

THE UNIVERSITY OF MANITOBA

AN EVALUATION OF THE ENVIRONMENTAL
ASSESSMENT PROCESS WITH RESPECT TO
THE PLANNING OF A MAJOR POWER
CORRIDOR IN SOUTHEASTERN MANITOBA

by

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the University of Manitoba in partial fulfillment of the requirements
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ABSTRACT

Since the late 1960's and early 1970's, there has been an increased involvement by government in the environmental matters of project development. This initiative occurred, in Canada, as a response to public expressions of concern about the apparent uncontrolled and sectoral approach to land use and resource management, and the effects that this situation was having on the quality of the environment. As a result of these government actions, environmental assessment requirements have been established in virtually every senior jurisdiction by either legislation or policy directive.

Many of these new requirements and the associated procedures are untested and, indeed, have implications to project planning and development which even their creators did not anticipate. There is, therefore, a need to review the effectiveness of these requirements in achieving what is essentially a common objective - a more co-ordinated management of the environment as well as the maintenance of a good environmental quality.

The objective of this research was to evaluate the environmental assessment process as it has been applied in the Province of Manitoba. The planning for a 500,000 volt, extra high voltage international powerline was used as a case study.

This project was most appropriate for undertaking such an investigation insofar as no decisions on line location had been made prior to the initiation of the environmental assessment study. It was the first study to fully apply the National Energy Board guidelines for environmental assessment. Finally, it was the first major project to address the Provincial policy directive on environmental assessment and the new Planning Act (S.M. 1976). Involvement by others than the proponent, Manitoba Hydro, was an integral part of the environmental assessment process.

It was found that the environmental assessment process which was applied on this electric transmission line study was an effective technique for including environmental matters in project decision-making. The assessment procedures facilitated a co-ordinated approach by the proponent, the government departments and agencies and the public, and expedited the final approval by the Provincial Land Use Committee of Cabinet and the National Energy Board. Certain weaknesses in the Provincial institutional framework were discovered. This research shows that, while the Manitoba environmental assessment process is a useful planning tool, there is a need to refine and to standardize process and regulatory requirements.

Topics requiring further research and investigation are identified.

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CHAPTER I

INTRODUCTION

Delimitation of Research

Organization of Thesis

CHAPTER I

INTRODUCTION

With the rise of public interest and concern over matters relating to the environment in the late 1960's and early 1970's, the Government of Canada and the Provincial Governments became increasingly involved in project planning and development. New regulatory requirements and procedures attempted to provide a comprehensive and integrated framework for including and evaluating environmental factors in the planning process. By the mid-1970's, the requirement for an environmental assessment of those projects having a significant effect on the environment was formalized by either legislation, regulation or government directive.

Man, in his development or use of the environment, must often make a decision as to the use or uses for which the land is to be designated. This necessity often results in a "trade-off" between the several or many potential uses of that environment. A decision, based on certain use priorities, must be made. In the past, these decisions were often based primarily or exclusively on financial gain. The environment was used in such a way as to provide the highest economic benefit to the public or private sector. This policy which was often not representative of broader

public goals commonly resulted in the degradation of the quality of the environment.¹ The general goal of the government initiatives in the 1960's and early 1970's on environmental matters was to correct this imbalance between resource development and use, and the quality of the environment. 'Environmental assessment' was devised as a means to ensure the consideration of environmental matters at the earliest possible stage in project development and prior to making, in the words of the American National Environmental Policy Act, 'irreversible and irretrievable commitments.'

The Government of Manitoba was one of the first Canadian governments to address the topic of environmental matters. In 1968, The Clean Environment Act (S.M., 1968, c.7) established the basis for the regulation of pollution and created a quasi-judicial agency, the Clean Environment Commission, to set standards and issue permits (S.M., 1968, c.7, s.8). This was followed in 1970 by provisions in the City of Winnipeg Act (En. S.M., 1974, c.76, s.1) for the requirement of an environmental assessment of public works. In 1972, a revised Clean Environment Act (S.M., 1972, c.7, s.1) established the Environmental Management Division within the Department of Mines, Resources and Environmental Management, amended certain of the Clean Environment

¹'Environmental quality', as referred to in this thesis may be thought of as those services of the environment which, for the most part, do not enter into the normal market system but which are appreciated by people and assist in making life more enjoyable (Schellenburg, 1973: p.206).

Commission procedures, and allowed for the creation of a body -the Manitoba Environmental Council - to advise the Minister on environmental matters. The new Provincial Planning Act addressed a wide range of planning and land use matters and established an administrative advisory and co-ordinating agency - the Interdepartmental Planning Board (I.P.B.) (S.M., 1975, c.29, s.9). In July, 1976, the Manitoba Environmental Assessment and Review Agency (M.E.A.R.A) was created and certain related procedures and guidelines were developed by Cabinet directive (Manitoba, 1976).

In December, 1976, the Manitoba Hydro Electric Board² completed an environmental assessment of a 500,000 volt international power line which was to extend from the Dorsey Transformer and Converter Station to the International Boundary, near Sprague, Manitoba.³ The environmental assessment process undertook to satisfy not only the requirements of the Province for the protection of the environment, but also, the requirements of the National Energy Board environmental assessment guidelines.⁴ How effective this environmental assessment was in the

²In this thesis the Manitoba Hydro Electric Board will be referred to as Manitoba Hydro.

³See Figure 7, p. 115.

⁴Reference can be made to these guidelines in Appendix 1.

achievement of a comprehensive and integrated decision is to be examined in this paper.

The purpose of this thesis, then, is to investigate the effectiveness of the environmental assessment study which was evolved for the siting of this extra high voltage transmission line in southeastern Manitoba. In order to properly carry out this investigation, certain tasks have been set out. They are five in number. The first task will be to examine the fundamental background problems which are associated with the management of natural resources and the implications to environmental quality. The second task will be to look at the development of public policies and legislation which has resulted in the requirement to undertake environmental assessment studies. Thirdly, this research will consider the principles and procedures which have evolved for environmental assessment. The fourth task will be to describe and evaluate the effectiveness of the environmental assessment process which was followed by Manitoba Hydro, in terms of achieving the designated objectives, and as an aid in comprehensive project planning. The final task will be to focus on further research needs and investigations which may serve to improve decisions which will have an effect on the quality of the environment in the Province of Manitoba.

In the past decade, there has been an 'explosion'

in the number and scope of environmental legislative and regulatory requirements to be addressed during the planning and implementation of such major development projects as water reservoirs, electric, gas and oil transmission lines, highways, mining projects and so forth. Many of these new requirements and the associated procedures are untested and, indeed, have implications which even their creators did not anticipate or understand. There is, therefore, a need to review, albeit by virtue of hindsight, the effectiveness of these requirements in achieving what is essentially a common objective - a more co-ordinated management of the environment and concomitantly, the maintenance of a good environmental quality.

Delimitation of Research

For the purposes of this study, the investigation will be restricted to the evolution of environmental assessment from its initial identification in government policy in the late 1960's to its application to project planning in late 1976. It is recognized that such a major innovation as environmental assessment develops over a considerable period of time and, indeed, is on-going. However, the designated time span is sufficient to provide an insight into the environmental assessment process in Canada, and in Manitoba. Reference, however, will be made to specific points of interest which extend beyond the

defined time limit of discussion when such a reference would serve to clarify certain aspects of the research.

There are a number of features of the Manitoba Hydro study which are worthy of note and which influenced its choice as a mechanism to illustrate the environmental assessment process.

- . This is, for instance, the first major project in Manitoba which attempted to address and incorporate the intentions and specific requirements of the National Energy Board guidelines for environmental assessment studies, the Manitoba Environmental Assessment and Review Agency policy statement, and the Provincial Planning Act (S.M., 1975).
- . Then, too, no commitments on the specific right-of-way location had been made prior to the initiation of the process.⁵
- . At the time of the study, several new and untested procedures had been instituted

⁵This point is of particular interest. In the past, environmental assessment studies had often been initiated after major decisions had been made. In 1974, Manitoba Hydro initiated an environmental assessment of another international power line well after the final route had been established and surveyed. It must be noted however, that the requirement for an environmental assessment was not established until this earlier project was well along in the planning stages.

both within the Provincial Government and within the utility.

- . A new and innovative approach to environmental assessment was applied.

In undertaking this research, the focus has been on the environmental assessment as an aid in project planning. Only limited consideration has been given to specific technical and methodological procedures. A knowledge of these aspects, while important, is not considered essential to the main thrust of this investigation. Consequently, if further insight is desired, the reader is encouraged to refer to the original manuscripts which are referenced in this paper.

It seems evident that the evolution of environmental policy and the procedures which have been developed in response is of topical interest to scholars concerned with regional analysis. The subject is of particular interest to geographers, planners, resource managers, ecologists, engineers and scientists who are involved in project and plan development in this country.

Organization of Thesis

The thesis begins with an outline of the problems to be investigated, the objectives of the study and the delimitations of the research.

In Chapter II the failure to consider the inter-

relationships of the environment in the management of natural resources is appraised. The problem of a limited land resource base and the need to attain a wider degree of involvement in project planning is identified.

Chapter III traces the evolution of environmental policies and legislation. The focus is on the more recent policy initiatives by Canadian governments.

Chapter IV discusses the principles and processes of environmental assessment as they have evolved, emphasizing the Provincial requirements. In discussing a broad topic such as environmental assessment, there is a requirement to establish a common basis of discussion. Accordingly, this Chapter begins with an introduction to the meanings of "environment" and "assessment" as they have evolved in legislation and the literature. This is followed by a discussion of the environmental assessment process, with specific references to the Provinces of Alberta, Ontario and Manitoba. The principle requirements of the environmental assessment are presented.

The approach for the environmental assessment of the 500 kV transmission line is developed and evaluated in Chapter V in terms of the nature of the project, the design of the study program and the process of implementation.

In the final Chapter, a summary of the research is presented, and recommendations for further study are provided.

CHAPTER II

BACKGROUND

Limited Resources

Electrical Energy as a Factor in the Use
of the Environment

A Basic Problem

Resource Planning Institutions

The Public Concern

CHAPTER II

BACKGROUND

Limited Resources

Today, few people would question the need or even the requirement to consider environmental quality matters in program and project development. Since the early part of this decade, the governments of most of the world's industrialized countries have required that matters of the environment be considered in the project planning process. The establishment of this requirement very often occurred as a response to the concerns expressed by the public over the effects of apparent uncontrolled growth on the environment and the lack of its formal consideration in the decision-making process.

The attention of the public, as well as of both politicians and scientists, was often focussed on the all-too-frequent environmental crises, such as oil spills, the virtually unregulated and widespread use of herbicides and pesticides and rapid increases in world population. The world-wide exploitation of the world's limited resources was of paramount concern. The sacrifice of prime agricultural lands and picturesque landscapes to unplanned urban sprawl has been documented. Many papers and books, such as Limits to Growth (Meadows et.al., 1972), have been

written on this topic.

Although the land resources are limited, any given parcel of land may fortunately serve and provide for a number of services. However, this introduces a basic problem - that of conflicting resource goals. The resolution of these conflicting goals is frequently made solely on criteria which are based upon the highest and best economic return. Other aspects, which are perhaps more difficult to assess in economic terms, are frequently not included in the final decisions. One result of this situation, which has received extensive discussion in the literature, is the disappearance of prime agricultural lands around such centres as Toronto, Montreal, Vancouver and even Winnipeg.⁶ Today, there is the demand to include not only those aspects which are able to be quantified but also those aspects which are difficult to quantify, in making decisions about the use of the natural resources. Moreover, there is often the question of whether the resource should be developed at all!

Canada, since the Second World War, and particularly since 1960, has witnessed a dramatic internal human

⁶During a five year period, 1966-1971, approximately 250,000 acres of prime agricultural lands were lost to urban development in Canada. In the Winnipeg area, almost 11,000 acres were lost. (Environment Canada, The Winnipeg Tribune, March 3, 1978: p.20).

population migration from the rural areas to the major urban areas. One of the consequences of this movement of population has been the extension of the urban influence far beyond the municipal and political boundaries. These influences have been reflected by a more extensive and intensive development and use of resources, a concentration of services and a growth in the role of government which is unparalleled in Canadian history, (Gertler, 1972: p.15). These influences have been reinforced by the increasing mobility of the population, with rising incomes and expectations, as well as more leisure time and the reliance on modern technology supported by rapidly growing energy requirements. As Gertler has observed, this trend towards urbanization has accentuated land resource conflicts to the degree that now, in the major Canadian population regions, the quality of the environment is more in character with the most densely populated areas of the world (Gertler, 1972: p.16).

Electrical Energy as a Factor in
the Use of the Environment

Energy is now and will continue to be, a major factor in economic growth and development. Electrical power will most certainly have a major role as has been suggested by National Energy Policy. Indeed, this role is reflected today in the increasing involvement of , and investment by,

government in the development of electric power. Therefore, we can expect an increasing recognition of potential conflicts with other competing uses of limited resources and the environment.

The words "electrical energy" and "environment" often denote an arena of conflict, particularly if perceived over the past decade (Young, 1973, Young, 1974). Indeed, some authors have considered the two subjects to be mutually exclusive (Robinette, 1973: p.1). However, in reality, this is not the case. The two are closely inter-related as expressed in the publication Environmental Criteria for Electrical Transmission Systems:

The electric utility industry is faced with a complex challenge in the 1970's. It must provide the generation and transmission facilities that are and will be needed to meet the ever-growing demand for reliable electrical power, and it must do this in a decade dedicated to the restoration and protection of our environment.

(U.S.D.I., U.S.D.A., 1970: p.iii)

Electricity is often considered and even promoted as a "clean" form of energy. However, its generation and distribution does affect the environment and the limited resources available. The effects of sulphur and nitrogen oxides associated with air emissions from coal and oil thermal generating stations are well known.

Nuclear stations emit low level radiation, and discharge substantial quantities of thermal pollution into

adjacent river systems. Thermal plants which are fueled by natural gas also pass heat pollution to cooling waters although obvious air contaminants are reduced. The effects of the large headponds and the water diversions associated with hydraulic generation have been widely discussed in the literature, and particularly in this Province. However, there is very little evidence as to the socio-economic and biotic impacts associated with such geographically massive engineering projects. Future energy generation systems offer some optimism in resolving the energy-environment dichotomy (Smil, 1974, p.7). There are, however, potential problems which have been reviewed by Reitze and Prezyna with respect to solar power.⁷

The distribution of electrical energy by larger and higher voltage transmission systems approaching 1000 to 1500 kV gives cause for concern (Rowell, 1976, p.15). These large facilities, in addition to insulting the visual character of the landscape disrupt agricultural operations and create property severances. Heavy equipment is used during the construction phases. This machinery can cause severe damage to the environment if careful control is not exercised. Right-of-way maintenance, involving the use of

⁷In summary, these include institutional barriers building and fire codes, labour problems, vandalism, the "natural" right to sunlight and the role of government. (Reitze, Prezyna, 1976).

herbicides (Tordon 101 or Tordon 10K) poses a serious and needless danger of questionable justifiability to the biotic system,⁸ particularly in the vicinity of streams and in areas of high ground water levels.

The electrical effects associated with Extra High Voltage and Ultra High Voltage systems are not widely known. The Canadian Electrical Association has established certain environmental standards, and all Canadian power utilities meet or exceed these design specifications. However, only a very limited amount of research and follow-up has been undertaken to determine the adequacy of these standards for E.H.V. and U.H.V. facilities.

In summary, there is a fixed amount of land for which there will be increasingly intense competition. Certain trade-offs as to resource use and the quality of the environment will have to be made. These problems will be most acute in urban centres and in those regions which are most accessible to the cities. However, these trade-off decisions are not limited to the urban regions. The demands of cities, supported by technology and energy subsidies, have served to extend this urban influence to

⁸This does not mean that herbicides should not be used. Herbicides can be a very effective method of brush control when applied properly. The use of "blanket" spraying from low level aircraft poses a very severe and needless threat, and is often cost inefficient (Engler, 1958, p.578).

even the most remote regions of the country. These facts will increase the need for a comprehensive framework for making decisions with respect to our limited land resources.

A Basic Problem

The problem of resource conflicts is not new to Canada. Such matters have been considered previously by Canadian laws and institutions. However, in the past, the laws, policies and actions on resource matters were, more often than not, fragmented and sectoral. The problem resolution process was oriented towards specific and isolated resources.⁹ Seldom was consideration given to the inter-relatedness of one resource entity with another. Thus, as often occurs, one government agency will directly undertake programs or projects, which although they may benefit one resource sector, conflict directly with other resource goals and objectives. All too often this lack of consideration by institutions of the linkages between resources has adversely affected the quality of the environment.

⁹For example, a major part of the effort by the water management agencies in this Province has been directed towards flood control works.

Resource Planning Institutions

A fundamental element in resolving the dilemma of resource conflicts and environmental deterioration is the institutional arrangement which society, through its government, has created respecting resources. An institutional arrangement has been defined as

An inter-related set of entities¹⁰ and rules that serve to organize society's activities so as to achieve social goals (Fox, 1976, p.743).

On this basis, then, the major tasks of an institutional arrangement are to allocate resources among groups, to assist in resolving conflicting resource objectives and to establish procedural rules that will reflect and that will achieve the intentions of society (Fox, 1976, p.743). Therefore, it is the character of these institutional arrangements which is of particular interest since these institutions can have a direct influence on the pattern of man's activities towards resource use (Ostrom, April 1962, p.72) and the administration and enforcement of the resource policies which have been established by legislation or regulation (Franson et.al, May 1972, p.12). While institutional arrangements provide the rules and procedures for making

¹⁰Entities may be thought of as an organization, an individual, a rule, a law, regulation or established custom.

decisions in accordance with policy, they are very often intimately participating in the decision-making process and in the development and implementation of programs and projects. Quite obviously, there is indeed a potential for "conflict-of-interest."

Until quite recently, the management of the environment was most often accomplished on a single project basis by a mission-oriented agency. This has been the case with the development of the electrical generation capabilities of the Nelson-Churchill River Basin, by Manitoba Hydro. The state of the environment was of little or no concern to society at large. Frequently, if an environmental problem was recognized, a special agency would be created with a mandate to resolve the perceived problem. For example, in Ontario, following the extensive flooding caused by Hurricane Hazel in 1954, the Ontario Water Resources Commission was created with a mandate to undertake water resource programs which would ensure that the recurrence of such flooding would not have similar, devastating effects. The problem, however, when viewed in hindsight, is that such agencies have much too narrow a focus of purpose with little or no responsibility to concern themselves with the broader aspects of the environment (Caldwell, 1970, p. 163). Moreover, these agencies have a tendency to be perpetuated long after their original objectives have

been fulfilled (Estrin, 1975).

It is perhaps appropriate to gain some understanding of this sectoral attitude towards the environment, particularly since resource managers, geographers, planners and other environmental technicians have long recognized the inter-relatedness of the various components of the total environment, and the need to reflect this in management practices (Rinchoy, 1947). The jurist G. Cano suggests that this attitude may be due to legislative tradition (Cano, 1976).¹¹ British common law, which applies to Canada, has traditionally concerned itself with resolving individual and specific conflicts between men. It would appear that this tradition was carried through to laws designed to resolve resource conflicts, on an individual interest and as required basis. For example, in Manitoba, we have a considerable number of early statutes respecting the use and ownership of land. There are laws governing property ownership, land compensation and expropriation, land lease and sale, land use planning and so forth. Since agricultural use of the land resource was one of the first concerns of the early settlers of the Province, this evidence is not unexpected.

¹¹ Although Cano was referring to the codification of laws in the Napoleonic tradition, this is significant to the evolution of resource laws in Canada.

As conflicts between individuals arose over the use of other natural resources - water, wildlife, forests, and minerals - it would be correct, as the empirical evidence suggests, to assume that the individual sector tradition prevailed. Indeed, in Canada and in the Province of Manitoba we have a multitude of laws and regulations on forestry rights, fishing rights, mineral rights and water rights. Laws were created to assist in the resolution of conflicts relating to the individual's use of a particular resource. No laws were created to resolve use conflicts between the various resource sectors. This legal tradition resulted in the establishment of an institutional framework which, by design, could not extend administrative responsibilities beyond the narrow perspectives of existing resource legislation.

It is of no real surprise that a clear, well-defined policy for the integrated and responsible management of common property resources¹² did not evolve (Caldwell, 1971, p.7). The rights of society and of the individual to exploit and pollute the perceived infinite communal resources of air, water and land was considered virtually inalienable.

¹²Common Property Resources are defined as "any part or attribute of the work that (a) has economic value, (b) cannot be reduced, or at least only imperfectly reduced, to individual ownership, and (c) does not enter into conventional processes of market exchange (Natural Resources Council, 1973, p.14).

