépotoir d'ordures ou de la terre de la réserve, selon le cas, d'une manière qu'il juge satisfaisante.

*Exécution des ordres*

13. Quiconque a reçu l'ordre du Ministre ou du conseil d'une bande, de faire quelque chose conformément aux articles 11 ou 12, doit l'exécuter sans délai.

*Penalties*

14. Every person who violates these Regulations is liable on summary conviction to a fine not exceeding \$100 or to imprisonment for a term not exceeding three months, or to both.

*Peines*

14. Quiconque enfreint le présent règlement est passible, sur déclaration sommaire de culpabilité, d'une amende d'au plus \$100 ou d'une peine d'emprisonnement d'au plus trois mois, ou des deux peines à la fois.

APPENDIX "F"

February 16, 1980

THE MANITOBA GAZETTE

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Manitoba Regulation 14/80

*Being a Regulation Under The Public Health Act to Amend  
Division I of Manitoba Revised Regulation P210-R2*

*(Filed February 1, 1980)*

- 1 Sections 1, 2, 3, 4 and 5 of Manitoba Revised Regulation P210-R2 are repealed and the following sections are substituted therefor:

DIVISION I  
DISEASE CONTROL

1. In this Division,

- (a) "carrier" means a person who harbours a specific infectious agent in the absence of discernible clinical illness and serves as a potential source of infection to others;
- (b) "communicable disease", "contagious disease", or "infectious disease" means an illness due to a specific infectious agent or its toxic products which arises through transmission of that agent or its products from a reservoir to a susceptible host either directly as from an infected person or animal, or indirectly through the agency of an intermediate plant or animal host, a vector, or the inanimate environment;
- (c) "concurrent disinfection" means disinfection during the continuance of the illness of a patient;
- (d) "contact" means a person or animal who or which has been sufficiently near to an infected person or animal or the environment contaminated by the person or animal, so as to have been exposed to transfer of infectious material either directly from the person or animal or indirectly from the environment;
- (e) "director" means the director of Preventive Medical Services of the Department or, in his absence, the Deputy Epidemiologist;
- (f) "disinfection" means the destruction of pathogenic microorganisms outside the body by chemical, physical or other means, directly applied;
- (g) "disinfestation" means any physical or chemical process that destroys or removes undesired small animal forms, particularly arthropods or rodents;
- (h) "immune" means a person or animal who or which, by virtue of previous infection or immunization, possesses protective antibodies against a specified communicable disease and therefore is unlikely to be susceptible to it;
- (i) "infectious tuberculosis" means any form of tuberculosis in which the tubercle bacillus can be demonstrated in the sputum or any other bodily secretion, excretion, or discharge, including discharge from open or discharging wounds or where there is any other evidence to support the fact that the disease is in an infectious state;
- (j) "infection" means the entry and development or multiplication of an infectious agent in the body of a person or animal, with or without clinical manifestations;
- (k) "isolation" means the separation, for the period of communicability, of infected persons or animals from others in such places and under such conditions as to prevent the direct or indirect conveyance of the infectious agent from those infected to those who are susceptible or who may spread the agent to others;

- (l) "notifiable disease" means cancer or malignant tumor or any of the communicable diseases listed in sections 3, 4 and 5.
- (m) "pet" means any bird or animal that is domesticated and is
  - (i) kept for pleasure, or
  - (ii) offered for sale to be kept as a pet.
- (n) "quarantine" means
  - (i) in respect of a person or animal, the restriction of freedom of movement of any person or animal who or that has been exposed to a communicable disease for a period of time equal to the longest usual incubation period of the disease or for as long as the person or animal gives evidence of harbouring the infectious agent, in such manner as to prevent effective contact with any person or animal not so exposed, and
  - (ii) in respect of premises or a part of any premises, the prohibition against or the restriction of entering or leaving the premises or part by any person;
- (o) "terminal disinfection" means the disinfection of the personal effects of a patient and the environment of the patient
  - (i) after the recovery of the patient
  - (ii) after the termination of a period of isolation, or
  - (iii) after the removal of the patient from the environment, or
  - (iv) after the patient has ceased to use those effects;

Note: See section 1 of Revised Regulation P210-R1 for other defined expressions that are applicable to this regulation.