Indeed, these rights were at times incorporated into the laws of the land. In Ontario, The Industrial and Mining Lands Compensation Act (Ont. Stat., 1918)¹³ forced land-owners to permit air pollution, without recourse to the courts, upon the payment of an easement (Estrin, 1975, ff.20).

Let it not be assumed, however, that no consideration has been given by Canadian resource institutions to the problems of an integrated process. The Resources for the Future Conference (1960-1961) attempted to grapple with the topic. The need for an integrated approach and, indeed, specific steps to achieve this objective were set out (Gertler, 1961). A few years later, a massive national resource inventory was undertaken through the Canada Land Inventory Program.¹⁴ The empirical evidence suggests, however, that this and similar studies such as the Department of Agriculture's many soil surveys, were often simple inventory exercises, or at the most, a single component of much broader, but poorly conceived, tasks with confusing objectives and few practical applications (Buckley, Tihanyi, 1967, p.106). McAllister notes however, that the Canada Land Inventory Program did identify and reinforce the need

¹³Since repealed.

¹⁴Canada Land Inventory, Objectives, Scope and Organization, C.L.I. Report No.1, Ottawa: D.R.E.E., 1970.

for a practical and comprehensive approach to resolving resource trade-off decisions (McAllister, 1972, p.95).

The Public Concern

Historically, we as Canadians have tolerated and acknowledged the role of government in the interests of achieving certain goals. For example, few people, except perhaps for the politicians, questioned the need for and the construction of the St. Lawrence Seaway or the Trans-Canada Highway. The economic and administrative powers of government were seen by the people as benefits which substantially out-weighed the possible disadvantages of government involvement. Indeed, public intervention was often a follow-up to a failure on the part of the private sector to fulfil certain common goals or objectives.¹⁵ In this respect, government involvement on environmental matters was appropriate. Perhaps, in the minds of some individuals, it was long overdue.

In the past, a high quality of environment was generally available - clean air and water, a pleasant rural landscape and so forth. However, with the increasing urbanization and virtually uncontrolled urban development in rural areas, many people perceived a deterioration in the

¹⁵Such as the building of the Trans-Canada railway network.

quality of the environment and realized the cost of a "quality environment" was increasing to the point where it might not be available at any price (Haefele, 1973, p.6). The lack of consideration shown towards the environment was perceived as a failure of the traditional evaluation and planning approaches to adequately and formally consider environmental matters in making decisions. The free market system was not capable of addressing the range of inter-dependencies associated with the environment (Crabbe, 1973, p.8). Compounding this fact were the attitudes of single purpose, mission oriented government agencies and their increasing role in the management and development of the environment.

Now, in the 1970's, times have changed! Today, the problems of environmental quality and resource conflicts have been receiving greater attention from both the public and the government. What is the reason for this attention? Perhaps, as Gertler suggests, it is reflection of a mature society which has secured the financial resources to free itself from concern over "pioneer tasks." (Gertler, 1972, p.23) Caldwell, more pragmatically perhaps, attributes this growing awareness to and knowledge about environmental quality to rapidly expanding populations and the development of sophisticated technologies. He writes:

The emergence of general social concern for the state of the environment is a very recent development in industrial society. It is largely a consequence of the simultaneous convergence of exploding populations, scientific technology and technological enterprise.

and he continues,

... science is becoming better able to measure and describe the systematic inter-relatedness of man's total environment shaping activities. It is enabling man to see with a new comprehension the nature and consequences of his impact upon the environment. (Caldwell, 1971, p.28-29).

Whatever the reasons, this change in public attitude created an initial crisis in the planning process.¹⁶ Few people realized at the time that it was a rejection of the historical decision-making process. Not only were people concerned, but now they wanted to be consulted on matters which were of concern or of interest to them (Graham, 1972).

Summary

The trend in making decisions about the use of natural resources is clearly toward the requirement to consider the inter-relatedness of each of the traditional

¹⁶In Ontario, for example, several major projects which were well along in the planning process, such as the Spadina Expressway in Toronto, were rejected. Other projects, such as the construction of several large transmission corridors by Ontario Hydro were delayed and subjected to extensive review. The Provincial Government was forced to establish investigative public commissions such as the Solandt Commission, the Porter Royal Commission in Electric Power planning and most recently, the Hart Commission to investigate the environmental implications of development.

components. Public concerns about the quality of the environment and the recognition that there is a limited amount of land have supported this trend towards an integrated and co-ordinated planning process. Moreover, people want to be involved to some extent in the process. The governments of Canada, whether Federal, Provincial or Municipal, have a responsibility to ensure that these goals are pursued. In the next Chapter, we shall investigate the evolution of public policies which recognize this need.

CHAPTER III

THE EVOLUTION OF ENVIRONMENTAL POLICIES

Background

American Policy Initiatives

The National Environmental Policy
Act of 1969

Canadian Environmental Policies

Environmental Policy Development

CHAPTER III

THE EVOLUTION OF ENVIRONMENTAL POLICIES

Background

The evolution of public policy is, in its simplest terms, a conscientious process on the part of society to logically set goals for the future in which it wishes to exist (Boulding, 1972, p. 139-151). The development of policy involves a perception of the future. It must be remembered, then, that such perceptions are not absolute.

We really know very little about the future
and the further we look the vaguer it gets
(Boulding, 1972, p.141).

Policy goals, which may be thought of as synoptic statement, and the strategies for their achievement are neither ultimate nor even precisely described. They may be thought of as a general consensus, at the highest level of decision-making, of a common intention towards which society proceeds. Therefore, the background for policy formulation is complex and, by necessity, constantly evolving, and truly inter-related to all of the elements of society.

Government policies are really an expression of principles by the strongest political group (Caldwell, 1970, p.64). Consequently, they serve as a guide for making more specific decisions. It is, however, at the policy formulation

level where the final decisions are made.

The evolution of public policy should follow the logical sequence of steps by starting first at the broadest level of consideration and, through increasing levels of refinement, arrive at a decision or planning option (Gertler, 1972, p.13-33). In this way, public policies provide the basis from which all other decisions are made. Ideally, then, the 'best' decisions will be made at the lowest possible level having due regard for all other public policies, legal and regulatory requirements, the particular geographic setting and the expressed interests of the community.

In a democracy, public policies evolve either in anticipation of or in response to the expressions of public concerns, or as a combination of both (Lundqvist, 1974, p.11). While there are certain advantages to a process which is responsive, there is an inherent danger. If, for example, the problem is not recognized by the public, even though it may exist, the policy makers are unlikely to take the initiative. Even if a problem is recognized and certain policies are established to correct the problem, it may be a considerable period of time before effective measures can be devised (or practical technology is available) to achieve the policy goals. With respect to the environment, these considerations are significant, particularly in view of

the fact that there is an 'ecological lag' between the time that a change is introduced to the system and the point when the effects are evident.

The United States Council on Environmental Quality noted this problem in their first annual report. Their report states:

Our ignorance of the inter-relationships of separate pollution problems is a handicap in devising control strategies ... much more thought is necessary before we can be confident that we have the intellectual tools necessary to delineate accurately the problems and long-range strategies for action. (C.E.Q., 1970, p. 232).

In Canada, public policies are evolved as a response to public opinion. Therefore, a policy on the environment normally would evolve only after public recognition of the problem as a legitimate area for public action. Moreover, in Canada, where the bureaucracy is a controlling factor in developing public policy, an environmental policy could not be implemented until an acceptable institutional framework could be established, which satisfied the individual departments of the government services (Lundqvist, 1974, p.12). In the absence of such policies, there is the very real concern that project and planning decisions would be made without adequate consideration of the benefits and costs, the alternatives and the quality of the environment.

The following sections outline the development and implementation of environmental policies. This task is

considered essential in order to provide a common basis for discussion in subsequent chapters of this thesis. The investigation begins first with a brief overview of the policies which have evolved in the United States. This was considered necessary since the American initiatives have influenced later Canadian policy directions.

American Policy Initiatives

In the United States, as early as 1962, and somewhat in anticipation of public concerns, the American Senate had established a framework for inter-departmental, multi-objective planning and environmental evaluation of water and land resource projects (Nancarrow, 1976). In 1965, President Johnson initiated a policy of National Beauty which advocated the development of a national environmental policy throughout the Republic (Lundqvist, 1974, p.11). This Executive initiative was followed by the creation of a number of committees of Congress and the Senate which sought to determine and to define the goals and objectives of a national environmental policy (Dreyfus, Ingram, 1976, p.246). The need for such a policy was well-recognized.

The area where greater knowledge would help is in the resource decision-making process. Many Federal resource decisions ... do not adequately reflect environmental factors ... no one can tell us the cost of various alternatives in long-term environmental values (Rockefeller, July, 1968, as cited in Dreyfus and Ingram, 1976, p.246).

Furthermore, a co-ordinated procedure was required, as proposed in 1969 by Senator H. Jackson.

There are about 80 major Federal agencies with programs under way which affect the quality of the human environment ... Concern for environmental quality must be made part of every Federal action (Jackson, as cited in Dreyfus and Ingram, 1976, p. 247).

The result was the passage, by the United States Congress, of the National Environmental Policy Act of 1969 (N.E.P.A.) (42 U.S.C., Pub. 1-91-190). It was signed into force by President Nixon on January 1, 1970 and was followed by similar legislation in many of the individual states - eg. California, Michigan, Minnesota. Thus, in the United States, by the time of the first "Earth Day" on April 22, 1970, a national environmental policy statement was in effect.

The National Environmental Policy Act of 1969 (N.E.P.A.)

The N.E.P.A. is a statute which sets out a national government policy on the environment (N.E.P.A., Section 101) and, at the same time, specifies certain procedures that all Federal government agencies must follow, to assure implementation.

Section 102 of N.E.P.A. is perhaps the principal, if not the most publicized feature of the Act. Briefly, this

section requires that proponent agencies shall:

- a) use a systematic, interdisciplinary approach in decision-making,
- b) ensure that presently unquantified environmental amenities be considered along with the more tangible economic and technical considerations,
- c) prepare an environmental impact statement on all Federal actions which could significantly affect the quality of the human environment,
- d) in areas of unresolved environmental conflict, study, develop and describe alternatives to the recommended action,
- e) recognize the spatial and temporal characteristics of environmental problems,
- f) develop remedial and mitigating measures to restore, maintain or enhance the quality of the environment,
- g) initiate and utilize ecological information in the planning of resource projects, and finally,
- h) assist the Council on Environmental Quality in carrying out its duties (N.E.P.A., 1969; Section 102).

Section 103 of N.E.P.A. instructs all agencies of the Federal Government to review their present policies, programs and projects to bring them into line with the environmental policies as set out by the legislation. Section 104 specifically identifies the need for consultation between both Federal and/or State agencies.

Title II of N.E.P.A. creates the Council on Environmental Quality (C.E.Q.) which is an independent environmental agency with certain responsibilities specified by the Act. It also requires the President to report annually to Congress on the "state-of-the-environment."

Thus, in the United States, through N.E.P.A., the requirement to approach project planning and development on a multi-disciplinary, inter-disciplinary and co-ordinated basis was established by the force of law. The Act, by way of "action-forcing provisions" ensured that the mission-oriented agencies would be made aware not only of the traditional economic and technical criteria of project planning, but also of the social and non-quantifiable factors of resource development and project alternatives.

Canadian Environmental Policies

In Canada, somewhat in contrast to the United States policy development, the evolution of environmental policy occurred in incremental stages as a response to public expressions of concern about the deteriorating quality of

the environment (Lundqvist, 1974, p.13). As might be expected, the general awareness of the environmental concern was most prevalent in those areas of greatest population concentration, and where major new development projects encountered public opposition, eg., the Pickering Airport proposal to the northeast of Toronto.

This is not to suggest that the Canadian bureaucracy was not aware of the environmental problem. L.O. Gertler, in a background paper presented to the Resources for Tomorrow Conference (1961), outlined the challenges posed to the environment by the lack of a comprehensive approach to the deterioration of the human environment as a result of rapid urbanization (Gertler, 1972, p.13). Gertler set out nine essential criteria to guide the development of an institutional framework and procedure for implementation to achieve 'optimum resource use and environment' and 'integration with broader levels of planning.' Following the Resources for Tomorrow Conference, in June, 1964, recognition was given by the Canadian Council of Resource Ministers to the problem of environmental pollution. The Ministers decided to sponsor a conference on the subject, rather than initiate direct legislative action, at the time. In the fall of 1966, a national tri-level conference on pollution was held in Montreal under the sponsorship of the Canadian Council of Resource Ministers. The nature of the problem

was defined thus:

Pollution of our environment exists when human welfare and activities are harmed or hindered by substances accumulated in our fundamental resources of water, air, and soil. There is natural contamination from physical and biological processes which exist independently of man. In addition to this, man's activities give rise to wastes and residues which are the inevitable by-products of any activity. There is no cause for alarm as long as these wastes are within the limits of man's tolerance and nature's self-cleaning capacity, but in our modern technological society there is clear evidence that we have gone well beyond these limits...

and continuing

... the central point about the problem of pollution is that it is complex, not one problem but a network of interlocking problems, scientific, administrative, technical, economic, social, political and moral. Action on such a network of problems must be taken on a broad front within a comprehensive framework.

(Canadian Council of Resource Ministers, 1966, p.1)

A review of the majority of papers presented at this conference suggests, however, that many of the participants perceived pollution not as a complex, interlocking problem but as a sectoral problem, and restricted to the perspective and mandate of their individual agency, department and jurisdiction. Consequently, an immediate response to the problem of environmental pollution was not forthcoming at the political level even though the need for a comprehensive co-ordinated framework was recognized.

This deficiency comes from the proliferation of ad hoc organizations, or "Single Purpose Authorities", that results in the compartmentalization of the different problems. There are organizations which are concerned only with water, soil, or air, and all within the same jurisdiction. And it is for this reason, to break down the compartments and to permit communication, that the two planning groups suggest that, ... the creation of such "Single Purpose Authorities" should be minimized, and that, on the other hand, environmental control and pollution control are carried out finally at the regional level by means of a regional plan (Saumier, C.C.R.M. Vol. 1, 1966, p.99).

Although the participants of the "Pollution and Our Environment" conference identified the need for a central or regional authority, an "interlocking" approach, and certain specific, action-oriented policies such as information programs, research and the maximum use of existing technology, the findings of the conference were not carried through in any significant and comprehensive manner to the political forum. It was not until the 1968 Federal election campaign when the pollution issue became a national issue (Dwivedi, 1972, p. 154). No doubt, this was partly as a result of the highly publicized Senate and Congressional debates on national environmental policy which were in progress in the United States. The first formal recognition of the environmental problem occurred in the Speech from the Throne of the newly elected Liberals under the leadership of Prime Minister P.E. Trudeau (Dwivedi, 1972, p.134).

However, it appears that the Government of the day was reluctant to initiate new environmental legislation. It

was not until November 5, 1969 that the first legislation, the Canada Water Bill (Bill C-144) was introduced to the House, and then only after considerable pressure from the Progressive Conservative opposition (Dwivedi, 1972, p.135).

As it may be observed, it was some eight years following the Resources for Tomorrow Conference and some three years after the Pollution and Our Environment Conference that the first attempts at environmental policy development were initiated. It is suggested that three factors may partially account for this delay in the evolution of Canadian environmental policy. These are: the geography of Canada, the question of jurisdiction over natural resources and the government bureaucracy.

Canada is a vast country with a rich supply of natural resources and a small population. This combination did not serve to focus and, indeed, did somewhat hamper public awareness of the seriousness of environmental deterioration. Although many Canadians were probably aware of the "environmental crises" and Congressional Debates in the United States and elsewhere, the prevailing attitude might be stated as "it can't happen here". However, a number of occurrences, including the sinking of the oil tanker "Arrow" off the shores of Nova Scotia and, later, major development projects such as the proposed Pickering Airport northeast of Toronto, and the runway extension at Vancouver, served to focus policy attention on the environmental quality issue.

The jurisdictional question is the more significant and perhaps unresolvable factor in the present development of, or lack of, national environmental policies in Canada. Due to the ambiguities of the Canadian constitutional framework on the matter of natural resources jurisdiction, the Federal Government can not unilaterally declare or legislate a national policy on the environment as was the case in the United States. Under Sections 91 and 92 of the British North America Act (Victoria, 1867), the Provinces have certain rights which are their exclusive responsibility. Briefly stated, the governments of the ten provinces have ownership of the natural resources within their political boundaries. The Federal Government has ownership of natural resources in the two territories and in certain selected but limited areas within the provinces - national parks, military reserves and property which has been purchased by the Federal Government.

However, jurisdiction is not based on a simple matter of ownership (MacNeil, 1971, p.9). Both levels of senior government have, within the existing constitutional framework, the exclusive powers to enact legislation over many resource matters. The provinces have power, within their sphere of jurisdiction, over land use planning, forestry, mineral resources, water (hydro-electric particularly) and so forth. The Federal Government has exclusive powers over resource matters which are of an international

nature (MacNeil, 1971, p.9). However, in addition, there are a number of spheres of jurisdiction which overlap, such as is the case with water resources. The constitutional study on the environment in 1971, by J. W. MacNeil concluded that there were four possible jurisdictional options. These are environmental matters which,

- a) are totally within and confined to a province,
 - b) originate in one province or territory but affect another province or territory,
 - c) originate in another country and affect Canada or originate in Canada but affect another country,
 - d) originate from lands or facilities under federal ownership and affect a province
- (MacNeil, 1971, p.175).

A third, and largely undocumented factor in the tardiness of the Federal Government to develop a national environmental policy, was the organization and role of the Canadian bureaucracy. The Canadian civil service is very influential in the formulation of government policy.¹⁷ The broad scope of the environmental issue crosses

¹⁷Dwivedi, 1972/1973, p. 136.

many of the traditional lines of authority, which historically have been aligned on a sectoral basis. Thus, it is suggested that internal jurisdictional disputes may have delayed the introduction of environmental policy legislation, particularly following the pollution conference of 1966. It was only after intense opposition and public pressure that the Government was forced to act.

From the foregoing, it is easy to see that the geography of Canada, the question of Federal-Provincial jurisdiction over natural matters, and the bureaucracy have all been an influencing factor in the evolution of environmental policy in this country. The first mention of the environmental issue by the Federal Government occurred in the 1968 Speech from the Throne. Even though a major debate on environmental policy was underway in the United States¹⁸ it was not until the Fall of 1969 when several Cabinet and Private Members' Bills were submitted to Parliament, that any firm initiative occurred (Dwivedi, 1972, p.134). Even then, the development and implementation of environmental policy was directed primarily towards pollution abatement and regulation, (Estrin, 1975) and specific resource concerns. Since 1970 there have been several major developments in environmental policy, particularly at the Provincial level of Government.

¹⁸ Above p. 28-29.

Environmental Policy Development

The development of policies concerning the environment have progressed through three incremental phases. During the first phase, the emphasis was on developing policies for specific resource sectors of the environment. A second policy phase, beginning about 1950 in Ontario and later in other jurisdictions, focused on a more comprehensive approach to environmental matters. The third policy phase was oriented towards environmental assessment laws. Figure 1 portrays the chronological relationship and nature of each phase. The following text describes in more detail the nature of each policy phase.

Phase I - Resource Sector Policies

Historically, the Federal Government has established an interest in many sectors of environmental resource matters such as; migratory birds, navigation, fisheries and Indian lands. For example, such an interest is suggested by the Preamble to the Migratory Birds Convention Act (Can. Stat., 1917),

... being desirous to saving from indiscriminate slaughter and of insuring the preservation of such migratory birds as are either useful to man or are harmless, have resolved to adopt some uniform system of protection ...