- 2(1) On becoming aware that any person is suffering from a notifiable disease, or any other disease that may be dangerous to the public health, a duly qualified medical practitioner shall forthwith report particulars of the case as required in section 3, 4, 5 or 6 to
  - (a) the medical officer of health of the municipality in which the patient resides; or
  - (b) the director, if the patient resides in an area in which there is no medical officer of health.
- 2(2) The superintendent or other person in charge of every hospital shall submit to the director, monthly, on Form VI in the Schedule, a report of patients treated in the hospital for any communicable disease including those listed in sections 3, 4 and 5 and including rheumatic fever (390-392) and poststreptococcal glomerulonephritis (580).
- 2(3) Every person in charge of a clinical laboratory who in the examination of any specimen derived from a human body finds microscopical, cultured, immunological, serological or other evidence of a notifiable disease listed in section 3, subsections 4(1) or 4(3) or section 5 shall within 7 days report the nature of that evidence to the Director together with the name and address of the person from whom the specimen was taken and the name and address of the duly qualified medical practitioner, if any, who is, or has been, attending the person from whom the specimen was taken.

- (l) "notifiable disease" means cancer or malignant tumor or any of the communicable diseases listed in sections 3, 4 and 5.
- (m) "pet" means any bird or animal that is domesticated and is
  - (i) kept for pleasure, or
  - (ii) offered for sale to be kept as a pet.
- (n) "quarantine" means
  - (i) in respect of a person or animal, the restriction of freedom of movement of any person or animal who or that has been exposed to a communicable disease for a period of time equal to the longest usual incubation period of the disease or for as long as the person or animal gives evidence of harbouring the infectious agent, in such manner as to prevent effective contact with any person or animal not so exposed, and
  - (ii) in respect of premises or a part of any premises, the prohibition against or the restriction of entering or leaving the premises or part by any person;
- (o) "terminal disinfection" means the disinfection of the personal effects of a patient and the environment of the patient
  - (i) after the recovery of the patient
  - (ii) after the termination of a period of isolation, or
  - (iii) after the removal of the patient from the environment, or
  - (iv) after the patient has ceased to use those effects;

Note: See section 1 of Revised Regulation P210—R1 for other defined expressions that are applicable to this regulation.

- 2(1) On becoming aware that any person is suffering from a notifiable disease, or any other disease that may be dangerous to the public health, a duly qualified medical practitioner shall forthwith report particulars of the case as required in section 3, 4, 5 or 6 to
  - (a) the medical officer of health of the municipality in which the patient resides; or
  - (b) the director, if the patient resides in an area in which there is no medical officer of health.
- 2(2) The superintendent or other person in charge of every hospital shall submit to the director, monthly, on Form VI in the Schedule, a report of patients treated in the hospital for any communicable disease including those listed in sections 3, 4 and 5 and including rheumatic fever (390-392) and poststreptococcal glomerulonephritis (580).
- 2(3) Every person in charge of a clinical laboratory who in the examination of any specimen derived from a human body finds microscopical, cultured, immunological, serological or other evidence of a notifiable disease listed in section 3, subsections 4(1) or 4(3) or section 5 shall within 7 days report the nature of that evidence to the Director together with the name and address of the person from whom the specimen was taken and the name and address of the duly qualified medical practitioner, if any, who is, or has been, attending the person from whom the specimen was taken.



3. The following diseases shall be reported on Form 1 of the schedule, and such of those diseases as identified by an asterisk (\*) shall in addition be reported as soon as possible by telephone or similar rapid means of communication:

INTESTINAL INFECTIOUS DISEASES

- \* Typhoid fever (002.0)
- Paratyphoid fever (002.9)
- Salmonellosis (003)
- Shigellosis (004)
- \* Food poisoning (bacterial) (005)  
(excluding Botulism 005.1)
- Salmonellosis 003, Shigellosis 004)
- Staphylococcal (005.0)
- Clostridium Perfringens (005.2)
- Other Clostridia (005.3)
- Vibrio Parahaemolyticus (005.4)
- Bacillus Cereus (005.8)
- Unspecified (005.9)
- E. coli Enteritis (008.0)

TUBERCULOSIS

- A. Primary Tuberculosis (010)
- B. Bacteriologically Confirmed
  - 1. Respiratory (011-012)
  - 2. Non-Respiratory (013-018)
- C. Not Bacteriologically Confirmed
  - 1. Respiratory (011-012)
  - 2. Non-Respiratory (013-018)

DISEASES OF CENTRAL NERVOUS SYSTEM

- Meningitis
  - A. Bacterial
    - Haemophilus (320.0)
    - Pneumococcal (320.1)
    - Other (All categories excluding Meningococcal 036 and Tuberculosis 013)
  - B. Viral
    - Aseptic meningitis due to Cocksackie virus (047.0)
    - Echo virus (047.1)
    - Other viral (047.9)
- Encephalitis
  - Western Equine encephalitis (062.1)
  - Other viral encephalitis (specify)