This act, which was enacted under Sections 92 and 132 of the British North America Act (Victoria, 1867) and others

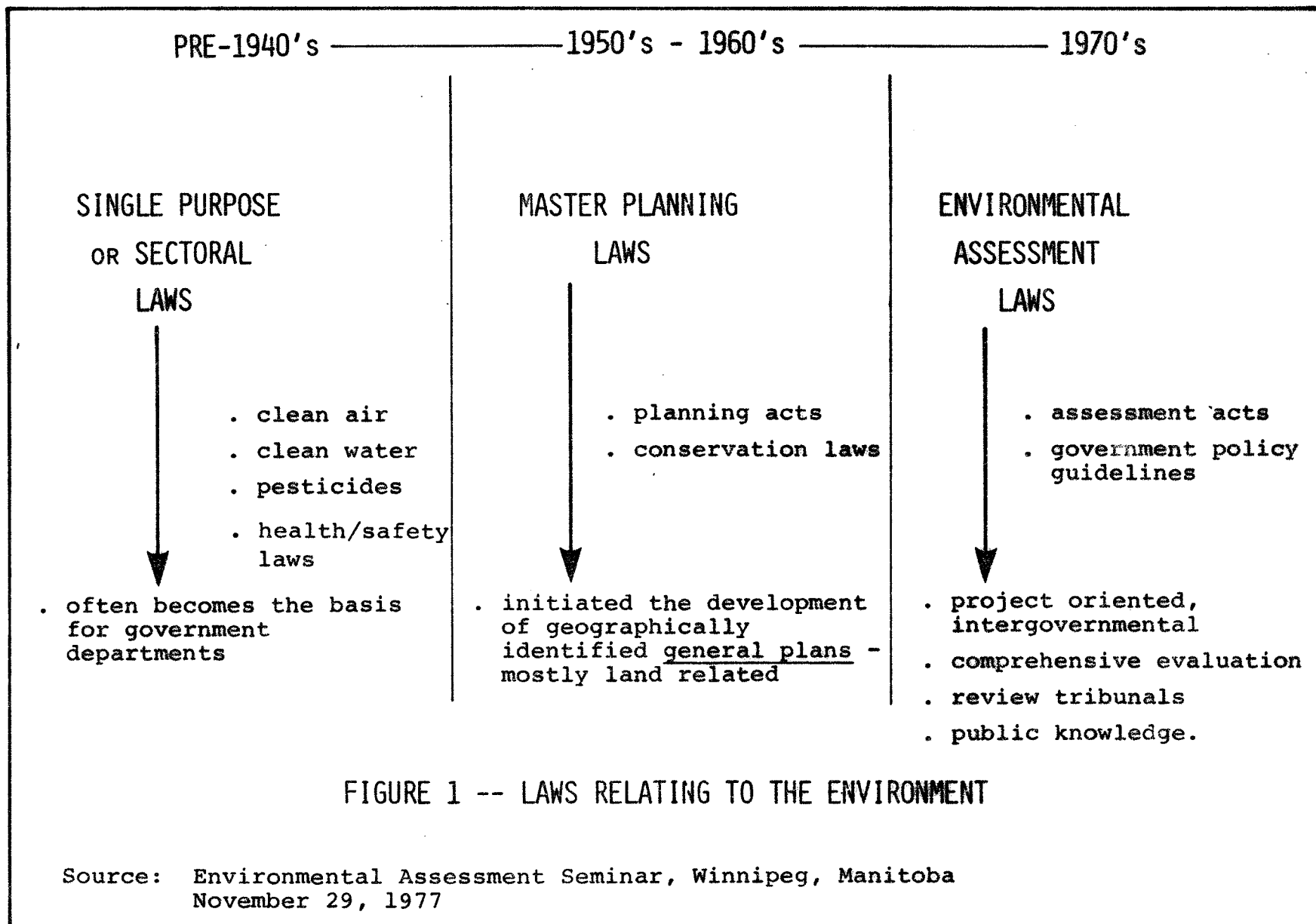


FIGURE 1 -- LAWS RELATING TO THE ENVIRONMENT

Source: Environmental Assessment Seminar, Winnipeg, Manitoba
November 29, 1977

of a similar nature has been upheld and extended by judicial decisions and precedence. However, as Bird quite correctly concludes, "It is doubtful whether they alone could justify a comprehensive environmental regulatory framework for resource developments (Bird, 1972, p.50).

In late 1969 and early 1970, sensing a certain degree of urgency from the public mood, the Federal Government, in a frenzy of activity, when compared to past activities, amended a number of the existing statutes and extended the regulations under these acts, to reflect a broader concern for the environment. For example, The Fisheries Act (Can. Stat. 1895) was revised (R.S.C., 1970) in a manner that strengthened and expanded the government's ability to prevent the pollution of waters inhabited by fish. New penalties of \$5,000 per day on conviction for breaches of the Act were established and polluters could now be assessed costs for clean up. Furthermore, new industrial operations would be required to install suitable and adequate pollution control equipment, before they went into production. The Canada Shipping Act (Can. Stat.) was amended (R.S.C., 1970) to prohibit discharges by ships into the air or water.

In an attempt to establish its leadership in the environmental sphere, legislation such as the Canada Water Act (S.C., 1970), the Clean Air Act (S.C., 1970), the Northern Inland Water Act (R.C.S., 1970) and the Arctic

Waters Pollution Prevention Act (R.S.C., 1970) was enacted (Lundqvist, 1974, p.16). The Canada Water Act (R.S.C., 1970) was the first of this Federal environmental legislation. This act was prepared by the Federal bureaucracy and extensively reviewed, at the request of the Provinces at the two Federal-Provincial Constitutional Conferences which were held in February and early September of 1970. Following this review the act was proclaimed on September 30, 1970. It has been advanced by Muntz (1972, p.112) that three jurisdictional scenarios evolved from the Canada Water Act (R.C.S., 1970). First, the Federal Government would take the initiative in areas of clear Federal jurisdiction. Second, the two senior levels of government would co-operate closely in areas of divided or overlapping jurisdiction. Third, the Federal Government would take the initiative in areas where a co-ordinated effort could not be established.

By the time that the Canada Water Act (R.S.C., 1970) was introduced there was considerable public pressure for a comprehensive approach to the "environmental crises". This fact was no doubt greatly influenced by the recent passage of the National Environmental Policy Act of 1969 in the United States. The Canada Water Act, because it placed an emphasis on water resources and pollution rather than providing for a comprehensive framework, and also because it did not create a powerful environmental agency such as



the Council on Environmental Quality, was severely criticized. As Dwivedi suggests, however, the Federal bureaucracy may have had motives which were in part directed by the Canadian constitutional framework:

It would appear that the Federal Government did use the Canada Water Act as well as other legislation, as a holding operation and as a means to gauge the strength of the national mood. The Federal Government's cautious approach revealed a desire to avoid any hasty move to create a superministry which might precipitate a constitutional or administrative problem. (Dwevidi, 1972, p.136).

It was also during the early 1970's that the Federal Government made a significant effort to enact environmental legislation relating to the Canadian Arctic. In 1970, the Territorial Lands Act (R.S.C., 1970) was amended to permit licensing of all development projects in the Territories and to provide a means by which the developers could be held accountable for any adverse effects to the land (Lloyd, 1970, p.732). The Northern Inland Waters Act (R.S.C., 1970) and the Arctic Waters Pollution Prevention Act (R.S.C., 1970) sought not only to protect the environment, but also to provide for the licensing of water users in the Territories and to extend the Canadian interest in Arctic waters. In this respect, it can not be assumed that this legislation was solely in response to public concerns over the environment. Indeed, this flurry of legislative activity occurred shortly after the voyage of the American tanker Manhattan

(1969), and the announcements over the possibilities of finding major oil and gas reserves in the Arctic. Therefore, it may be concluded that a need to protect the environment was also closely allied with the need to strengthen Canada's sovereignty in the Arctic (Lloyd, 1970, p.736).

At the Provincial level of Government, the characteristics of Phase I environmental policies are evident. In Ontario, legislation such as the Ontario Water Resources Act (Ont. Rev. Stat., 1957) addressed a specific resource sector problem. Over the years, however, the Ontario Water Resource Commission greatly expanded its role to the extent of providing a comprehensive water resource management program in the Province.

Other similar legislation, some of it dating back to the turn of the century, related to specific resources such as minerals, wildlife, forestry, crown lands, and land use. Very often, this legislation formed the basis for specific resource departments, branches or agencies. Still other laws, such as the Pesticides Act (Ont. Rev. Stat., 1967) continued the Phase I environmental policy initiatives until well into the 1960's.¹⁹

¹⁹The Pesticides Act (1967) provided for some control over the commercial use of pesticides. However, the private use of pesticides, including a farmer using pesticides on his own land, was excluded from the Act except for certain specific compounds.

Phase II - Comprehensive Environmental Laws

While Phase I was often a frenzy of legislative activity in an attempt to satisfy public demands, the major policy thrust was towards a rather narrow, sectoral interpretation of the environmental issue. Phase II may be broadly described as encompassing the first steps towards addressing the environmental issue as a holistic problem (Estrin, 1975, p.244). The actions of government were strongly influenced by several scholarly works on the subject, including MacNeil's constitutional study (1971) and, in certain jurisdictions, by a strong, effective and knowledgeable public, such as the Canadian Environmental Law Association.

During Phase II a number of comprehensive environmental acts were passed by most jurisdictions and new institutional arrangements and procedures were established to administer the sectoral and single-purpose legislation of the earlier attempts to establish environmental policy (Estrin, 1975, p.244). The Federal Government created, by order-in-council, the Federal Department of the Environment on November 26, 1970. This action was later incorporated into legislation by the Government Organization Act (Can. Stat., 1970).

The new environment agency was given, under the rather broad and general wording of the Government Organization Act,

(Can. Stat., 1970) the responsibility for a wide variety of existing and proposed legislation. The pertinent section of the Act reads,

5. The duties, powers and functions of the Minister of the Environment extend to and include all matters over which the Parliament of Canada has jurisdiction, not by law assigned to any other department, branch or agency of the Government of Canada, relating to ...

5e. the protection and enhancement of the quality of the natural environment, including water, air, and soil quality.

Furthermore, the Department of Environment has a wide range of powers to "initiate, recommend and undertake programs, and co-ordinate programs ... designed to promote... objectives or standards relating to environmental quality..." (Can. Stat., 1970, s.6,b(a)). Co-operation with other Federal and Provincial agencies is to be in the interests of achieving the designated objectives (Can. Stat., 1970, s.6(b)).

Briefly, the stated objectives of the Department of the Environment are as follows:

- . to carry on established resource programs and services,
- . to clean up and control pollution,
- . to assess and control the impact on the environment of major development,
- . to initiate long-term environmental programs and to provide leadership and support in

- pursuing these goals,
- . to promote and support international environmental initiatives,
 - . to develop an environmental information and education program, (Canada, 1973).

It is evident that the Federal Government, due to the jurisdictional question, was not in a position to implement a national environmental policy. However, by Cabinet decision, a Federal Activities Program was established on June 8, 1972. The main purpose of this program was to monitor and regulate environmental pollution at the national level. It was restricted, however, to projects or programs which were initiated by the Federal Government, or under its jurisdiction. The policy is stated thus:

... all new projects initiated by the Federal Government or under its jurisdiction (other than Crown corporations which should be considered similar to private industry) should be screened for potential pollution effects, on the basis of criteria to be established inter-departmentally, by departments and agencies and, if indicated, referred to the Department of Environment for further assessment. All new projects should be registered to indicate screening decisions (Guide for Environmental Evaluation, June, 1972, p.2).

As was the case at the national level, the development and definition of Phase II environmental policy on the Provincial scene occurred as a response to increasing public concern about the quality of life. However, there was a

delay of about two years after the passage of the Canada Water Act (1970). This would seem to be due to the jurisdictional question and acknowledgement by the Provinces for the Federal Government to take a lead role in environmental policy formulation. Indeed, the Provinces did not proceed until after extensive discussions with the Federal Government and the Department of Environment (Lundqvist, 1974, p.16).

In Ontario, the second level increment for environmental policy resulted in the creation of the Ministry of Environment (1971) and the enactment of the Environmental Protection Act (Ont. Rev. Stat., 1972). The situation was similar in the other provinces.

In Manitoba, the origins of phase II environmental policy may be seen as early as 1967 with the proclamation of the Manitoba Water Commission Act (Man. Stat. 1967) which created the Manitoba Water Commission. As a vehicle for environmental management, this advisory Commission appears to be of quite limited authority in that it can only address "Projects, problems and schemes ... to secure the maximum benefits to the Province from the use, allocation, and conservation of water" (Section 5) which have been referred to it by the Minister. However, it is of significance that provision has been made in the Act for public hearings, although the requirements under which hearings would be held are not specified (Section 3(9)).

In 1968, the Manitoba Clean Environment Act (Man. Stat. 1968, c.130) was enacted by the Legislature. The main thrust of this Act was towards maintaining environmental quality by setting certain standards and by regulating operations. Under the terms of the Act, an operation or activity could not operate without a license to contaminate the environment (Man. Stat., 1968, c.130, s.2,3,4). Although no direct correlation could be established, it would appear that this legislation was influenced by the Pollution and Our Environment Conference (Montreal, 1966). At the time, this Act was perhaps the most advanced environmental legislation in Canada, particularly since it recognized the environment in terms of land, water and air. The scope of the Act was limited, however, by a number of exclusions which included: The Pesticides Control Act, The Noxious Weeds Act, (S.M., 1968, c.7, s.2), the disposal of mine wastes (S.M., 1968, c.7, s.3), and the Metropolitan Corporation of the City of Winnipeg (S.M., 1968, c.7, s.4).

A significant feature of the Act was the creation of the Clean Environment Commission (C.E.C.) (S.M., 1968, c.7, s.8). The Commission was established as a senior administrative body, empowered to hold hearings on environmental matters (S.M., 1968, c.7, s.16), set environmental pollution standards, issue licenses and set regulations. An interesting feature is the requirement for the C.E.C. to prepare

an annual report on its activities and to review the state of the environment, for the responsible Minister (S.M., 1968, c.7, s.10). This is similar to the requirement of the C.E.Q. under the terms of the American National Environmental Policy Act of 1969.

In 1972, the Clean Environment Act (S.M., 1972, c.76) was revised substantially. In part this may have been due to the extensive, and at times ambiguous obligations of the Clean Environment Commission (Booy, 19, p.136-137). In brief, the new Act,

- a) re-created a Clean Environment Commission as a quasi-judicial agency, independent from the public service, and reporting to the Minister (S.M., 1972, c.76, s.2),
- b) enabled the Minister to appoint an environmental advisory committee, for the purpose of advice and assistance (S.M., 1972, c.76, s.2(3)),
- c) created the Environmental Management Division of the Department of Mines, Resources and Environmental Management.

Other changes to the appeal procedures, definitions and administration of the Act were made.

The major limitation of this legislation is the reliance on protecting environmental quality by setting

specific limits by regulation. Limits are very often considered to be specific, quantifiable numbers. If no standards are set, or certain 'contaminants'²⁰ can not be measured because of, for instance, the limits of present technology, then it is virtually impossible to set emission limits for designated activities. Indeed, some contaminants are not quantifiable and thus, perhaps, beyond the effective authority of the Commission.

Although the Manitoba Clean Environment Act (S.M., 1972) is comprehensive, there are a number of shortcomings when compared to the American National Environmental Policy Act of 1969. First, there is no formal procedural framework or requirement for an integrated approach to resolving environmental problems, as was designated by the American legislation.

²⁰The Clean Environment Act (S.M., 1972) defines contaminant as meaning 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 "contaminate" as a similar meaning;
(S.M., 1972, c.76, s.1).

Secondly, a project or development may be exempt from the Act at the discretion of the Minister (S.M., 1972, c.76, s.14(1)). Thirdly, the scope of authority is restricted to the narrow spectrum of environmental pollution of the air, water and land (S.M., 1972,c.76,2.1). Not included are the socio-economic components of the quality of the environment. Fourth, there is no provision for a broad level of agency or public involvement except through a public hearing. Fifth and last, the Act is project oriented. No provision is made for actions, policies or plans which do not have a direct (or primary) effect, but which 'may significantly affect the environment' through secondary or even tertiary effects. For example, the development of a new provincial park may have considerably more implications to a region than a single project, such as a transmission line.

Phase III - Environmental Assessment Laws

This phase in the evolution of Canadian environmental policy, reflects an escalation in the development and implementation, in order to resolve some of the shortcomings of Phase II. While the sequence of events, the confidential reports and studies, the initiatives and strategies of certain public pressure groups, and the reaction of industry and government agencies makes for interesting reading, it is far beyond the scope of the present research. The purpose

here is to briefly describe the results of this evolutionary phase and to highlight certain pertinent points.

On December 30, 1973, some five years after the environmental issue was first acknowledged, the Federal Cabinet directed that all departments and agencies would have to take environmental matters into account during the planning and implementation of Federal projects and programs.²¹ The Cabinet further directed the Minister of the Department of Environment under Sections 5, 5(e), 6(a)&(b) of the Government Organization Act (1970), "to establish, in co-operation with other Ministers, a procedure for administering the Environmental Assessment and Review Process (E.A.R.P.)" Thus, projects which have been initiated by a Federal department or agency, which require Federal financing²² or which involve Federal lands would be subject to the E.A.R.P. At the same time, provision was made for an Environmental Assessment Panel (E.A.P.), which was to act as an advisory agency to the Minister of the Environment and was to ensure a uniform and objective approach to the Federal environmental assessment process. This action is in line with the second

²¹"E.A.R.P. Procedures." Memorandum from J.B. Seaborn, Deputy Minister, Environment Canada, October 2, 1975.

²²By virtue of the spending power of the Federal Government, this clause has far-reaching implications of extending the jurisdictional authority on environmental assessment far beyond that which was discussed earlier.

strategy identified by Muntz.²³ It should be noted, however, that although the E.A.R.P. is very closely monitored and controlled by Environment Canada bureaucracy, Federal Proprietary Crown Corporations and regulatory agencies which function under specific Federal legislation, such as the National Energy Board (N.E.B.) are not bound by the Order. However, they may join if they so desire, as the Atomic Energy Board has done.

The National Energy Board, being a quasi-judicial board which was created by the National Energy Board Act (Can. Stat., 1959) has chosen not to participate in the Federal E.A.R.P. Instead, it has elected to establish its own environmental assessment procedures for certain projects under the National Energy Board Act (1959), Section 44(a).²⁴ As a result of this fact, the Board has issued a series of guidelines to be followed by proponents in the preparation of the assessment (Appendix I). Generally speaking, these guidelines are applicable to energy-related projects (or developments) which are international in nature. This action appears to be based upon the first strategy identified by Muntz (1972).²⁵

²³Above, P. 42

²⁴This extension of the National Energy Board Act (1959) under Section 44(a) is being challenged in the courts by the Province of Manitoba through Manitoba Hydro on the basis of jurisdiction.

²⁵Above, p. 42

There are a number of concerns relating to the Federal environmental assessment process in Phase III. The major weakness in the opinion of this author is the failure (or inability) of the Federal Government to incorporate the need for an environmental assessment into legislation. Thus, it would be virtually impossible to withhold project approval on the basis of an inadequate, or even complete absence of consideration of environmental matters.

A government agency or regulatory authority such as the N.E.B. has a choice within its mandate as to whether a comprehensive planning study will indeed occur. There is no guarantee that an environmental assessment will be required. Secondly, can a regulatory agency such as the N.E.B., which has traditionally been concerned with the technical and economic factors of project development, adequately consider environmental factors as an equal in the decision-making process? As a number of authors have observed, regulatory agencies tend, over time, to reflect the views of those whom they purport to regulate (Kahn, 1971, Foreword).

The earliest indication on the provincial scene of policy proposals for environmental assessment procedures began in 1972, and were formally identified in the Ontario Government's Speech from the Throne in March, 1973. (Caplice, 1975). In September, 1973, the Ontario Green Paper on

Environmental Assessment, which set out a series of environmental policy scenarios, was submitted for public review. However, it was not until late in 1975 that the Environmental Assessment Act (1975) (Ont. Stat., 1975, c.69) was passed by the Legislature. However, it should be noted that the Act underwent extensive public review which resulted in significant changes.

The Ontario Environmental Assessment Act of 1975 mandates by statute, the requirement for information about the environment likely to be affected by an action and the need to adhere to certain procedural criteria. The Act applies not only to the actions and activities of the public sector, but also the private sector, as well.²⁶ The powers of the Minister of the Ministry of the Environment are described with respect to the identification of the necessity for undertaking an environmental assessment and to the final project approvals. An independent, quasi-judicial Environmental Assessment Board is created with the powers to hold public hearings and call witnesses and advise the Minister.

In Alberta, in early 1976, a comprehensive environ-

²⁶The section of the Act pertaining to private sector enterprises has not yet been proclaimed, although the proposed expansion of the uranium mines in Elliot Lake by Denison Mines and Rio Algom Ltd. is being submitted to an environmental assessment. The Environmental Assessment Board is holding public hearings under the terms of the Environmental Assessment Act of 1975.

mental assessment process, with authority vested with the Environmental Co-ordination Service of the Alberta Department of the Environment²⁷ was implemented under the Land Surface Conservation and Reclamation Act (S.A., 1973, s.3)

In Manitoba, the Phase III implementation of environmental assessment procedures has occurred, not by legislation, but by a Cabinet Order dated November 12, 1975. The policy procedures are to be applied within the Provincial Government with responsibility vested with the Minister of the Department of Mines, Resources and Environmental Management. The Environmental Assessment and Review Agency was created to advise the Minister and the Provincial Cabinet on environmental assessment matters. The requirement as to whether an environmental assessment study is required rests with the Minister of the Department of Mines, Resources, and Environmental Management. The final project decision, however, rests with the whole Provincial Cabinet.

The Manitoba Environmental Assessment and Review Agency functions as an element of Cabinet policy. As such, it can not be considered as part of the central function of government in that it does not draw its mandate from legislation.²⁸ Consequently, its philosophy and process

²⁷ Under Ministerial Order 26/76 pursuant to the Department of the Environment Act (Alberta, 1977, p.14).

²⁸ It is recognized, however, that Cabinet Orders do have the force of regulation equivalent to laws, as long as the Order remains in force.

has never been tested in the public forum, and could quite easily cease to exist with a change in government or public policy. The Manitoba assessment process and the manner by which environmental matters are considered is very similar to the processes followed by the Federal Department of the Environment, in that it is oriented towards controlling pollution. However, the intentions are clear. The need for a comprehensive evaluation of project development is evident.

Summary

As documented in this Chapter, only in the past eight years or so has the Canadian public recognized that dangers to the quality of the environment exist in Canada as well as in the other countries of the world. The interest and involvement of the Government of Canada and the Provincial Governments is on the whole a more recent phenomenon.

It has been suggested that this increased involvement may be due to a variety of reasons. In summary, these are:

- . . . the requirement to establish certain public priorities for the use and conservation of certain resources which were no longer thought of as infinite, due in part to the rapid advancement of technology,
- . . . an increasing awareness of the inter-relatedness of the elements of the

environment and the need for a coordinated and integrated approach to management by both the public and private sectors,

- . a tendency for the Canadian Government to intervene and directly manage and develop a resource sector in the absence of private sector financial resources or initiatives, and finally,
- . the need to manage and control single-purpose mission-oriented government agencies whose goals and objectives may conflict.

In Canada, government policies on environmental matters evolved as a response to public pressure, not in anticipation of public awareness. In the United States, the development of environmental policy, occurred partially in anticipation of and partially in response to the needs of its citizens.

The jurisdictional ambiguities of the constitutional framework in Canada regarding natural resources have been a major contributing factor to this delay in environmental policy definition. In the United States, the senior level of government is not hampered by constitutional matters on the environment. As such, policy definition occurred within two or three years after the identification by government of the environmental concern. However, in Canada the Federal

Government could not and did not act on environmental matters until extensive negotiations had been undertaken with the individual provinces, and constitutional studies had been completed. Thus, it was not until late in 1973, some five years after the issue was first recognized, that there was a definition of environmental policies at the national level.

The jurisdictional issue in Canada has also directed the process of federal involvement in the definition of environmental policy. Four jurisdictional options for the Federal Government, as documented previously, were identified within the existing constitutional framework. The approach applied has been one of policy definition by regulation, rather than by legislation. However, in the United States, where the role of the Federal Government on resource matters is quite well defined, legislation has been the vehicle of environmental policy definition. Moreover, in the United States this fact has not hindered the individual states from enacting legislation on environmental assessment. Many, including Minnesota, New York and California have done so. The provinces in Canada, reflecting their authority and responsibility on resource matters within their individual political domains have also incorporated environmental policy using either existing or new legislation. The extent of these environmental policy initiatives is summarized in Table 1.

<u>GOVT.</u>	<u>DEPT. CONCERNED</u>	<u>LEGIS. REQ'T</u>	<u>WHO DECIDES IF E.A. REQUIRED?</u>	<u>WHO DOES REVIEW OF E.A.?</u>	<u>IS THERE A PUBLIC HEARING BOARD?</u>	<u>WHO DECIDES IF PUBLIC HEARING IS REQUIRED?</u>	<u>TO WHOM DO YOU APPEAL?</u>	<u>PUBLIC INVOL'T REQUIRED?</u>
FEDERAL	Env. Canada	Cabinet Decision (Order)	Proponent From Init. Environ. Evaluation	Env. Canada	Env. Assess. Panel	Min. of Env.	Minister/Cabinet	No
.B.	Dept. Env.	Gov't Policy	Cabinet	Dept. Envir.	No	Pub. Mtgs Only--D.O.E.	Cab. Com. on Econ. Devel.	No Review is Discretionary
.E.I.	Dept. Env.	None	Cabinet for Comp. Review	D.O.E.	Discretionary	Cabinet	Cabinet	No Discretionary
.S.	D.O.E.	Gov't Policy for Rivers & Coastal Areas	Cabinet	D.O.E.	Env. Cont. Council	Citizen's Env. Council/Proponent	Minister/Cabinet	No Discretionary
NT.	M.O.E.	Env. Ass't Act	Minister/M.O.E.	M.O.E.	Env. Ass't Board	Minister	Minister	No
AN.	Dept. Mines Resources & Env. Mgmt.	Gov't Policy	Minister-- Env. Ass. & Review Agency	M.R.E.M. Review Agency	Clean Env. Commiss. or Env. Ass. Rev. Agency	Minister	Minister	Discretionary
ASK.	D.O.E.	None	Inter Dept. Committee	Inter Dept'l	No	None	Cabinet	No
LTA.	D.O.E.	Land Surf. Cons. & Recl. Act	D.O.E./Minister	D.O.E.	No	None	Econ. & Plng & Res. Committee	No Discretionary
.C.	Dept. of Lands, Forests & Water Resources	Env. L.U. Act Poll. Control Act Water Act	Department	Sub Dept.	No	None	Cabinet	No

TABLE 1 -- SUMMARY OF CANADIAN ENVIRONMENTAL POLICIES

Source: Environmental Assessment Seminar,
Winnipeg, Manitoba, November 29, 1977

However, these provincial policy developments will not necessarily restrict the influence of the Federal environmental policies. By virtue of its extensive "spending power", the national government will be able to extend its environmental policies into many elements relating to the quality of the environment which might have traditionally been considered to be the exclusive realm of the provinces. Needless to say, the definition of jurisdictional powers on environmental matters will continue to evolve, particularly if the Federal Government makes further attempts to apply the first strategy, as it is doing under the National Energy Board Act (Can. Stat., 1959).

Policy implementation is an important element for discussion, as this will determine the eventual effectiveness of environmental policies in the decision-making process. An understanding of the organization and operation of the federal and provincial civil service is a major factor in any such discussion. This is of particular significance in Canada because of the key role of the bureaucracy in policy development and implementation. It would appear that, at the present time, the success of the environmental policy implementation stage in Canada, and in Manitoba particularly, is dependent upon the close co-operation and consultation between staff of the public service.

The danger lies in that many of these institutions

were established for a new frontier. The pioneering spirit or "new frontier" mentality placed little importance on the preservation of the land, the air or the water. Thus, these very institutions which are to be entrusted with this responsibility are not always capable of doing so. Today, fertile agricultural lands are often being taken out of production by uncontrolled urban growth. The responsible agencies, for instance, have not been able, as yet, to prevent the gradual loss of the Niagara Fruit Belt. Agricultural lands are often looked upon by government planning agencies as holding zones for urban development.

The challenge, then, for the analyst, whether he be a geographer, planner, ecologist, or engineer is to create a dynamic, flexible framework within which the often broad and conflicting resource goals and uses can be openly assessed and integrated with the decision-making process. The challenge concerns the "ecology of the human community" (Mumford in Gertler, 1972, p.23) and thus, provision must be made for the involvement of people in the process. In order to be successful, the process must have a thorough understanding not only of the geography of the region and its people, but also an appreciation of laws and policies. Historically, this has been a difficult and imprecise task. Today, the task has been further complicated by the need to

satisfy certain institutional requirements.²⁹ All of this information must be collected, interpreted, evaluated and presented in a manner which recognizes 'environmental realities'.

²⁹Such as the N.E.B. Guidelines for Environmental Assessment Studies (Appendix I).

CHAPTER IV

A RESPONSE TO RESOURCE CONFLICTS AND ENVIRONMENTAL DETERIORATION

Introduction

The Meaning of Environment

Environmental Assessment

Environmental Impact Assessment

A Framework for Environmental Assessment

Environmental Assessment Methodologies

CHAPTER IV
A RESPONSE TO RESOURCE CONFLICTS AND
ENVIRONMENTAL DETERIORATION

Introduction

In the past, the planning process has been characteristically fragmented and sectoral, particularly with respect to the management of natural resources. Decisions affecting the use of the environment often did not reflect the inter-related nature of the various components nor did they adequately incorporate those intangible elements which were difficult to measure. Such a course, while tolerated in the past, is not acceptable today. It has been realized by the public and governments alike that mission-oriented agencies can no longer continue to operate in a manner which jeopardizes the quality of the environment and our limited resources. A co-ordinated action which brings environmental considerations into the planning process is perceived as being essential.

As shown in the previous Chapter, new policies and institutional arrangements respecting environmental matters have evolved in most jurisdictions in Canada.

During Phases I and II, the evolution of environmental policies was often ad hoc and reactionary. Phase III, however, set the stage for a unified and comprehensive

approach to project planning. No longer was it simply a matter of setting certain standards and measures, as, for example, was the case with earlier public health and safety or air pollution laws and regulations. The trend was clearly preventative; from defensive 'towards optimum resource use' as Gertler suggests (Gertler, 1972, p.23).

This trend, however, may in reality be a logical progression. In a presentation to the Resources for Tomorrow Conference in 1961, L. O. Gertler identified four conceptual phases to planning³⁰ (Gertler, 1972, p.18-28). In the first phase, defensive action is taken to correct an imminent breakdown of the 'community environment'. 'The aim, he states, 'is to alleviate those aspects of the incipient breakdown that arise out of disorder' (Gertler, 1972, p.19). In the second phase, there is a recognition of the importance that the land and resources are limited and must be protected from the failures of the economic system to consider them. Phase III is presented as a positive response, as compared to the 'defensive and protective' aspects of the first two phases. He writes;

³⁰ Although Gertler was referring to regional planning, I have cautiously avoided the use of 'regional' because of the urban-centred overtones that the term has taken on.

...the planning process moves from an emphasis on overcoming the waste and misuse of resources to provide a guide for the optimum use and development of the region's resources and locational advantages; and from a preoccupation with halting the deterioration of environment to the creation of the best possible physical setting for the community's life. (Gertler, 1972, p.23).

The fourth and last phase requires that there be 'integration with broader levels of planning' resulting in a wider level of participation in the planning process.

In this context, the planning process should not be considered strictly in terms of 'the optimal dispersion of economic activity' as Richardson suggests (Richardson, 1969, p.4). It is a complex, all-embracing concept which is related to the many facets of the community.

With this in mind, then, the purpose of this Chapter is to investigate the principles and practices of procedures which have evolved as a response to the Phase III policies. In so doing, the purpose will be to provide a background from which to evaluate the environmental assessment which has been applied in Manitoba.

In addressing a topic as broad as this, a common basis for discussion must be established. Accordingly, the first section develops a set of definitions. This is followed by a discussion of the environmental assessment as a function of the planning process.

The Chapter concludes with a brief overview of the

approaches which have evolved in response to the policy requirements.

The Meaning of Environment

The term "environment" has many different connotations or meanings for many people, depending upon the country or even region in which one might live, and indeed, which discipline one might have studied. In fact, it may be virtually impossible to achieve a total consensus on the meaning of "environment" since it is such an all-embracing concept.

In the minds of many, until quite recently, the term was often considered to be synonymous with the natural environment, biology or ecology. This is perhaps a reflection of the influences that outstanding scholars such as the ecologist E. P. Odum (1962) have had on the evolution of the concept. Compounding this problem of definition is the fact that many disciplines, including geography, planning, sociology and others claim jurisdiction over the term. Each field of study has its own definition and its own jargon.

Moreover, "environment" is a relatively new field of study as compared to the so-called "hard" sciences of engineering, mathematics, chemistry and physics. Indeed, much of the major contributing research is on-going. Consequently, very little has been accomplished in the way of standardization of terminology and theory. One need only

read the numerous environmental assessment reports to gain a full appreciation of this point. However, there have been some recent significant contributions towards clarification by such authors as Dansereau (1976), Dorney (1973), Hills (1974), and Dooley (1974, 1976).

Erich Zimmerman's concept, drawing upon the works of Bernard (1925), is that the environment is a system of processes and relationships to which man is linked through adaptation to and modification of the natural resources. He writes:

...we see rising before our eyes a lofty edifice, stories piled upon stories, resting on a physical basis not of matter alone but also of energies, of processes, of relationships. (Zimmerman, 1964, p.177).

More recently, G. J. Cano (1976), drawing upon the Stockholm Conference on the Human Environment identified three "generic environmental elements" which reflected the degree of man's influence. These were:

- a) Natural Environment, on whose original state man has had no influence, and which includes,
 - (1) natural resources (atmosphere, land, soil, slopes, fresh water, the sea and its floor, mineral deposits, flora, fauna, primary energy, geothermic resources, panoramic resources) in other words, the elements of nature that are useful to man;

(2) harmful natural phenomena, such as seismic waves, volcanic eruptions, cyclones and tornados, floods, spontaneous fires, natural plagues (animal and plant) epidemics, epizootic diseases.

- b) Cultivated Environment, in which man induces and influences the production of natural resources; products from agriculture, silviculture, livestock, aquaculture, secondary energies;
- c) Environment created or produced by human action, buildings, constructions (dams, roads, etc.) manufactured products (foods, remedies, fertilizers, pesticides) and manufactured elements which make up the sensorial environment; noise, odours, flavours, created scenery.

In Canada, there exist in legislation, various definitions of the term "environment." The Manitoba Clean Environment Act defines environment as; 'the air, water or soil' (Am. S.M., 1974, c.42, s.1(a)). This is expanded further by supplementary definitions.

The air is described as,

the atmosphere not including the atmosphere within a mine or within a building other than any building designated by the Minister.

Water includes,

flowing or standing water on or below the surface of the earth and ice formed thereon.

Soil includes,

earth, land and terrain

In Ontario, the Environmental Assessment Act, 1975

(Ont. Stat., c.69, s.1) defines "environment" as,

- (i) air, land or water
- (ii) plant and animal life, including man,
- (iii) the social, economic and cultural conditions that influence the life of man or a community,
- (iv) any building, structure, machine or other device or thing made by man,
- (v) any solid, liquid, gas odour, heat, sound, vibration or radiation resulting directly or indirectly from the activities of man, or,
- (vi) any part or combination of the foregoing and the inter-relationships between any two or more of them.

Subsections (i) and (ii) outline the more traditional concepts of the physical and biological system, but subsection (ii) goes further than the Manitoba definition to recognize and to include man as part of the functioning system. Subsections (iii), (iv) and (v) expound the definition to include, not only the socio-economic and cultural environments of Bernard (1925), and Zimmerman (1964, p.177), but also any output from man's activities - that is to say

the induced environment embraced by Cano (1976, p.3). This development is carried further to encompass the interactions of the control and support mechanisms of the holistic system, thus reflecting the ecological notions of a dynamic, inter-related system (Odum, 1962, in Cox, 1969, p.6). The Ontario legislation recognizes that man is not only part of but also a manipulating element of the environment - a "complex unity" as L. K. Caldwell suggests (Caldwell, 1970, p.x).

Ancillary definitions within Section 1 of the Act further clarify and expound the definition of environment.

Land is conceived as,

(including) enclosed land, land covered by water and subsoil,

and water as,

surface water and groundwater, or either of them.

In the latter instance, it is significant that the relationship between surface and groundwater is recognized. This is a major contribution, for in the past this and similar concepts were not recognized by legislation and the institutional arrangements for resource management (Fox, 1976, p.753).

The term "assessment" is also a word that may convey various and different meanings. In the past, it has often and most commonly been used to define a specific function or work task of the management/planning process as with the

Canada Land Inventory Program. In this case, certain specific geographic variables were inventoried and "assessed" to determine the capability of a landscape to attract and to sustain certain resource factors - forestry, agriculture, outdoor recreation, wildlife and so forth. However, this rather narrow context does not appear to be appropriate today, as indicated by the stated objectives of the environmental assessment. In the Ontario Government's Green Paper on Environmental Assessment (1974), the objectives are stated as being,

- 1) "to identify and evaluate all potentially significant environmental effects of proposed undertakings at a stage where alternative solutions, including remedial measures and the alternative of not proceeding, are available to the decision-maker;
- 2) "to ensure that the proponent of an undertaking and government and agencies required to approve the undertaking give due consideration to the means of avoiding or mitigating any adverse environmental effects prior to granting approval to proceed with an undertaking" (Green Paper on Environmental Assessment, 1974, p.9).

Similarly, in the United States, the National Environmental Policy Act (1969) expressed its view thus,

"...it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and co-ordinate Federal plans, functions and programs, and resources..." (N.E.P.A., 1969: Section 101(b)).

In Manitoba, the stated objective of the Environmental Assessment and Review Process (E.A.R.P.) is:

The above process [referring to E.A.R.P.] may be considered a preventative strategy or a mechanism to identify and resolve potential environmental problems related to air, water, or soil pollution of a proposed action, and in turn, strengthen existing environmental management practices in Manitoba (Manitoba, 1976:p.2).

The emphasis of the "assessment" is therefore on the decision-making process, of which there may be any number of planning functions. The main thrust is towards information and communication.

It would appear that there is a problem in providing a clear, precise and concise definition of the term "environmental assessment". In the search for a suitable definition framework, attention was paid to a wide variety of literature including the United Nations Conferences on the Human Environment (Stockholm, 1972) and the International Geographical Congress (Montreal, 1972).

The Honourable W. G. Newman in his statement to the Ontario Legislature on the introduction of the Environmental Assessment Act (1975), described environmental assessment as;

...a comprehensive system of anticipation and prevention of environmental damages which can result from future development projects...

and continuing,

it is really preventive medicine ... action before the fact...as opposed to reaction after the illness has developed, the damage to the environment has occurred." (Speech to the Ontario Legislature, March 24, 1975).

Perhaps one of the most thorough appraisals of the concept of environmental assessment was the S.C.O.P.E.³¹ Workshop on Impact Studies in the Environment which was held at Victoria Harbour, Ontario in 1974. This workshop, which was co-sponsored by the United Nations Environmental Program (U.N.E.P.), Environment Canada and U.N.E.S.C.P., concluded that environmental assessment is a systematic process which functioned as part of a much broader and integrated planning process. They concluded that environmental assessment was:

those environmental planning activities concerned with assessing the quality of the environment in both the natural and disturbed states (Munn, 1975, p.23).

This definition gives recognition to environmental assessment as part of the environmental planning process. Thus, in the context of the evolution of policy in both Canada and the United States, the objective is to ensure that environmental matters are considered along with other aspects (technical, economic, political, etc.) of program or project development. To fulfill this objective, the environmental assessment process must be linked to the higher and broader participation levels of planning.

³¹S.C.O.P.E. means Scientific Committee on Problems of the Environment.

Such a concept assumes, of course, that the planning process is rational. Thus, if the decision-maker has all of the best and most current information available, he will arrive at an optimal solution - i.e., a decision which will optimize man's dynamic inter-relationships with the environment, in the long-term. The Honourable Jeanne Sauvé alluded to this principle in her presentation to the Association of Consulting Engineers of Canada, Workshop on Environmental Assessment in Ottawa (1975):

During the second generation, [referring to the Federal E.A.R.P.], the focus will be preventative rather than responsive. Prevention is best achieved through long-term stabilization of the renewable resource supply (Sauvé, 1975, unpagged).

This is quite clearly an extension from the traditional, or at least well-recognized principles and practices of the past. This holistic framework is within the realm of regional analysis as conceived by Gertler and others.

It must be noted that, although at first glance the environmental assessment activities in the planning process might appear to raise such matters above the traditional factors of decision-making, this is not, in fact, the intent (Young, 1976, p.6). It is obvious, however, that the assessment process must be reflected in the implemental stages of project development. This is essential if environmental factors are to be established as an equal 'consistent with other essential considerations of national policy' (N.E.P.A., 1969, Sect.101(b)).

Environmental Impact Assessment

'Impact' may be thought of as an effect or change in state, in one body, either positive or negative, caused by the action of another body. Over the past few years, the term has been closely associated with environment. This association, which is thought to have originated with Professor L. K. Caldwell, was firmly established by the N.E.P.A. of 1969 (Section 102, (c)(i)). Since that time, the term has been the subject of much research, controversy and litigation in the United States, particularly centred around the contents of the environmental impact statement.

As the Ontario Environmental Assessment Act (1975) suggests, man is both part of a dynamic, changing environment and through his activities³² an agent of change. Man can and does, through the use of technology, alter the natural energy flows, processes and food cycles. In the context of environmental assessment, impact can be thought of in terms of man's activities in a particular geographic area and in time. Environmental impact assessment is thus defined as,

a change in state, either positive or negative, to a particular geographic area of the earth; occurring at a particular time; caused by the activities of man, and to interpret and communicate information about the impacts.³³

³² Activities in this context are considered in the broadest sense to include not only projects but also plans, programs, legislation, operational procedures, etc.

³³ Adapted from Munn, 1975, p.23.

The need to assess environmental impact in project planning is specified by Canadian procedures. In Ontario, the environmental assessment must include a description of 'the effects that will be caused or that might reasonably be expected to be caused to the environment' (Ont. Stat., 1975, c.69, s.5(3)). In Alberta, the Environmental Impact Assessment Guidelines requires the identification of the 'possible effects' of a proposed development, and a suggested method of organizing this task is presented (Alberta, 1977, p.3).