OTHER BACTERIAL DISEASES

- \* Diphtheria Cases (032)
- Diphtheria Carriers (V02.4)
- \* Meningococcal infections (036)
- Pertussis (033)
- Brucellosis (023)

OTHER VIRAL DISEASES

- Hepatitis A (070.0)
- Hepatitis B (070.2)
- Measles (055)
- Rubella (056)
- Congenital Rubella (771.0)

Mumps (072)

- 4(1) The following diseases shall be reported on Form II of the Schedule; those indicated by an asterisk (\*) shall also be reported by telephone or other rapid means:

- Amoebiasis (006)
- \* Anthrax (022)
- Brucellosis (023)
- \* Cholera (001)
- \* Lassa Fever (078.8)
- Leprosy (030)
- Malaria (084)
- \* Plague (020)
- \* Poliomyelitis (045)
- Psittacosis (073)
- \* Rabies (071)
- \* Smallpox (050)
- Tetanus (037)
- Trichinosis (124)
- Tularaemia (021)
- \* Viral Haemorrhagic fever (078) (065)
- Yellow Fever (060)

- 4(2) The following diseases shall be reported on Form II of the Schedule only when they occur in large numbers or epidemic proportions in a community: and the report shall state either the number of cases or the percentage of population having the disease;

- Chickenpox (052)
- Influenza (487)
- Skin diseases, communicable.
  - (a) Impetigo; (684)
  - (b) Pediculosis; (132)
  - (c) Ringworm; (110)
  - (d) Scabies; (133)

Other diseases occurring in large numbers or epidemic proportions and that appear to a duly qualified medical practitioner to be communicable.

- 4(3) In addition to individual reports required under sections 3, 4(1) and 5 the person in charge of a laboratory, shall report the numbers of persons with microscopic, culture, immunologic, serologic or other evidence of any of the following diseases:

- Arboviral infection, including
  - St. Louis Encephalitis and Dengue (060-066)
- Brucellosis (023)
- Campylobacter infection (005)
- Giardiasis (007)
- Influenza (487)
- Legionnaire's Disease (482)
- Parasitic diseases, Not otherwise specified
- Q fever (083)
- Relapsing fever (087)
- Rickettsial Diseases, other (083)
- Rocky Mountain Spotted fever (082)
- Rotavirus infections (008.6)
- Streptococcal (B-Haemolytic) infection (034)
- Yersinia infections (027)

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4(4) The person in charge of a laboratory shall, upon the request of the medical officer of health or director, provide the name, residence address, sex and age of each person included in a report submitted under subsection 4(3).

5. The following Venereal infections and contacts shall be reported on Form III of the Schedule and also as required by section 34 of this regulation:

Gonococcal infections  
Ophthalmia Neonatorum (098.4)  
Other (All 098 categories excluding 098.4)

Syphilis  
Early (Primary and Secondary) (091)  
Other (090, 092-097)

Chancroid (099.0)

2 Manitoba Regulation P210-R2 Division I is further amended by the addition of the following sections immediately following section 28.2.

28.3(1) In the event of an animal bite to a person in which a physician determines that there is a possibility of transmission of rabies, the person bitten or any duly qualified medical practitioner or registered nurse attending that person shall forthwith notify the Medical Officer of Health or the Animal Control Officer of the municipality in which the biting incident occurred or a Peace Officer of the details of the biting incident.

28.3(2) An Animal Control Officer or Peace Officer receiving a report pursuant to Section 28.3(1) shall notify the Medical Officer of Health of the details of the report at the earliest possible opportunity.

3 Forms I, II, V, VI are deleted and replaced by

**REPORT OF COMMUNICABLE DISEASES  
REGULATIONS UNDER THE PUBLIC HEALTH ACT  
To be filled out by the Attending Physician or Hospital**