The question may be raised as to the value of assessing environmental impact. Dickert has indicated several reasons - identification, prediction, evaluation (Dickert, 1974, p.127). First, it identifies directly the range of effects, including both their 'spatial dimensions and time frame', that specific project actions might be expected to cause to specific features of the environment. Second, it will provide some indication as to the degree of change that might be expected. Finally, it communicates the trade-off issues that must be addressed by the decision-maker.

Only by fulfilling these criteria will the assessment process provide adequate information to the decision-maker in order to progress towards the achievement of optimum resource use and the maintenance of the quality of the human

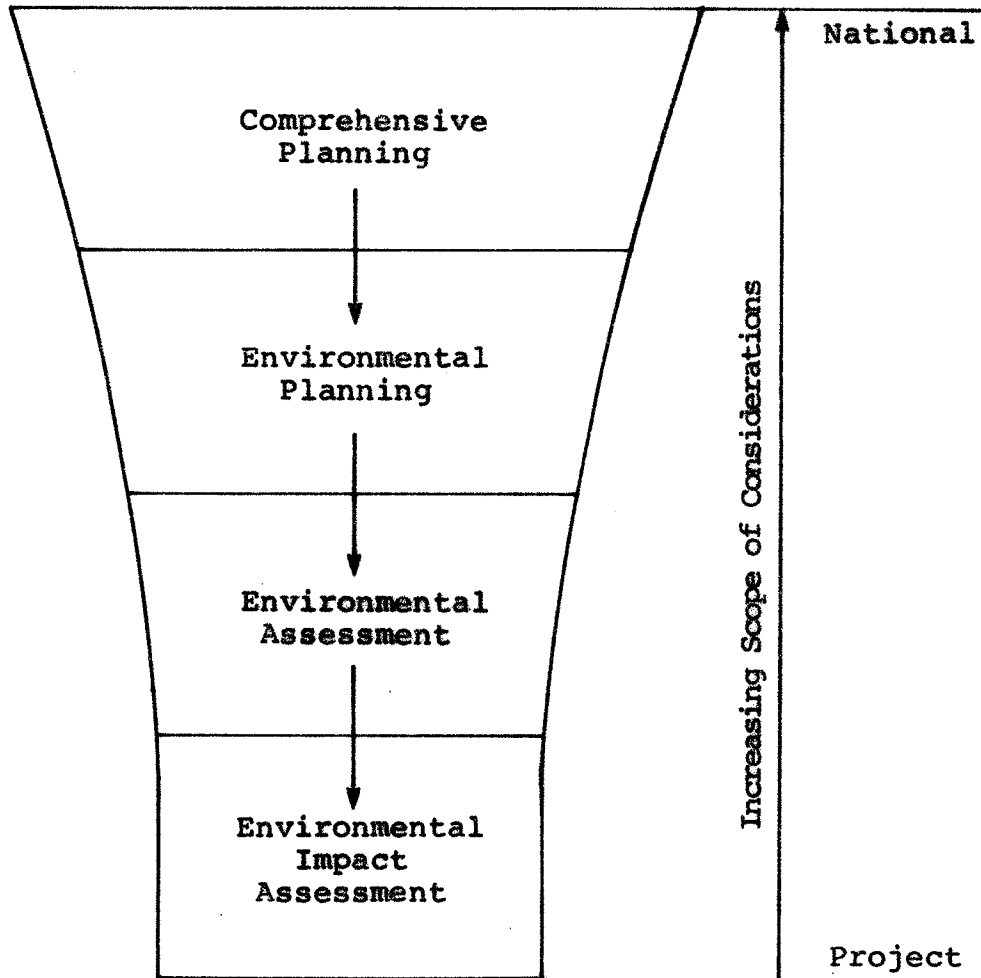


FIGURE 2 -- THE SCOPE OF PLANNING AND ASSESSMENT AT THE PROJECT AND NATIONAL LEVELS

Source: Munn: 1975: p.24.

environment. The scope and relationship of environmental impact assessment is shown on Figure 2. Comprehensive planning may be considered as a narrower scope, and focusing on planning matters related to the environment. Environmental assessment is designed to identify and evaluate the effects of project development on the environment, and the ways of avoiding or reducing adverse impacts. Environmental impact assessment emphasizes those scientific and technical tasks of determining and communicating the environmental effects of project activities.

A Framework for Environmental Assessment

An optimal framework for environmental assessment as a function of an integrated planning process is being widely sought. However, there appears to be a wide divergence of opinion as to the constitution of the 'best' approach. Our general lack of understanding of the relationships between impact on the environmental systems and the quality of life for man is certainly part of the problem. Added to this is our lack of adequate scientific information about the many and diverse supporting and controlling mechanisms of the total system. Thus, in Canada, no single approach has received widespread recognition. It is apparent, however, that any framework which may evolve must recognize that the assessment process is a function of land and resources

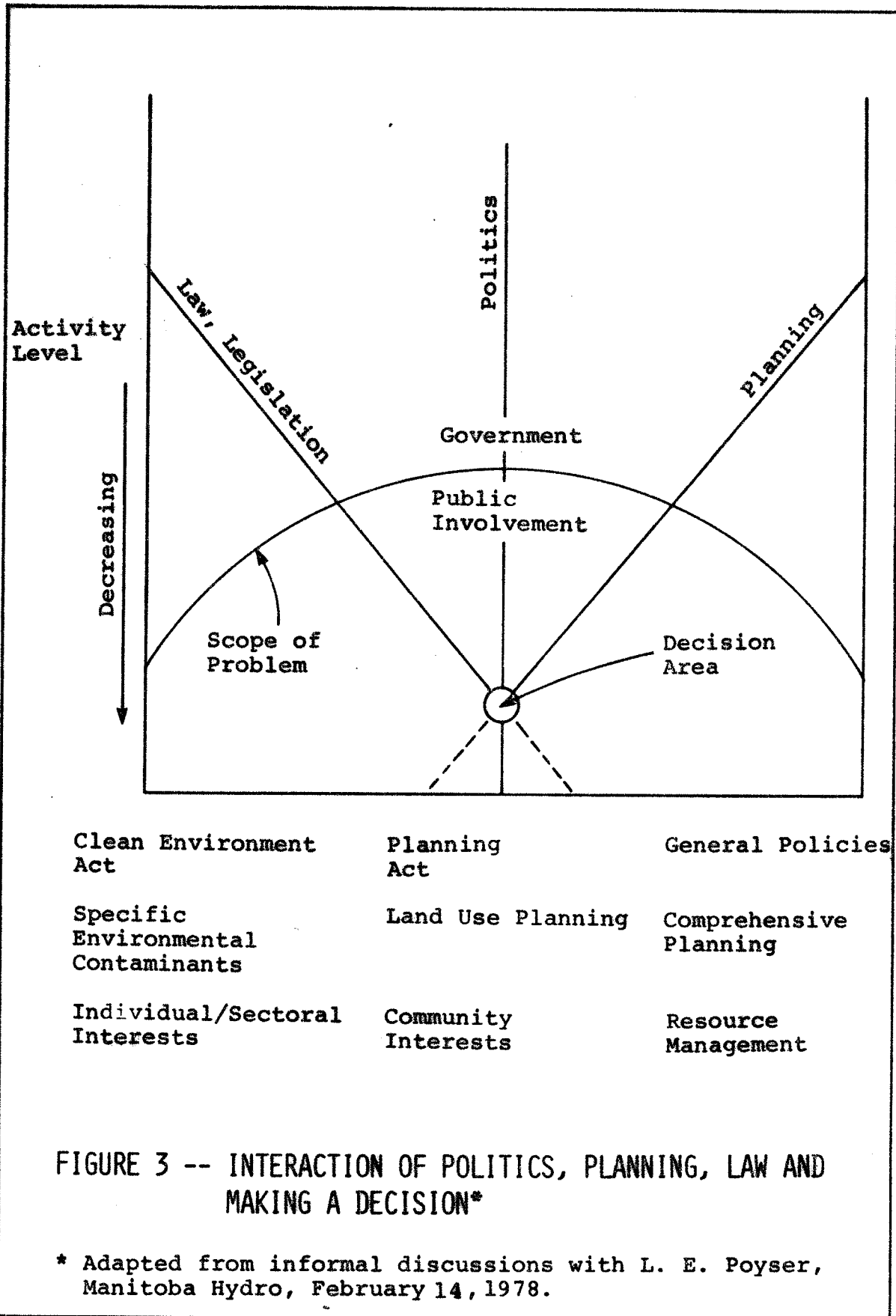


FIGURE 3 -- INTERACTION OF POLITICS, PLANNING, LAW AND MAKING A DECISION*

* Adapted from informal discussions with L. E. Poyser, Manitoba Hydro, February 14, 1978.

planning, laws, politics and the scope of the problem.³⁴

This relationship is shown on Figure 3.

Planning may be thought of as a series of inter-related steps which are taken to resolve an existing or anticipated problem. The planning process begins with a definition of the problem, and proceeds to its resolution and eventual approval and implementation. Information commensurate with the scope of the problem is required if the final outcome of the planning process is to be meaningful - i.e., to decrease the uncertainties which Boulding referred to in his paper.³⁵ Ideally, then, this sequence of steps should begin at the broadest possible level, and through increasingly finer levels of investigation arrive at a decision which is based upon the sound evidence of fact. At the highest level of activity, planning is concerned with those policies and issues of national interest. As the activity level decreases, the interest becomes more focused on specific natural and land resources and their use, and the informational requirements become more 'scientific' and precise.

Laws are a reflection of the policies and goals of

³⁴'Scope of the problem' includes not only administrative but also geographic, economic and technical aspects.

³⁵Above p. 25.

society. Consequently, they do not in themselves provide a decision. They provide a forum for communication which assists in the resolution of a problem. Once a decision is made, laws provide the means of implementation either by establishing certain standards and regulations which must be achieved, or by limiting certain uses or activities. At the highest level of activities, laws are restrictive and regulatory, reflecting individual or sectoral interests.³⁶ At lower levels of involvement, laws provide the forum for making decisions which include facts and the interests of the community. A certain degree of flexibility is required in order to achieve this forum, as compared to the rigid higher levels of activity. It is recognized, however, that the rigid situation is far easier to administer.

Land and resource use planning represents a fusion of planning and laws. However, these two aspects do not result in the decision about a project or program. People make the decision! At the highest level of political activity, decisions are made by a central elite of government with the ultimate resolution resting with, in Canada at least, the Cabinet. As the activity level falls, the decisions include a wider level of participation which is

³⁶ Above, p. 16.

responsive to local interests and individual expressions of the community. This lower level of activity also permits the identification of other social needs (Gibson, 1975, p.23). Ideally, the decisions should be made at the lowest level of political activity which is commensurate with the scope of the problem.

In Manitoba, referring again to Figure 3, the Clean Environment Act (S.M., 1972), because it is concerned with particular environmental contaminants and the setting of specific standards to be achieved with regard to certain individual operations, represents a high and rigid level of activity. The Provincial Planning Act (S.M., 1976), because of a close association with the community, the importance of municipal government involvement and greater reliance on communication and co-operation instead of on standards and regulations, represents a low or more flexible level of activity.

Considering, then, that the basic purpose of the environmental assessment process is to identify and communicate information about the effects of project development on the environment to the decision-making process, certain basic requirements must be fulfilled. It has been suggested by Canter (1977, p.20-29), that five aspects are involved, as follows,³⁷

³⁷ Although Canter was referring to the American situation, the principles are relevant to Canada. However, certain details may differ.

- a) Basics - In order to fulfill this step there is a need to have a complete and thorough understanding of all of the relevant legislative and regulatory requirements; the nature of the project to be assessed; and an interdisciplinary study team which can competently address the range of environmental features to be considered and which are relevant to the study;
- b) Description of the environmental setting - The purpose of this task is to provide the information which is essential in order to evaluate the proposed actions and alternative courses of action. In the compilation of this 'base-line' data, recognition must be given to the types and nature of impacts which might be expected to occur, to environmental guidelines such as those which have been prepared by the National Energy Board (Appendix II) and the Manitoba Environmental Assessment and Review Agency (Appendix III). Attention must also be directed to other studies of a similar nature, the methods to be used in the study,

and finally, the concerns of the decision-makers and the people who may have an interest;

- c) Impact prediction and assessment - The objective at this stage in the environmental assessment process is to identify, to predict and to evaluate the nature, direction³⁸ and extent of the effects which may be anticipated to occur to the physical, biological and cultural systems of the environment, due to a proposed activity, or activity;
- d) Selection of proposed action - Out of a set of alternative courses of action which are identified through the process, a preferred alternative is designated at this stage. Ideally, the selection of the preferred alternative would include not only environmental considerations but also technical design criteria, costing, public concerns, government policies, the effectiveness of mitigating and remedial measures and so forth;

³⁸ Recognition must be given as to whether the effects of a proposed activity are beneficial--positive, or detrimental--negative, to the environment.

- e) Preparation of environmental assessment documentation and report³⁹ - The purpose of this final step in the process is to fully document the course of the study, including public involvement, to identify all value judgements, and decisions made, to identify all of the potential impacts and how these impacts may be minimized⁴⁰ to recommend a course of action or rejection of the action, and to identify irreversible and irretrievable resource commitments.

The relationship of each of the steps to the environmental assessment process is shown on Figure 4.

In the publication Environmental Impact Assessment Guidelines, the Government of Alberta committed itself, to achieving a balance between resource development and environmental quality (Alberta, 1977, p.1)

In order to accomplish this objective an institutional procedure referred to as "the Environmental Impact Assessment

³⁹Canter refers to this stage as 'Preparation of environmental impact statement' (1977, p.28).

⁴⁰Or maximized in the case of beneficial effects.

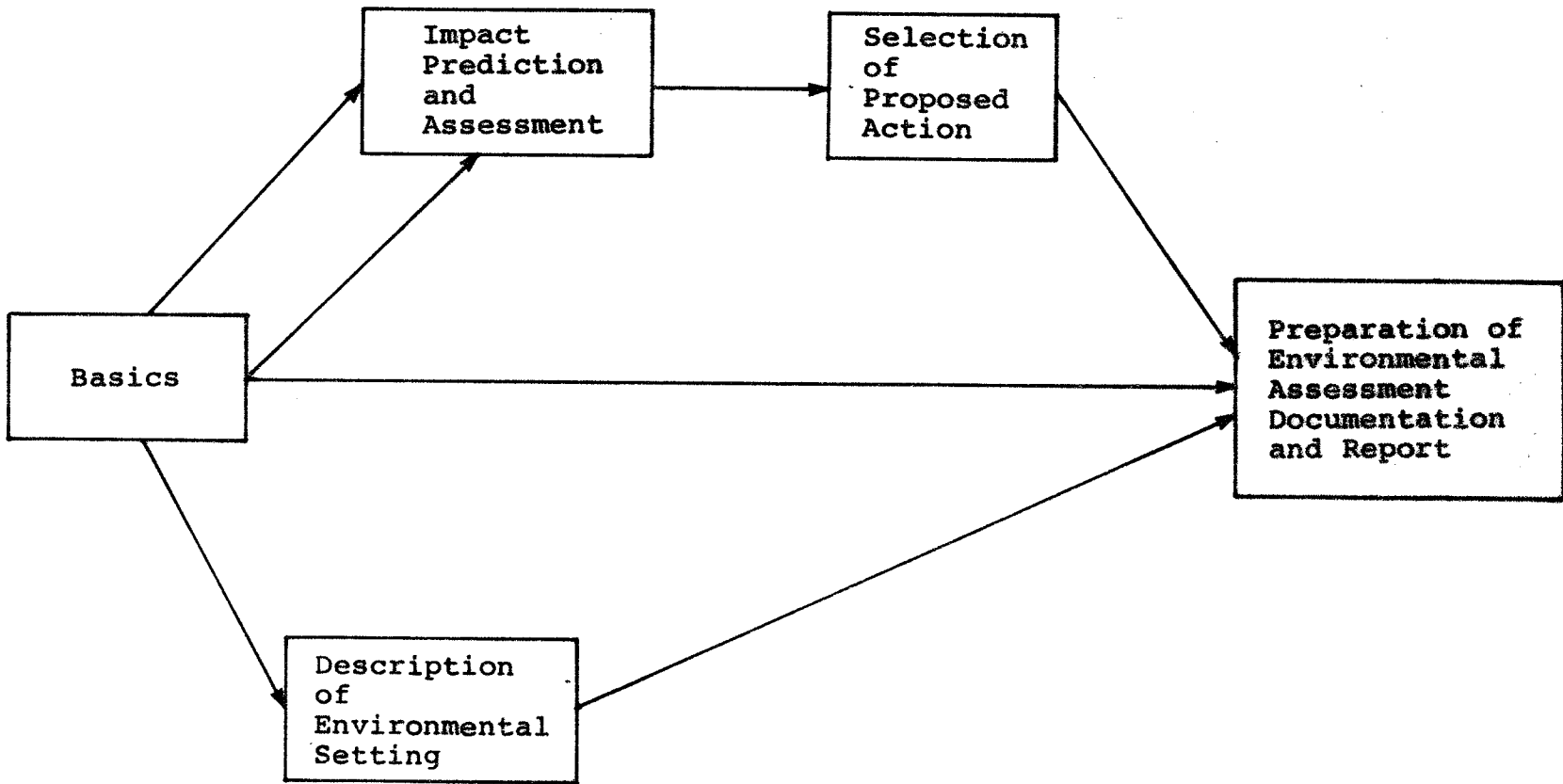


FIGURE 4 -- THE ENVIRONMENTAL ASSESSMENT PROCESS

Source: Canter, 1977: p.21

System' was established:

to facilitate the early identification and resolution of potentially significant adverse environmental effects of proposed resource development before environmental damage occurs (Alberta, 1977, p.1).

The Alberta environmental assessment process is presented as a series of ten basic steps. These are shown in Figure 5. Essentially, the process begins with a complete description of the project,⁴¹ - the purpose, the timing of development, the other agencies involved, the permits required and so forth. Somewhat paralleling this task is the requirement to describe the existing environment. Then, by relating the proposed development and its feasible alternatives to the environment, the effects or changes to the environmental systems can be determined and described. In the next step, the major resource issues are identified either independently by the proponent or by the proponent in consultation with government agencies and the public.⁴² The intent at this point is to focus the assessment process on the matter of resolving resource conflicts before final

⁴¹For a comprehensive and detailed outline of each step, and the contents of the final report, reference must be made to the publication entitled Environmental Impact Assessment Guidelines (Alberta, 1977).

⁴²Public involvement is not considered as mandatory, but it is highly recommended by the Guidelines and such involvement would appear to be the norm.

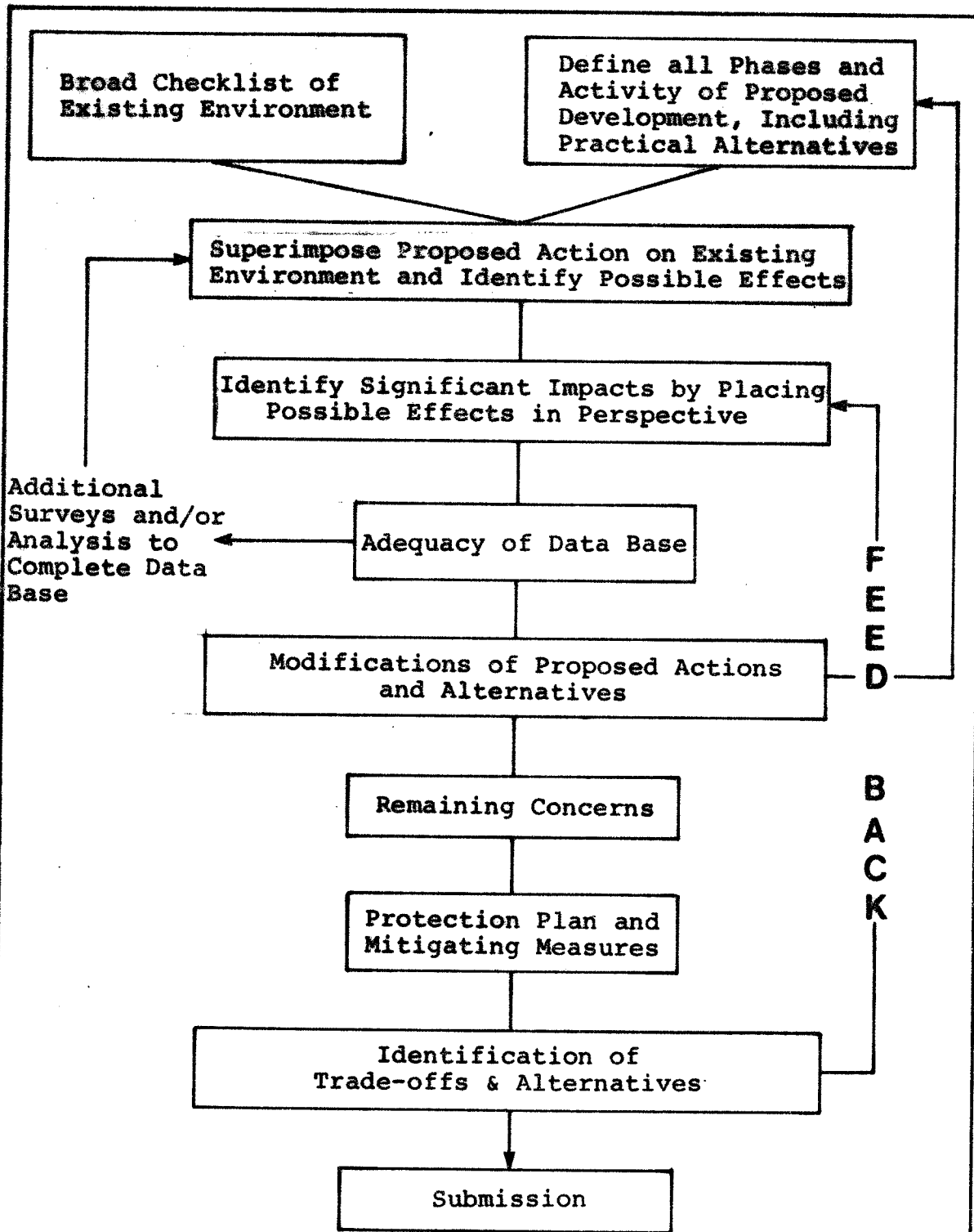


FIGURE 5 -- CONCEPTUAL APPROACH TO THE PREPARATION OF ENVIRONMENTAL IMPACT ASSESSMENT REPORTS

Source: Alberta, 1977: p.2

decisions are made. Thus, the next step requires that the environmental information assembled in the second step be assessed and up-dated in order to deal adequately with the major concerns of project development. The remaining steps in the process address the problems of resolving these major issues through the consideration of alternative actions and ways of undertaking the proposed action. Finally, a decision on the project which will minimize the adverse impacts and maximize the beneficial effects is made. A final report consisting of a summary and a detailed documentation of the study process and findings, and all environmental trade-offs which have been made is to be prepared by the proponent. This report is then submitted to the formal review process.

In Ontario, similar requirements exist and are described by the Environmental Assessment Act (1975) (Stat. Ont., 1975, c.69,s.5), and administered by the Ministry of the Environment. Briefly, the environmental assessment requirements include the following inter-related steps:⁴³

- a) Identification and description of the purpose,

⁴³ Adapted from a presentation by A. G. Appleby, Environment II Seminar, The Association of Consulting Engineers of Canada (Montreal, September 28-29, 1976).

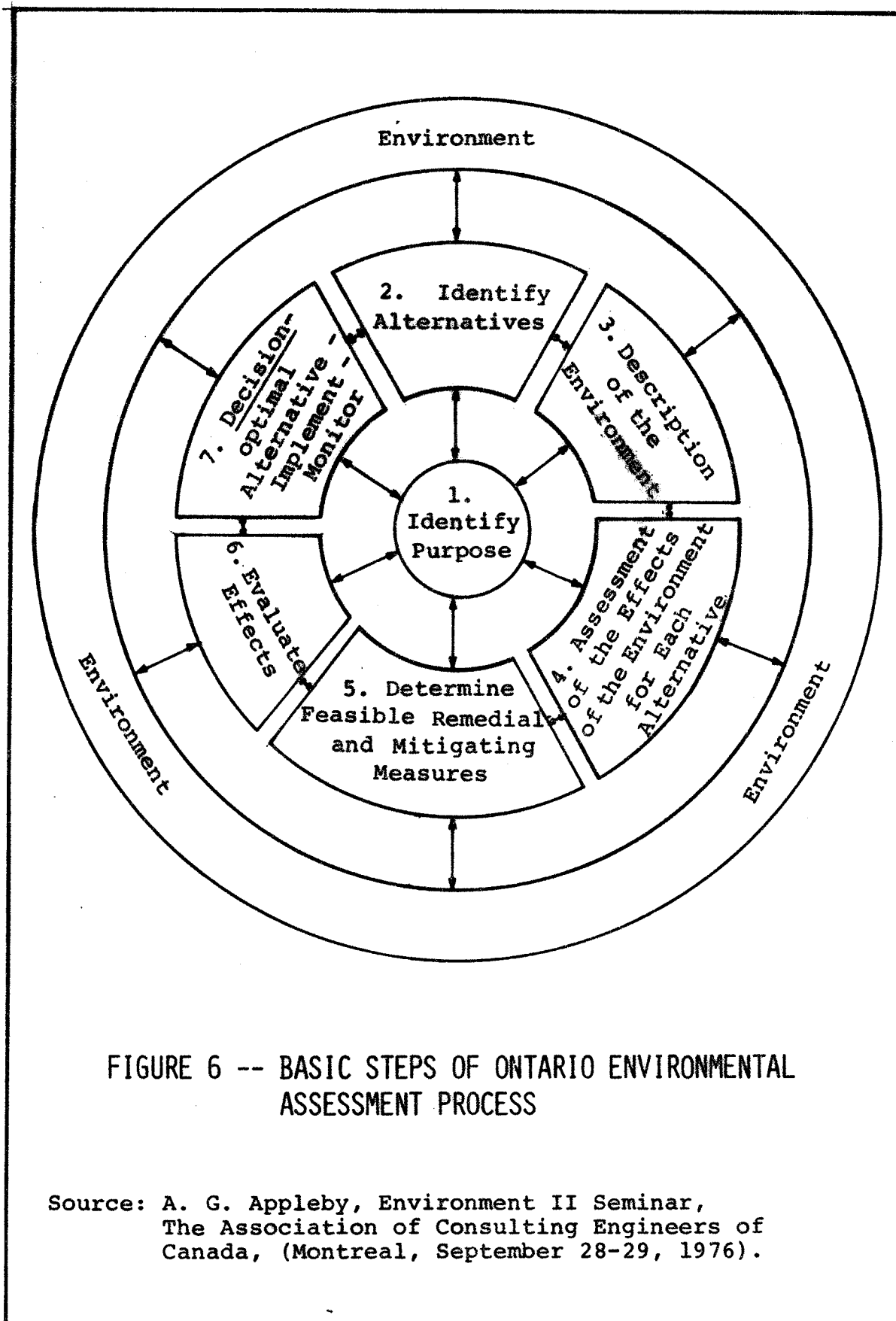


FIGURE 6 -- BASIC STEPS OF ONTARIO ENVIRONMENTAL ASSESSMENT PROCESS

Source: A. G. Appleby, Environment II Seminar, The Association of Consulting Engineers of Canada, (Montreal, September 28-29, 1976).

- b) a statement of the rationale of the proposed action and possible alternatives to the action, including alternative ways of carrying out the action,
- c) a description of the environment, likely to be affected,
- d) an assessment of the effects to the environment that might be caused by the action and alternatives,
- e) the determination of feasible remedial and mitigating measures for each of the alternatives,
- f) an evaluation of the effects in terms of the beneficial and adverse effects,
- g) the determination of which alternative is the optimal solution,
- h) the implementation of the decision,⁴⁴
- i) the monitoring of the action taken.

The process is shown graphically in Figure 6.

In the Province of Manitoba, a publication entitled

⁴⁴In Ontario, similar to Alberta, implementation would include obtaining specific licenses, permits, approvals, etc. from other agencies as a separate activity apart from the environmental assessment process. Manitoba has a similar situation.

Environmental Assessment and Review Process (Manitoba, 1976)

sets out the requirements for environmental assessment in this province. The stated objective of the process is 'to inform a decision-making authority of the potential effects of a proposed action on the environment'.⁴⁵ The requirements of the process are very similar to those of Ontario and Alberta.

The Manitoba Environmental Assessment and Review Process (E.A.R.P.) was established by Cabinet Order and is administered by the Environmental Assessment Review Agency within the institutional structure of the Manitoba Department of Mines, Resources and Environmental Management. The responsibilities of the Agency are to,

1. review proposals for new projects or proposals respecting major alterations to existing facilities;
2. exempt those projects which would not require a thorough environmental assessment;
3. recommend to the Minister of Mines, Resources and Environmental Management, those projects which in the judgement of the Review Agency require an environmental assessment;
4. provide environmental impact assessment guidelines in accordance with those presented in Appendices 1 and 2;
5. review environmental impact statements;

⁴⁵ Presentation by Dr. G. Bowen to A Workshop on Environmental Assessment, Association of Consulting Engineers of Canada, Ottawa, October 22-23, 1975.

6. recommend additional procedural guidelines to further identify and mitigate adverse environmental impacts;
7. submit reviews and recommendations to Cabinet to permit, modify or disallow a proposed undertaking.
(Manitoba, 1976, p.3).

Representation on the Environmental Assessment and Review Agency is as follows,

Chairman

Deputy Minister of the Department of Mines,
Resources and Environmental Management

Members

- a) Assistant Deputy Minister - Environmental Management Division, Department of Mines, Resources and Environmental Management
- b) Assistant Deputy Minister - Department of Health and Social Development⁴⁶
- c) Assistant Deputy Minister - Department of Finance
- d) A representative from the proponent who is preparing the environmental assessment.

Staff assistance to the Agency is provided by the Department of Mines, Resources and Environmental Management.

Under the guidelines set out for the Manitoba process, various types of projects are indicated as requiring an

⁴⁶Certain regulations and responsibilities from the Public Health Act are delegated to the Environmental Management Division (Booy, 1975, p.152).

environmental assessment.⁴⁷ The proponent is first required to submit a project description to the Agency who will then recommend to the Minister of the Department of Mines, Resources and Environmental Management, on the basis of this description, whether an environmental assessment is indeed required. If it is approved by the Minister, the process begins with preparation of an environmental assessment and proceeds through a series of reviews by the Agency. Any person may make a submission to the Minister regarding the proposal, once the Minister has given public notice. During the review process, recommendations on remedial and mitigating measures, monitoring studies and so forth may be made by the Agency. A public hearing may be called at the discretion of the Minister. The final recommendations are submitted to the Provincial Cabinet for a decision.

All of the provinces discussed above have essentially the same basic objective, which is to provide a framework by which environmental matters are considered in the project decision-making process. Certain institutional requirements are implied. The responsible agency or department must have the authority to carry out its duties. In both Alberta and Ontario, this authority has been established by an act of

⁴⁷This includes electric transmission lines of 230,000 volts or greater and which extend for a distance of five miles or more (Manitoba, 1976, p.13). Specific project guidelines are issued once a decision has been made to proceed (See Appendix III).

the provincial legislature. The assessment process itself therefore has been tested in a public forum. In Manitoba, the process has been implemented not by legislation but by a Cabinet Order. It has been observed by Teclaff, who undertook to investigate environmental assessment practices in a number of countries, that processes which had their basis in law were much more authoritative and effective in achieving objectives than were those which were implemented by 'the best ad hoc arrangements' (Teclaff, 1976, p.326). With respect to the Manitoba Environmental Assessment and Review Process, its effectiveness in achieving the stated objectives may be limited as Cabinet policy dictates the policy obligation to a proponent agency, at a specific point in time. There is considerable administrative discretion in the Manitoba process.

The effectiveness of the assessment process is also dependent, to a certain degree, on the ability of the process to address the inter-relationships of the environment, used in the broadest sense of the term (Fox, 1976: p.753). The Manitoba definition of the term "environment" is not as comprehensive as the Ontario definition or the concepts developed by the Alberta Environmental Impact Assessment Guidelines (Alberta, 1972). With this in mind, then, the effectiveness of the Manitoba process would be limited to the narrow interpretation of "environment" as

air, water and soil, and excluding social and community aspects from investigation.

This is indeed the case. The Honourable S. Green in his statement to the Provincial Legislature regarding the requirement for an environmental impact assessment for all major Provincial projects and the government review of the assessment statement indicated that this narrower interpretation was the rule. He stated,

The Environmental Protection Branch of this government is concerned with pollutants, contaminants to the air, land or water. The environmental statement that will be required with regards to government projects or public projects related to contaminants. Now I know that the honourable member would want it to relate to aesthetics, would want it to relate to space, would want it to relate to all of the aspects of the environment which this department is not involved in, which perhaps he would like us to be involved in but which I have repeatedly told him we have no intention of building an empire on. (Manitoba, Legislative Assembly, Debates, March 4, 1976, p.635).

The representation in the Agency and the reliance on the Department of Mines, Resources and Environmental Management and the Clean Environment Act (S.M., 1972) for expertise reflects not only a narrow interpretation of 'environment' but also an agency which is regulatory in nature and to a degree, mission-oriented.⁴⁸ The effectiveness of the

⁴⁸As indicated by the Mines Division within the Department.

Manitoba E.A.R.P. as an agent in the land and natural resources planning process will be limited to a somewhat inflexible, regulatory function which is likely to have a low priority over the other legislative obligations of the agency.⁴⁹

A broad base of participation, external to the proponent, is limited in most of the Provinces. In Ontario, the environmental assessment report could be prepared and submitted to the Ministry of the Environment before any formal notification is made to the public or even other agencies. Alberta is somewhat more organized in this respect in that once the draft environmental impact assessment is submitted, it is automatically distributed to a number of agencies. It must be noted, however, that in both of these provincial review processes, the involvement of external agencies and the public is strongly promoted.

In Manitoba, a similar situation exists. There is no formal procedure in the E.A.R.P. for external involvement, other than through the ministries represented on the Environmental Assessment Agency, or directly to the Minister, or through public hearings, which are discretionary. This will

⁴⁹ For example, the Environmental Management Branch provides research and enforcement support to the Clean Environment Commission. It would not be unreasonable to assume that the requirements of the Commission and the Clean Environment Act would have certain priorities over the E.A.R.P.

limit the effectiveness of the Manitoba process as an aid to the project planning process, particularly in the identification of major issues and the integration with more comprehensive levels of planning.⁵⁰

There are a number of important points which may be observed from the above discussion and definitions. Briefly, these are as follows,

- a) The environmental assessment process requires a thorough investigation of a project before firm commitments are made,
- b) the use of an inter-disciplinary study team is a pre-requisite,
- c) in order to communicate information effectively, the methods and approaches must exhibit a high degree of openness and flexibility,
- d) the "burden of proof" as to the effects of project development on the environments, and the determination of remedial and mitigating measures rests firmly with the proponent.

⁵⁰The question here is not one of advocating public involvement on a large scale. The question is that if the environmental assessment process is to be an aid to the decision-making process, there must be an exchange of information between the various sectors and integration with other policy objectives. This notion has been discussed extensively in the literature; for example, Allison (1975), Gertler (1972) and others.

- e) Furthermore, the process attempts to identify the tangible and intangible benefits and costs which are directly related to a proposed action.

In conclusion, the responsible environmental assessment agency must have the credibility and the authority in order to address the many and inter-related facets of the environment. The environmental assessment process, as a function of the decision-making process, must reflect an appreciation of the politics and policies of the government and the community which it represents. It must be concerned with existing laws and regulations and must exhibit a professional appreciation of the planning process and the nature and scope of the problem to be addressed.

Environmental Assessment Methodologies

In response to the requirement to consider environmental matters in project development, a large number and wide variety of methodologies have been proposed to assist in the assessment process. These methods attempt to provide a better understanding about and measure of the indirect, more subtle consequences of the environment, of project planning and development. These "intangible" elements of resource utilization have historically been considered a non-measurable part of project evaluation, (Coomber, Biswas,

1973, p.1) which were either ignored or addressed on a presence-or-absence basis (Shelton, 1968, p.17). However, this is no longer acceptable, since it ignores the true social-environmental costs and benefits associated with resource development (Kneese, 1968, p.188-190) and because of the new legislative requirements.

The traditional evaluation methods such as Cost-Benefit Analysis, while still valid tools for evaluation, are limited. Conceptually, the Cost-Benefit Analysis is in effect an accounting ledger where the benefits are added on one side and the costs on the other side. Thus, variables which are not easily quantifiable cannot be included. A similar observation has been made by the Environmental Protection Board,

The Benefit-Cost Analysis was recognized as one important tool in the decision-making process, and that such an analysis could be required in certain circumstances. In other cases, multi-objective evaluations (such as the Leopold Method) might give better guidance for rational decisions. In effect less faith was demonstrated in the Benefit-Cost Analysis to include intangible items than in some other methods now available (Environmental Protection Board, 1973, p.54).

Of concern then, is the evaluation of the physical, biotic and cultural variables of a region, and the nature and probable changes attached to various alternative courses of project and plan development. However, due to the fact

that much of the research and development is relatively recent and on-going, the approaches are less precise when compared to those of the so-called "hard" sciences. Because of this lack of refinement, no Canadian environmental agency or review board has become "locked into" a particular method.⁵¹

Five broad categories of methods may be identified as follows: Ad Hoc Committee, Checklist, Map Overlay, Network Analysis, and Systems Analysis. However, it must be noted that these categories are not to be considered conceptually distinct. Characteristics from one method can and have been used with or incorporated into another. A Map Overlay Approach could use both a Checklist and an "Ad Hoc" Committee Approach to list and evaluate parameters.

Ad Hoc Committee Approach

The "Ad Hoc" Committee approach is the oldest, and by today's standards, the crudest technique for environmental assessments (Warner, Bromley, 1974, p.3). It often takes the form of a task force, or panel of experts which have been assembled on a project or single purpose basis. Each expert is assigned the task of preparing an analysis of

⁵¹The Manitoba E.A.R.P. does require an application (modified) of the Leopold Matrix as part of the project screening to determine if the project should be subject to an environmental assessment. However, no specific method is designated once it has been decided to proceed with the assessment process.

environmental impact for his particular discipline such as hydrology, air emissions and noise pollution. The separate reports are then assembled as distinct sections in an overall final report. A summary or overview is prepared by the Chairman of the Task Force.

The "Ad Hoc"Committee is very often applied in conjunction with the principles of a controlled information feedback system or "Delphi Panel" (Dalkney, 1969). Although this procedure gained prominence in forecasting technological events, it has proven to be flexible and effective in certain types of planning and policy research (Smil, 1974). The method is, however, open to misuse and manipulation. The credibility of the approach is very dependent on the credibility of the individual task force which is conducting the study.

Checklist Approach

The checklist approaches list the types of impact that would normally be associated with a particular type of project. From this list, a study team would select and evaluate those impacts which have a high probability of occurring. Drobney and Smith (1973) have identified three levels of sophistication. The first is a simple checklist of parameters such as the so-called "Leopold Matrix Approach" (Leopold et.al., 1971). The second is a checklist of parameters plus a framework for

integrating parameter values into a summary value. The third and most sophisticated checklist approach consists of a parameter set plus criteria for defining the magnitude of impact or the significance of impact, and the means of integrating these individual values into a total impact value. The Battelle Environmental Evaluation System (Dee, et.al., 1972) is considered as representative of the third level.

Map Overlay Approaches

The Map Overlay Approach is a well-known and well-documented technique which has been developed primarily by the planning and landscape architectural professions in both the United Kingdom and North America as an aid in project or plan design. Often the overlay procedures such as used by Lacate (Lacate, 1970), do not consider man's intervention upon the environment. The techniques of McHarg (1971) and Lewis (1964, 1962) however, make a significant attempt to consider and relate project effects on the environment, and environmental constraints to the final design. McHarg states,

I believe that ecology provides the single, indispensable basis for landscape architecture and regional planning (McHarg, 1967, p.105).

and continues in his book, Design with Nature,

As we contemplate the squalid city and the pathetic subdivision, suitcase agriculture and ... we fervently hope that there is another way. There is. The ecological view is the essential component... (McHarg, 1971, p.29).

Phillip Lewis also recognizes the need to synthesize "the paths of human spirit" with the elements of the "real landscape". He states that his goal is,

to identify, preserve and enhance the most outstanding intrinsic values and to determine that man-made values are developed in harmony with these natural 'intrinsic quality resources' (Lewis, 1962).

The approaches of Lewis and McHarg, while not developed strictly for the purposes of environmental assessment, have had a substantial influence on the procedures which have evolved. This observation is reinforced by the relatively large number of applications, using manual and computerized data banks in both Canada and the United States.

Network Analysis Approach

The original notion of network analysis, as applied to environmental assessment, incorporated a cause-condition-effect concept. Sorensen (1971) structured these principles into a series of linear, stepped matrices which related proposed (or possible) development to environmental effects. Uses, which are defined on the basis of resource conflicts, are identified. Causal factors, or forces of change,

associated with a Use are defined. Possible adverse impacts are identified on the basis of initial condition, consequent condition and effect. Specific remedial or mitigating actions for each cause-condition-effect relationship are described and evaluated. Perhaps the most significant contribution of Sorensen's research is the clear and definite identification of cause-effect relationships and their remedial or mitigation criteria.