PLEASE PRINT — PRESS HARD		AS A CASE OF (Underline)	
ONSET DATE _____	Postal Code _____	<i>Intestinal Infectious Diseases</i>	<i>Diseases of Central Nervous System</i>
City _____		*Typhoid fever (002 0)	Meningitis
Municipality _____		Paratyphoid fever (002 9)	A Bacterial
Town or Village _____		Salmonella infections (003)	Haemophilus (320.0)
Name _____		Shigellosis (004)	Pneumococcal (320 1)
Address _____		*Food poisoning (bacterial)	Other (specify below)
City, St. & No. (Sec. Tp. Rge.) Hosp. or Camp		Staphylococcal (005 0)	B Viral
Racial Origin _____ (Treaty Indian)		Botulism (005 1)	Aseptic meningitis due to
Sex _____ Age _____		C. perfringens (005 2)	Coxsackie (047.0)
Was patient immunized against this disease? Yes No		B. cereus (005 8)	Echo virus (047.1)
Material Used _____ Doses _____ Year _____		Other (specify below) (005 9)	Other viral (specify below)
Is Diagnosis Clinical? _____ Laboratory? _____		E. coli enteritis (008 0)	or unknown (047.9)
ATTENDING PHYSICIAN _____		<i>Other Bacterial Diseases</i>	Encephalitis
Signature _____		Brucellosis (023)	Western Equine Encephalitis (062.1)
		*Diphtheria cases (032)	Other viral encephalitis (specify)
		Diphtheria carriers (V02 4)	<i>Other Viral Diseases</i>
		*Meningococcal infections (036)	Hepatitis A (070.0)
		Pertussis (033)	Hepatitis B (070.2)
		Tuberculosis - specify type below	Measles (055)
		Veneral Diseases - Use NHI form	Mumps (072)
		OTHER DISEASES INCLUDING RARE* AND IMPORTED* (SPECIFY)	Rubella (056)
			Congenital Rubella (771.0)
		ADDITIONAL INFORMATION _____	

Fill out separate card for each case. For epidemics of other diseases use surveillance report  
Telephone report to Medical Officer of Health or Preventive Medical Services (775-9761) for diseases indicated by (\*)  
This copy for MEDICAL OFFICER OF HEALTH

SCHEDULE FORM 1  
(SECTION 3)

February 16, 1980

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FORM II  
(SECTION 4)

EPIDEMIOLOGICAL REPORT

(Use for epidemics or disease episodes of Public Health significance)

DISEASE:

First Report:

Location of Outbreak:

Progress Report:

Date of Onset of First Case:

Date:

EPIDEMIOLOGICAL FEATURES (number of cases, number of deaths, population of risk, age, sex, race, mode of spread, etc.)

LABORATORY RESULTS (if available)

ACTION TAKEN OR PLANNED - ADDITIONAL MEASURES LIKELY  
TO BE REQUIRED:

REPORTED BY: (please print)

COMMENTS BY PROVINCIAL  
EPIDEMIOLOGIST

Name: .....

Title: .....

Health Unit: .....

Address: .....

Date: .....

Signature: .....

Date: .....

Distribution: two copies to Provincial Epidemiologist



PROVINCE OF MANITOBA

Notification of DEATH from Notifiable Disease  
(Section 7, Division 1, Part II  
Reg. under the Public Health Act)

Manitoba Department of Health

Preventive Medical Services

Full Name \_\_\_\_\_

Address \_\_\_\_\_  
City, Street and No. Sec. Tp. and Range

Sex \_\_\_\_\_ Age \_\_\_\_\_

Date of Death \_\_\_\_\_ 19 \_\_\_\_\_

Place of Death \_\_\_\_\_  
City, Street and No. (Sec. Tp. and Range) Hospital or Camp

Signature \_\_\_\_\_

Address \_\_\_\_\_

Date \_\_\_\_\_ 19 \_\_\_\_\_

AS A CASE OF (Underline)

Intestinal Infectious Diseases

- \* Typhoid fever (002.0)
- Paratyphoid fever (002.9)
- Salmonella infections (003)
- Shigellosis (004)
- \* Food poisoning (bacterial)
- Staphylococcal (005.0)
- Botulism (005.1)
- C. perfringens (005.2)
- B. cereus (005.8)
- Other (specify below) (005.9)
- E. coli enteritis (008.0)

Other Bacterial Diseases

- Brucellosis (023)
- \* Diphtheria cases (032)
- Diphtheria carriers (V02.4)
- \* Meningococcal infections (036)
- Pertussis (033)
- Tuberculosis - specify type below
- Venereal Diseases - Use NH11 form

OTHER DISEASES INCLUDING RARE\* AND IMPORTED\* (SPECIFY)

ADDITIONAL INFORMATION \_\_\_\_\_

Diagnosis confirmed by autopsy Yes \_\_\_\_\_ No \_\_\_\_\_

Diseases of Central Nervous System

Meningitis

A Bacterial

- Haemophilus (320.0)
- Pneumococcal (320.1)
- Other (specify below)

B Viral

- Aseptic meningitis due to
- Coxsackie (047.0)
- Echo virus (047.1)
- Other viral (specify below)
- or unknown (047.9)

Encephalitis

- Western Equine Encephalitis (062.1)
- Other viral encephalitis (specify)

Other Viral Diseases

- Hepatitis A (070.0)
- Hepatitis B (070.2)
- Measles (055)
- Mumps (072)
- Rubella (056)
- Congenital Rubella (771.0)

FORM V  
(SECTION 7)

Mail to: Preventive Medical Services

Sealed in the Special Addressed Envelope Provided for the Purpose.