Systems Analysis

The Systems Analysis approach is used by many disciplines including engineering (Wisner, 1976), geography (Crowley, 1971), (Dansereau, 1976), planning (Dorney, 1973), resource management (Hills, 1960, 1961, 1976), economics (Hite, Laurent, 1972) and ecology (Walden, Griffiths, 1974) to resolve environmental problems. Essentially, it is a process by which the immensely complex and dynamic total environment (Hills, et.al., 1970, p.41-44), (Hills, 1960, p.406) is dissected into manageable components for the purposes of analysis. The main concern and interest is, however, with the control and support mechanisms of the holistic system,

The relationship among variables must be identified and these relationships built up into the systems operating on the site (Plantown Consultants Ltd., 1974, p.A-VIII-42).

There are four basic steps involved in the systems approach,

- a) precisely state the objectives which will be required to solve the problem;
- b) identify the possible methods that might be helpful in achieving the objective(s);
- c) select the best method and design an algorithm for analysis; collect the information which is necessary to satisfy the algorithm;
- d) proceed through the framework and construct the best solution.

A systems approach can employ either an analytical model, such as dynamic programming, or a simulation model. However, the latter is often the only means available, as Hufschmidt concluded,

Systems analysts have turned to simulation because it is often the only way to effectively deal with large and complex systems that defy analytical solution.. (Hufschmidt, 1965, p.566).

Simulation models, by the analysis of a large number of variables over time, attempt to reproduce the character of a particular system, "without actually achieving reality," (Hufschmidt, 1965, p.566).

There have been a number of attempts to establish a large-scale environmental model in order to evaluate regional resource and land use decisions (Lyle, von Wodtke, 1974, p.395). The publication, Limits to Growth (Meadows et.al., 1972) was

an ambitious attempt to prepare a "world simulation model" in order to '...understand the varied but interdependent components...'. .

The systems approach and simulation models offer a great potential as tools in our evaluation of large, complex environmental systems. This is particularly so in light of the requirements for environmental assessment as set out in legislation, regulations and guidelines. However, the results will be only as good as the information available (Cooper, 1968, p.47) and our understanding of the total system.

CHAPTER V
AN APPLICATION OF ENVIRONMENTAL ASSESSMENT
TO PROJECT PLANNING

Introduction

Project Considerations and Constraints

Legal and Regulatory Considerations

Technical Considerations

Internal Administrative Considerations

External Reviews

Policy Considerations

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CHAPTER V
AN APPLICATION OF ENVIRONMENTAL ASSESSMENT
TO PROJECT PLANNING

Introduction

Manitoba Hydro is the major producer and distributor of electrical energy in the Province of Manitoba. The utility was established as a Crown Corporation in 1951, and operates according to the Manitoba Hydro Electric Board Act (S.M., 1961, (1st Section), c.28). Briefly stated, the primary objective of the Corporation is to supply firm electrical power to the people of Manitoba at cost. Thus, it has been the policy of the Corporation to maintain sufficient capacity on its system to totally meet the demand for generation capacity at its peak value, and to maintain firm generation on its own system without relying on sources outside of the Provincial Integrated Grid System.⁵² The main exceptions have been the purchases of small blocks of power, (1) to meet electrical loads during system faults and (2), to defer the requirement of new generation

⁵²The Provincial Integrated Grid System includes both the Manitoba Hydro and Winnipeg Hydro systems. The latter is an independent utility which supplies power to portions of the City of Winnipeg, but is operated in conjunction with the overall needs of the Provincial system.

facilities.⁵³

Electrical energy is obtained from a variety of sources. As Table 5.1 indicates, most of this energy originates from hydraulic generating facilities, with other sources including thermal, diesel, and imports from the Provinces of Ontario and Saskatchewan, and the United States. It must be noted, however, that the ratio of hydraulic generation to other generation sources may vary from year to year, depending on the availability of water supplies. For example, in 1975-1976, hydraulic generation accounted for about 96.1% of the total energy generated.⁵⁴ However, in 1976-1977, a period of low rainfall conditions and associated low water levels, hydraulic generation accounted for 89% of total generation. This represents a total decrease of 7% between 1976 and 1977.

Future generation for the Provincial Integrated Grid System is oriented towards the expansion of hydraulic capacity on the Churchill-Nelson River System.⁵⁵ If the present development programs continue, there will be 1106 megawatts of additional installed capacity on this river system by 1980. In total, it has been estimated that the Province of

⁵³ Interview with Mr. L. E. Poyser, Manager, Environmental Services Department, October 12, 1976.

⁵⁴ Manitoba Hydro Electric Board, 25th Annual Report for the Year ended March 31, 1976, p.8.

⁵⁵ Includes Churchill and Burntwood River diversions.

Manitoba will require approximately 4,500 megawatts of installed capacity by 1990 (Department of Energy, Mines and Resources, 1976, p.68).

TABLE 2
SOURCE OF MANITOBA ELECTRICAL ENERGY SUPPLY

SOURCE OF POWER	1976	1977
<u>Integrated Grid</u>		
Hydraulic	14,250*	12,078*
Thermal	586	1,489
<u>Other</u>		
Diesel	53	53
Hudson's Bay Mining & Smelting	27	87
<u>Imports</u>		
Ontario Hydro	3	-
Saskatchewan Power Corporation	4	3
United States	27	528

*Energy in millions of kilowatt hours.

Source: The Manitoba Hydro Electric Board 25th Annual Report for the Year Ending March 31, 1976, p.3.

The Manitoba Hydro Electric Board 26th Annual Report for the Year Ending March 31, 1977

The major point established from the above is that the Manitoba Hydro electrical system is almost totally dependent

upon hydraulic capacity, and will continue to be so in the foreseeable future. In such a system, energy can not be stored for future use.⁵⁶ The energy capacity must be used when it is available. If the capacity is not used, then the water must be 'spilled' over the dam, and therefore, is no longer available for electrical generating purposes. Since the normal practice of Manitoba Hydro is to design for the worst case situation - i.e., lowest water flows, the Province is likely to have a surplus of capacity at any given point in time. Moreover, the Manitoba Hydro system is designed to meet a winter peak demand load, and consequently there is an excess capacity during the summer period.

In the United States, the power utilities which operate in the mid-western states have a somewhat different electrical generating system. The electrical generation is derived primarily from thermal sources and is designed to meet a summer peak load situation. Therefore, a transmission interconnection between the Manitoba Integrated Grid System and the American systems which is based on capacity and seasonal diversity exchanges has certain obvious advantages to both electrical systems. These are: the deferment of expenditures for new plants, increased systems security and new revenue generated through

⁵⁶As compared to a coal-fired thermal generating plant where the fuel can be stockpiled for later use.

the sales of surplus energy by both Manitoba Hydro and the American utilities.⁵⁷

In 1976, Manitoba Hydro signed an Interconnection Agreement with the Northern States Power Company (N.S.P.) of Minnesota to construct and operate an extra-high voltage (E.H.V.) transmission line from the Dorsey Transformer Converter Station (near Rosser, Manitoba), via the proposed Riel Transformer Station (Near Deacon, Manitoba), to cross the International Boundary between Longitude 95 degrees 29 minutes 45 seconds, West, and Longitude 95 degree 42 minutes 12 seconds, West. From this border location, the Northern States Power Company would construct a transmission line to Minneapolis (See Figure 7).

This agreement forms part of an on-going policy program of Manitoba Hydro to establish energy interconnections with other electrical utilities. At the present time, there are two such interconnections with the Saskatchewan Power Corporation, two with Ontario Hydro, one with N.S.P. (1969) and one with the Minnesota Power and Light Company (1976). These transmission facilities operate at 230,000 volts.

⁵⁷For the purposes of this thesis, it has been considered necessary to provide a brief outline of the Manitoba Hydro system and the background for the exchange of electrical energy. If further details are required the reader is referred to Guidelines for Inter-Utility Energy Exchange Agreements by G. Spafford, L. P. Haberman, D. A. Young (October, 1976), or such comprehensive studies as Perspective on Power, (Berlin, Cicchetti, Gillen, 1974).

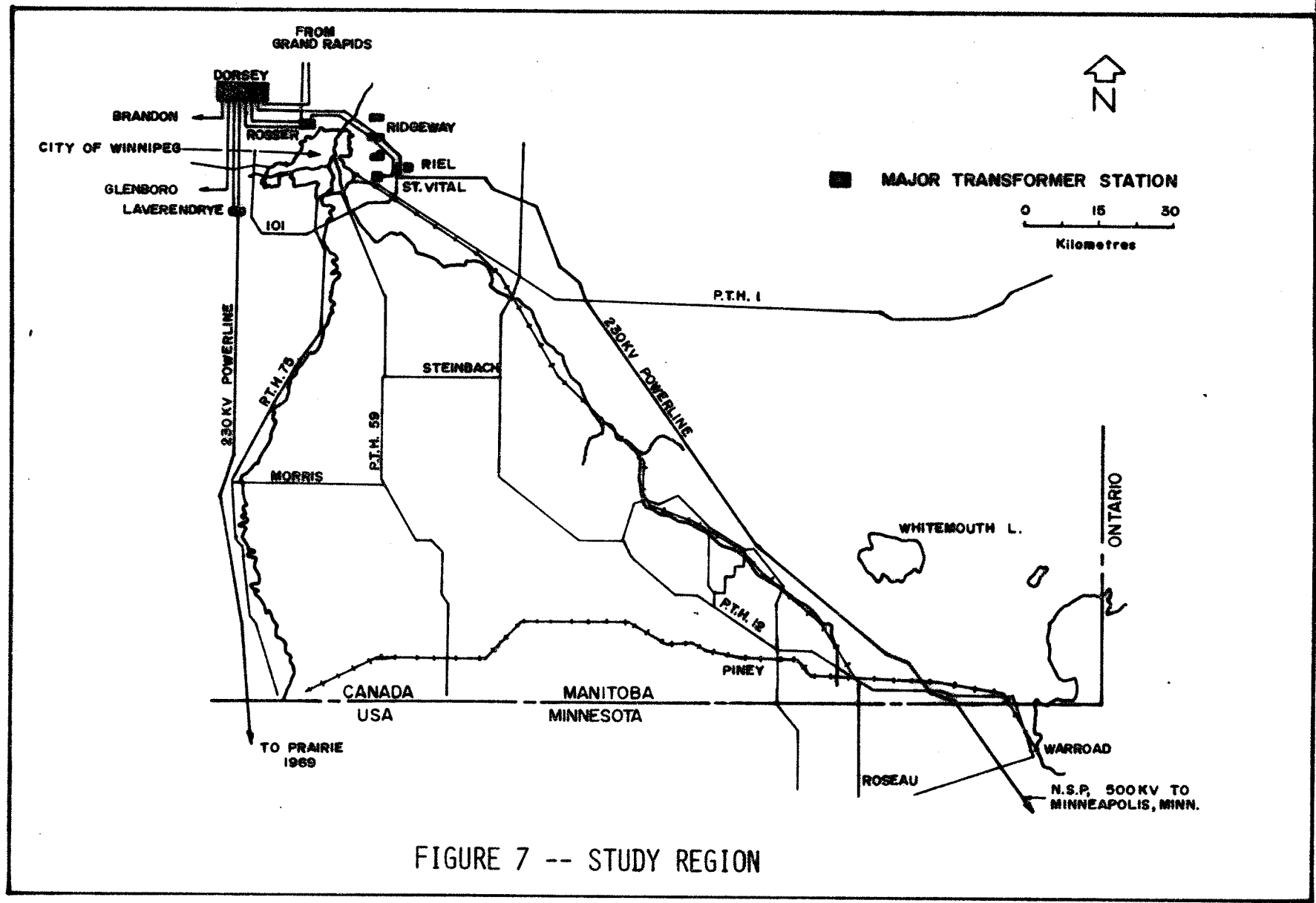


FIGURE 7 -- STUDY REGION

Provincial Cabinet approval in principle was given for the proposed E.H.V. interconnection by Order-in-Council No. 841-76.

Project Considerations and Constraints

Legal and Regulatory Considerations

The agreement between Manitoba Hydro and N.S.P., because it involved an international energy exchange commitment, was subject to the review and approval of the National Energy Board, under the authority of the National Energy Board Act (Can. Stat 1959, c.46). Historically, the Board has been concerned only with the technical and economic matters of such agreements.⁵⁸ However, with the rise of Federal involvement in environmental matters⁵⁹ the Board prescribed the requirement for an environmental assessment of all international power lines in excess of 50,000 volts⁶⁰ (National Energy Board Act, Can. Stat. s.44(a)), before a Certificate of Public Necessity and Convenience would be approved and issued. In July, 1974, a set of environmental assessment guidelines was issued by the Board to assist

⁵⁸For example, reference can be made to the Manitoba Hydro-N.S.P. energy exchange application to the N.E.B. in 1969.

⁵⁹Above, p. 54.

⁶⁰Power lines of 50,000 volts or less may be excluded from the environmental assessment requirement upon application to the Board.

proponents in the preparation of the assessment.⁶¹

This transmission line was not subject to the Federal Environmental Assessment and Review Process because,

- a) it had not been initiated by a Federal agency,
- b) it did not involve Federal lands,
- c) no Federal monies were involved, and
- d) there is no legislative or regulatory link between the Environment Canada procedures and the National Energy Board.⁶²

This initiative by the N.E.B. quite clearly has its origin in the constitutional study by MacNeil (1971) and in certain precedents which were established by the Canada Water Act (1970). First, MacNeil identified the environmental jurisdictional scenario relating to international matters (MacNeil, 1971, p.175). Secondly, and most important, the Canada Water Act (1970) set the background for Federal initiative on environmental matters which were of clear Federal jurisdiction or where there was a Provincial/Federal jurisdictional conflict. Thus, the N.E.B. environmental

⁶¹See Appendix II.

⁶²Regulatory agencies were excluded from the policy statement of December 20, 1973 (Above, p. 53).

assessment requirement is limited to international power lines only. However, this Federal initiative, in an area of potential conflict of jurisdiction, is open to challenge by the Province involved.⁶³

The N.E.B. environmental guidelines are quite explicit. First, a study area extending one kilometer to either side of the proposed power line alignment must be described in terms of a set of specified, environmental criteria. Next, the proposed facility is tested against the environmental criteria, on the basis of certain environmental standards in order to determine the environmental impact and to establish the appropriate remedial and mitigating measures. Alternatives to the proposed action must also be considered, although a "without" project alternative is not specified, as is required by the United States Procedures (N.E.P.A., 1969). Public participation in the assessment process is not a requisite of the guidelines, although "applications to and decisions by public bodies" must be included in a final environmental assessment document which is to be prepared and submitted to the Board.

Provincial Considerations

In the siting of a transmission line in Manitoba, a

⁶³Indeed, Manitoba Hydro is at present challenging the authority of the National Energy Board on this matter.

variety of Provincial legislation and a number of regulations need to be considered. However, for the purposes of this discussion only, the more significant ones relating to land use, resource management, land ownership and environmental pollution are mentioned. Briefly, these are,

- . The Clean Environment Act (1972,1974,1976)
- . The Manitoba Environmental Assessment and Review Agency
- . The Planning Act (1975)
- . The City of Winnipeg Act (1972)

Furthermore, a number of municipal considerations relating primarily to future land use planning were relevant to the study design.

In terms of the construction, operation and maintenance of the proposed transmission line, The Clean Environment Act (1972) is relevant. However, since the emphasis of this Act is on the regulation of contaminants, the most direct evidence of its applicability occurs somewhat later in the project development program - i.e., specific design and construction criteria. In terms of siting, the Act has relevance primarily in terms of providing advance guidance to the environmental regulations and standards which should be considered early in the project planning process. This might include such things as the methods of fuel storage, of right-of-way clearance, of ozone and other gaseous emissions and of the use of herbicides for right-of-way maintenance.

The Manitoba Environmental Assessment and Review Agency requires that transmission lines of 230,000 volts or more be subjected to an environmental assessment which is to be submitted to the Agency for review (Manitoba, 1976, p.14). On November 26, 1976 a set of guidelines was issued by the Agency (Appendix III). These broad, comprehensive guidelines catalogue the environmental variables to be assessed and the nature of the impacts to be identified and evaluated. In content, they are very similar to the guidelines issued by the National Energy Board. The Manitoba E.A.R.A. are, however, considerably more specific in terms of the identification of environmental impacts and mitigating measures. An important item to note from a review of the guidelines is the wide spectrum of subject matter. It includes not only the air, water and soil, but also the cultural and social factors of the environment.

The siting of a transmission line, particularly in the more densely settled areas of southern Manitoba, requires that consideration be given to the Provincial Planning Act (S.M., 1975). The following reasons support the requirement. First, the linear nature of an electric transmission facility creates property severances. Since Manitoba Hydro intended to purchase the right-of-way,⁶⁴ the potential for creating

⁶⁴As compared to a land lease policy of previous years.

separate property parcels, under separate title, existed. This could influence future land use patterns in a number of ways. The most important of these is that the severed parcels could be sold and used as building lots, resulting in the loss of agricultural lands and the creation of servicing problems. Such occurrences would be contrary to the zoning policies of some of the rural municipalities.⁶⁵

Secondly, the size of the proposed facility would have certain effects on the aesthetics and social aspects of the area. Thirdly, The Planning Act (1975) includes transmission lines within its definition (S.M., 1975, c.29, s.1(d)). Finally, the National Energy Board guidelines specify the need to consider present and future land use when assessing the impact of the proposed transmission line (Section 6(c) (ii)).

The Planning Act (1975) was passed by the Provincial Legislature on July 19, 1975 and proclaimed into law on January 1, 1976. The Act is a comprehensive land use planning statute which has two basic concepts. These are,

- a) to decentralize planning and decision-making to the local level through the development plan process, and

⁶⁵ Many of the rural municipalities have zoning designations of A40 and A160, which in essence restrict the creation of separate titles for property parcels consisting of less than 40 acres, for uses other than those of an agricultural nature.

- b) to co-ordinate and expedite the planning effort at the provincial level.⁶⁶

In order to achieve this co-ordination and expediting function, provision was made in The Planning Act for the creation, by the government, of the Interdepartmental Planning Board (S.M., 1975, c.29, s.11). A second co-ordinating body, the Provincial Land Use Committee of Cabinet, a Cabinet sub-committee, assists in co-ordinating provincial land use and resource policies and planning initiatives.

The Interdepartmental Planning Board (I.P.B.) was established essentially as a central administrative group which is to monitor and co-ordinate land use and resource development activities in Manitoba. Specifically, the I.P.B. is to,

advise and assist any public authority in the planning and regulation of use and development of land and co-ordinate the major land use planning activities of such public authorities (S.M., 1975, c.29, s.11(b)).

The Board is comprised of staff positions, usually deputy-ministers, from fourteen provincial departments or agencies, all of which are involved to varying degrees with land use and natural resource management. Staff support is provided to I.P.B. through the Provincial Planning Branch of

⁶⁶ Interview with D. Johns and S. Scrafield, Inter-departmental Planning Board, Winnipeg, February 13, 1978.