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THE MANITOBA GAZETTE

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Please Report Rare Diseases  
and cases of Typhoid, Diphtheria  
or Meningococcal Infections by  
telephone to  
Preventive Medical Services  
Winnipeg 775-9761 ext. 154.

STATISTICS CANADA

Public Health Section

National Notifiable Disease Reporting

GUIDE

(Revised for the Province of Manitoba)

List of Notifiable Diseases, with International List Numbers  
(Ninth Revision International Classification of Diseases)

A. COMMON DISEASES

Intestinal Infectious Diseases

- Typhoid fever (002.0)
- Paratyphoid fever (002.9)
- Salmonellosis (003)
- Shigellosis (004)
- Food Poisoning (bacterial) (005)  
(excluding Botulism 005.1,  
Salmonellosis 003, Shigellosis 004)
- Staphylococcal (005.0)
- Clostridium Perfringens (005.2)
- Other Clostridia (005.3)
- Vibrio Parahaemolyticus (005.4)
- Bacillus Cereus (005.8)
- Unspecified (005.9)
- E. coli Enteritis (008.0)

Tuberculosis

- A. Primary Tuberculosis (010)
- B. Bacteriologically Confirmed
  - 1. Respiratory (011-012)
  - 2. Non-Respiratory (013-018)
- C. Not Bacteriologically Confirmed
  - 1. Respiratory (011-012)
  - 2. Non-Respiratory (013-018)

Venereal Diseases

- Gonococcal infections (098)
- Ophthalmia Neonatorum (098.1)
- Other (All 098 categories  
excluding 098.4)
- Syphilis
  - Early (Primary and Secondary) (091)
  - Other (090, 092-097)
- Chancroid (099.0)

Diseases of Central Nervous System

Meningitis

- A. Bacterial
  - Haemophilus (320.0)
  - Pneumococcal (320.1)
  - Other (All categories excluding  
Meningococcal 036 and  
Tuberculous 013)

B. Viral

- Aseptic meningitis due to
  - Coxsackie (047.0)
  - Echo virus (047.1)
  - Other viral (047.9)

Encephalitis

- Western equine encephalitis (062.1)
- Other viral encephalitis (specify)

Other Bacterial Diseases

- Brucellosis (023)
- Diphtheria Cases (032)
- Diphtheria Carriers (V02.4)
- Meningococcal infections (036)
- Pertussis (033)

Other Viral Diseases

- Hepatitis A (070.0)
- Hepatitis B (070.2)
- Measles (055)
- Mumps (072)
- Rubella (056)
- Congenital Rubella (771.0)

B. RARE DISEASES

- Amoebiasis (006)
- Anthrax (022)
- Botulism (005.1)
- Cholera (001)
- Lassa Fever (078.8)
- Leprosy (030)
- Malaria (084)
- Plague (020)
- Polio myelitis (045)
- Psittacosis (073)
- Rabies (071)
- Smallpox (050)
- Tetanus (037)
- Trichinosis (124)
- Tularemia (021)
- Viral Haemorrhagic fever (078) (065)
- Yellow fever (060)

C. EPIDEMIC FORMS OF OTHER DISEASES AND  
UNUSUAL CLINICAL MANIFESTATIONS NOT  
OTHERWISE REPORTED.

D. DISEASES REPORTABLE BY HOSPITALS

- Glomerulonephritis, post streptococcal (580)
- Rheumatic fever (390-392)

E. DISEASES REPORTABLE BY LABORATORIES

- Campylobacter Infections (005)
- Giardiasis (007)
- Legionnaire's Disease (482)
- Parasitic Diseases, other
- Q - fever (083)
- Relapsing Fever (087)
- Rocky Mountain Spotted Fever (082)
- Rotavirus Infection (008.6)
- Streptococcal infection (B-Hemolytic) (034)
- Yersinia Infections (027)