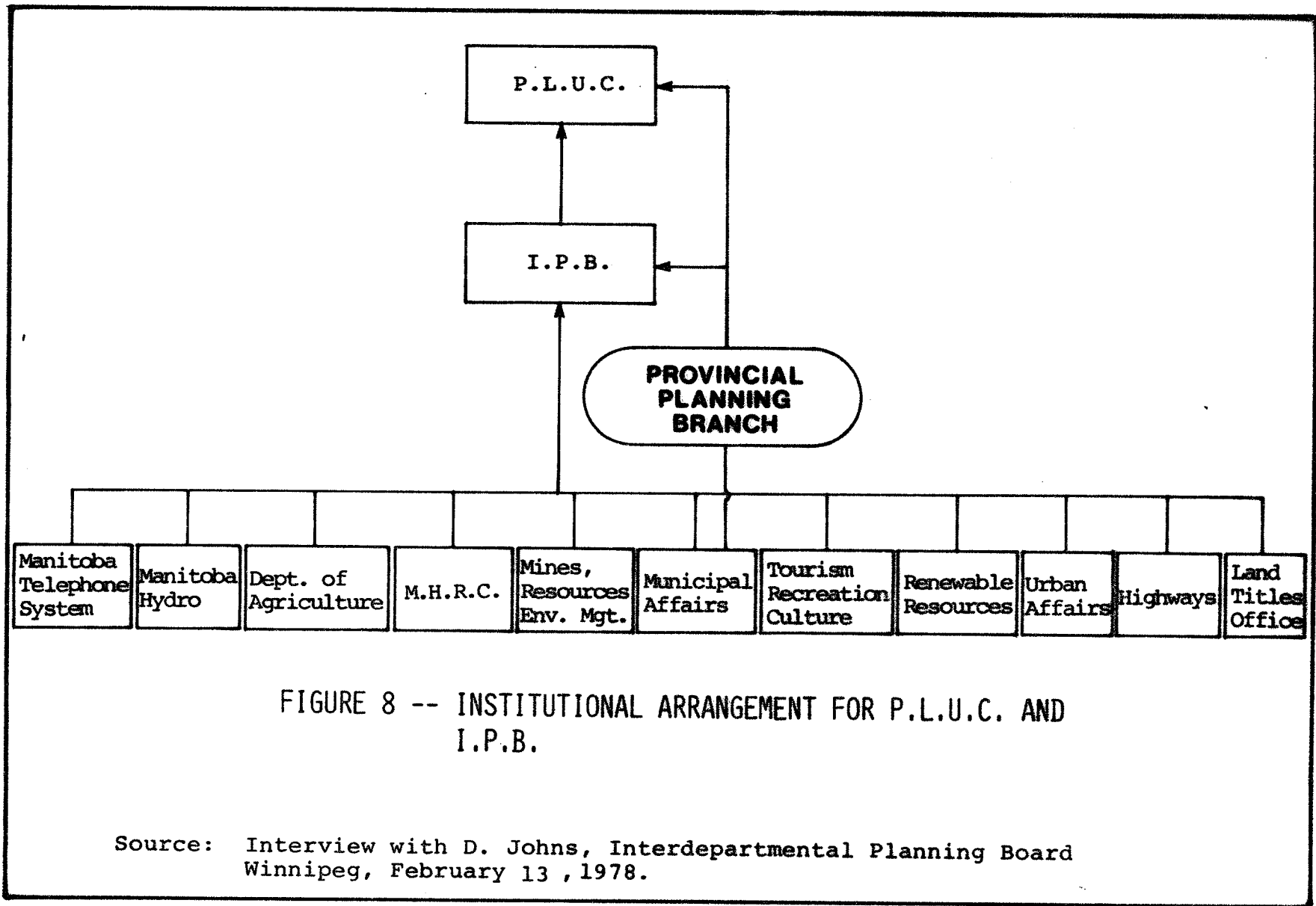
the Department of Municipal Affairs. An important task of the Board has been to provide a forum within which land use conflicts between departments could be resolved and supportive programs could be co-ordinated. Problems which can not be resolved through the Board are referred to the Provincial Land Use Committee of Cabinet, which is the senior level of decision-making on planning matters.

The Provincial Land Use Committee of Cabinet (P.L.U.C.) is comprised of Cabinet Ministers who are to ensure that provincial land use policies are consistently followed. While the major planning function of P.L.U.C. is to review municipal development plans, the Committee has proved useful in resolving interdepartmental conflicts over land use and resource development. Staff support is provided by the Provincial Planning Branch.

The institutional arrangement for P.L.U.C. and the I.P.B. is shown on Figure 8.

In summary, through the P.L.U.C. and the I.P.B., The Planning Act (S.M., 1975) offers a broad forum for review by the administrative agencies of the central government and also, at the political level of evaluation, of land use and resource-related planning projects and programs.

It was necessary to consider the City of Winnipeg Act (S.M., 1972) because there was a possibility that the transmission route might be located within the 'Additional Zone'



of the City. This Additional Zone was created primarily for planning purposes (S.M., 1972). Essentially, it extends the influence of the City of Winnipeg about five miles beyond the municipal boundary. Within this area, the City of Winnipeg has a major role on land use planning and development matters.

Technical Considerations and Limitations

Technical and electrical systems studies which were undertaken by Manitoba Hydro determined that the power line should operate at 500,000 volts alternating current and would require one circuit. Right-of-way requirements for this type of facility are two hundred and fifty feet. However, since future bulk transmission in the Province will be at the 500 kV level it was decided by Manitoba Hydro to incorporate future right-of-way requirements in the international power line studies.

Future bulk power transmission considerations include the following:

- . the construction of a new, major transformer station near the Deacon Reservoir, southeast of the City of Winnipeg. This is referred to as the Riel Station;
- . the need to interconnect the proposed Riel Station with the

existing Dorsey Transformer-Converter Station located near Rosser, Manitoba (northwest of Winnipeg). This requirement would include first, the construction of two 500 kV single circuit power lines north of Winnipeg⁶⁷, and later, two 500 kV circuits to the south and west of Winnipeg;

- . inter-connection requirements with future generation along the Winnipeg River, at 500 kV;
- . inter-provincial electric system connections with Ontario Hydro.

On the basis of these studies, it was concluded that a new right-of-way was required for the 500 kV power lines instead of up-grading existing rights-of-way. Additionally, certain technical specifications were established.⁶⁸

Engineering alternatives such as underground facilities and direct current transmission were rejected at this time (Manitoba Hydro, 1976, p.7).

Internal Administrative Considerations

Manitoba Hydro, like most large corporations, is

⁶⁷This is referred to as the 'North Loop'.

⁶⁸For details on technical considerations, reference should be made to Appendix IV.

organized according to various Divisions and Departments. Each of these components operates to fulfill certain specific functions within the organization. However, no single group within the corporate structure had the necessary resources to carry out a study which had to address the range of topics outlined by the guidelines of the National Energy Board or the Environmental Assessment and Review Agency. The Systems Planning Division within Manitoba Hydro did have the responsibility and authority to ensure that all of the requirements for the export license application, including the Certificate of Public Necessity and Convenience, were fulfilled.

Accordingly, a special project task force chaired by a representative from the Systems Planning Division and supported by various other departments involved in transmission planning was created. Although the utility has had considerable experience and expertise in constructing power lines, it had only a small group assigned to address environmental matters - the Environmental Services Department. Therefore, because of the wide range of matters to be considered and documented, Manitoba Hydro retained the services of an outside consultant who reported to the chairman of the task force.

Such an organizational approach has certain advantages to the proponent and the study program. First and foremost,

it offered an interdisciplinary, multidisciplinary approach. Secondly, it established one group which could focus its attention on the project and thus act as a credible spokesman for Manitoba Hydro in its dealings with external groups. In addition, the task force approach provides continuity to the study program as it progresses through each succeeding stage.

The major difficulty encountered in a task force such as this in a corporation like Manitoba Hydro is to educate the various individuals in the land use planning and environmental assessment process. It must be remembered that the individual members of the project study team came from specialist, mission-oriented sectors of the corporation. Therefore, problems similar to those discussed in Chapter 2 with regard to government departments are evident. It is essential, then, that a project task force of this nature have clearly defined terms-of-reference, and a strong mandate from the executive.

External Reviews

Historically, Manitoba Hydro has had little need to include agencies and organizations external to the utility in the planning for transmission routes. The Manitoba Hydro Electric Board Act (S.M., 1961) gives the utility a rather broad mandate to achieve its objective of supplying energy, at the lowest cost, to the Province. The Act reads:

The intent, purpose, and object of this Act is to provide for the continuance of a supply of power, adequate for the needs of the province, and to promote economy and efficiency in the generation, distribution, supply and use of power. (Stat., Man., 1961, c.28, s.3).

In the past, the normal procedure has been to establish a route based primarily on transmission design and efficiency parameters, as well as on specific property considerations. Once the route had been established by the Manitoba Hydro transmission planning groups, the proposed alignment was distributed by the utility to other Provincial agencies, such as the Crown Lands Branch and the Manitoba Telephone Service. Federal agencies were included on an 'as required' basis. For example, if the proposed alignment was in close proximity to a licensed aerodrome, Transport Canada would be asked for comment.

Once the reviews were completed and the comments were received, they were evaluated by the transmission planning groups. Essential modifications would then be made to the alignment or facility design. Once the route had gained general acceptance, both within Manitoba Hydro and by other government agencies, the utility advised the individual councils of the municipalities in which the power line was to be located. Subsequently, the individual property owners were contacted and told of the utility's intentions to acquire property for the right-of-way. Up until this point,

the individual property owners had no formal knowledge of the proposed transmission line. The planning process had, by this stage, progressed to the point where the owner either acquiesced or faced expropriation. Indeed, the need for the power line and its location was well established before the proposed alignment was submitted to the other provincial departments and agencies. There was only very limited involvement outside of Manitoba Hydro in the transmission planning process and there was virtually no opportunity to change a proposed alignment other than for technical or regulatory reasons.⁶⁹

For many years, this rather ad. hoc. process to transmission line routing was generally well accepted. Indeed it has been suggested that people welcomed power lines because of the advantages that electrification brought to rural life.⁷⁰ The evidence suggests, however, that a change away from the traditional approach is required. The trend towards a broader involvement is now evident.

Provincial agencies and departments, public groups and individuals can make a contribution to the environmental

⁶⁹ It is unlikely that technical or regulatory reasons have resulted in any major changes of alignment or the rejection of a route. The transmission planning groups would consider these factors in the normal course of the design process.

⁷⁰ J. Funnell, Manitoba Hydro, Presentation to ECON'77, Winnipeg, November 24, 1977.

assessment process. However, neither the National Energy Board Act (1959) nor the Board's guidelines of July, 1974 specify the need for a public involvement program. The guidelines do require that the applicant for a Certificate of Public Necessity and Convenience submit documentation on all applications to and decisions by other reviewing bodies. The only method for formal involvement by outside groups is by participation as an intervenor at the public hearings which the Board convenes to review the proponent's application (Rev. Stat. Can., 1969-1970, c.65, s.20(i)). Before an intervention is allowed, the intervening party must establish standing on the matters before the Board.⁷¹

At the Provincial level, once again, public participation in the broadest sense of the term is not a formal requirement of the assessment process. A public hearing is the provision for public involvement and review,

Public hearings may be initiated by the Minister of Mines, Resources and Environmental Management through the Environmental Assessment Review Agency or the Clean

⁷¹The Board, as indicated by the Manitoba Hydro hearings in Winnipeg (January, 1976) and the more recent Hydro Quebec hearings in Montreal (June, 1976) has interpreted this stipulation quite broadly. During the hearings in Winnipeg, the Board recognized several intervening groups who were not property owners along the proposed route and who were not directly affected by the location of the transmission line. The Board thus reinforced the need to consider outside groups in the environmental assessment process and to gain the approval of provincial departments and municipal councils.

Environment Commission prior to any decision to permit, modify or disallow a proposed project (Manitoba, July, 1976, p.6).

The Minister also has certain procedural duties which introduce the project to external review (Manitoba, July, 1976, p.5).

The proponent is, however, encouraged to include the public in the environmental assessment program :

Since public participation may be considered essential to the environmental assessment, the proponent may elect to introduce citizen involvement in the initial stages of the environmental assessment. Specific public concerns, constructive criticism, recommendations and reviews would then be available for inclusion in the 'Environmental Impact Statement.' (Manitoba, July, 1976, p.6).

Thus, the public, and more significantly, those people directly affected by a project in Manitoba may have an opportunity to participate in the decision-making process, but this is at the discretion of the project proponent. What has occurred in Manitoba and most other provinces in the past, is that no provision for public involvement in the planning process has been made by the proponent. The formal public hearing has been the only forum provided for public discussion, e.g., the Solandt Hearings in Ontario, the recent N.E.B. - Manitoba Hydro hearings in Winnipeg (January, 1976).

There are several concerns over the reliance on public hearings, which in part relate to the adversary situation which is created between the intervenors and proponent. By the time a project reaches the hearing stage, many of the commitments have been made with the result that the final decision is either a "go" or a "no-go" situation. There is little room available for negotiation and discussion. Then too, many people do not have the time or financial resources to prepare for a formal hearing, or even to attend. Finally, by the time that the hearings are convened the proponent, if it is a major project, will very likely have expended considerable staff and financial resources on environmental, technical and pre-design studies. Politically, it may be very difficult to reject a project, particularly if there are no dominant issues.

The Manitoba Environmental Assessment and Review Agency offers a limited scope of external review since the administrative Agency is represented by only three Provincial departments - the Department of Mines, Resources and Environmental Management, the Department of Health and Social Services and the Department of Finance. The Environmental Management Division of Manitoba Hydro, in its capacity of providing staff review, offers a range of environment-related disciplines, but it does not include the social and land use aspects which were likely to be a major

issue in the area to be studied.

Consequently, Manitoba Hydro elected to submit the project to Provincial review through the Interdepartmental Planning Board process. Not only did this agency offer a wider sphere for review but it also included the Department of Mines, Resources and Environmental Management within its reviewing process. Thus, the E.A.R.A. was represented, albeit indirectly.

In Manitoba, the local municipal councils have an important role to play in matters relating to land use. All development plans must be adopted by by-law (Stat. Man. 1976, c.29, s.30). Thus although Manitoba Hydro is exempt from matters relating to subdivision control (Am. Stat. Man., 1976, c.51, s.60), the local councils play an important part in the gaining of public acceptance. Consequently, an external involvement program which included the local municipal councils and individual councillors was initiated by the utility.

Several special interest groups intervened on environmental matters at the National Energy Board hearings on the 230 kV application, in Winnipeg in January, 1976. The two more vocal groups were the Manitoba Environmental Council and the Manitoba Naturalist Society. The former group is an environmental advisory body to the Minister of the Department of Mines, Resources and Environmental

Management.⁷² Its membership is drawn from a wide range of organizations and agencies in the Province. The Manitoba Naturalist Society is a public organization of people drawn from across the community who have a common interest in the preservation of the natural environment.

Summary

In the design of the study process for the Manitoba Hydro environmental assessment, it was realized that some forum for external involvement was essential. Such a forum needed to fulfill the following basic objectives:

- . to provide information;
- . to identify concerns that might not normally be recognized by an isolated project planning group;
- . to seek constructive suggestions in the siting of the right-of-way;
- . to provide guidance in establishing resource priorities and community values, and finally;
- . to obtain formal approval of a preferred alignment out of a wider number of basically optimal solutions;

⁷²Clean Environment Act (S.M., 1972).

.. to gain approval from the National Energy Board.

There are several elements which relate to these objectives. Firstly, the external involvement program had to undertake to inform and to educate the outside agencies and groups on the criteria necessary to achieve a meaningful review, since transmission line planning is a complex task which had never before been outside of the control of the utility. Secondly, once Manitoba Hydro embarked on the program, it had to be prepared to accept the final decision, whether the utility agreed or not. Thirdly, the forum had to be open and flexible, not only to provide information, but also to obtain information from the external participants in the form of value judgements and specific environmental information.

Policy Considerations

The documentation of stated or implied public policies is perhaps one of the more difficult problems in any planning study. This is due to the fact that much of the information is un-written or, at the very least, unpublished. Moreover, public policy is subject to change over time. In the Province of Manitoba, the state of broad, comprehensive planning has not reached the point where regional resource planning goals can be fully realized. The traditional policy instruments have not been totally effective in dealing with

the multitude of existing and potential resource conflicts. In part, this is due to the historical, sectoral approach to resource management.

There has, however, been a significant attempt to overcome this problem. In the course of the past few years, a major, co-ordinated and comprehensive planning study has been undertaken by the Department of Municipal Affairs for the Winnipeg Region. This study, together with on-going studies, and discussions with the Provincial bureaucracy, provided certain rather broad policy guidelines for the Manitoba Hydro environmental assessment. In general, the policy guidelines related to:

- a) the need to preserve the Province's prime agricultural lands, particularly in the Red River Valley and in the vicinity of the City of Winnipeg;
- b) the need to minimize conflicts with existing and anticipated urban development, particularly to the north of the City of Winnipeg along the Red River;
- c) the need to minimize the disruption to resource extraction operations (eg. sand and gravel, forestry);
- d) the overall objective to preserve the cultural heritage of the Province including

outdoor recreation and to maintain a high quality of environment.

The Character of the Region (Geographic Considerations)

The area under study, although reasonably well-documented, is complex and, as such, poses a number of problems related to the assessment of a linear facility such as a 500,000 volt transmission line. In summary, these included:

- a) largely private ownership of land, particularly on the highly productive chernozemic soils of the Red River Plain. Land holdings for the most part, are based upon the Township and Range system, although a long lot pattern exists along the Red River and in St. Anne Parish;
- b) a flat, open landscape which creates a high visibility for a power line of this magnitude;
- c) an extreme pressure on the rural lands within 15 to 20 miles of the City of Winnipeg to provide, on a continuing basis, specialized and capital-intensive agricultural operations, active and passive recreation, land for residential and rural estate development, urban growth, other

- utility corridors (highways, pipelines, aqueducts, other power lines) and a pleasant, rural landscape;
- d) relatively few areas of high aesthetic, recreational or ecological value, thus giving an increased importance to these areas which do exhibit it, e.g., Bird's Hill Provincial Park;
 - e) the extensive land holdings by the Crown to the east, centred on the Sandilands Provincial Forest Reserve.

Scheduling Considerations

The planning and development of a transmission line involves eight basic stages. These are:

a) Preliminary Studies

At this stage, broadly based design and economic studies are undertaken to determine the overall viability and feasibility of the project. This stage may include obtaining political approval 'in principle'. Alternatives to the project are considered in terms of optimizing project design.⁷³

⁷³ Much has been written about the need to consider environmental matters at this stage. While conceptually this may be desirable, in reality it would appear, for transmission lines at least, that given our limited knowledge about environmental systems, such an evaluation would be extremely broad and accordingly difficult to define in terms of a specific project.

b) Siting Studies

This stage includes planning and environmental assessment, technical, economic and engineering design studies.

c) General Survey of Right-of-Way

Once a specific route is chosen from several alternatives, it is established by legal survey.

d) Property Acquisition

This stage includes obtaining permits to cross Crown Lands, the appraisal and purchase (or lease) of private property, and expropriation if required.

e) Right-of-Way Clearing

This is the first stage in the construction process. Once the right-of-way has been acquired, the right-of-way is cleared of trees in forested areas. The normal practice is to harvest the saleable timber, and then to 'clean-cut' according to the specified design requirements.

f) Construction

This stage involves a number of steps - the installation of tower footings, tower erection, conductor stringing, post-construction clean-up and final inspection.

g) Operation and Maintenance

Once the facility has been energized, the normal practice is to inspect the right-of-way every year. The right-of-way is maintained by the periodic clearing of trees which might interfere with the line, and brush control, either by mechanical means or the use of herbicides.

h) De-commissioning

At this stage, the facility is taken out of operation. However, transmission lines, because they have a long design life expectancy (50 years or more) are seldom taken out of service.

An Approach to Environmental Assessment and Planning

Any given region may be evaluated in terms of a large number of variables. However, within the process of regional analysis, such discrete variables by themselves are of limited use in the total evaluation process. These variables must be synthesized into a relatively small number of meaningful combinations of factors which are based upon a thorough knowledge of the region under study, government policies, the community interest legislation, regulations, and guidelines and the technical requirements of the planning process.

In this context, then, the objective of the transmission line environmental assessment study was to develop alternative electric power transmission rights-of-way between the Dorsey Transformer and Converter Station, and the International Boundary in southeastern Manitoba, and to refine to a single route the one which, in general, follows the path of minimum environmental impact; this route having been determined with the benefit of input from government agencies and departments, municipal councils, and certain public special interest groups, and having due regard for the technical and electrical systems guidelines and constraints and existing legislative and regulatory guidelines.⁷⁴ The objective was no longer restricted to 'building a 500 kV transmission line'. Manitoba Hydro quite obviously wished to gain a general external agreement on the routing of the power line which was feasible, acceptable to the community and which satisfied the legal, regulatory requirements and the environmental guidelines.

In order to fulfill these objectives, it was essential to design a program which complemented the institutional framework which had been established by the Province and the National Energy Board. Accordingly, an External Involvement Program was implemented as an integral part of th environ-

⁷⁴ Interview with L. E. Poyser, Manitoba Hydro, March 12, 1977.

mental assessment program (Manitoba Hydro, 1976, p.25). Co-ordination of this program was executed by the proponent's study task force and by the review procedures established by the Interdepartmental Planning Board. Municipal councils were also involved. Initially, however, this aspect was managed directly by Manitoba Hydro. Later in the study program, the Municipal Services Branch, in its capacity as the prime Provincial-Municipal liaison agency on municipal affairs, took on an important co-ordination function with the councils through the I.P.B. Provision was made, although not extensive in scope, for the involvement of special interest groups such as the Manitoba Naturalist Society and the Manitoba Environmental Council. No provision was made in the study program for direct individual involvement by the public. Manitoba Hydro had concluded that the rightful forum for such involvement was through the local municipal council and the individual ward representatives.⁷⁵

The requirements of the National Energy Board had only a limited influence on the actual design of the assessment program. This was due to the fact that the Board's involvement is limited to the public hearings to review the application.⁷⁶

⁷⁵ Interview with L. E. Poyser, Manitoba Hydro, February, 14 1978.

⁷⁶ Once a proponent makes an application to the N.E.B., virtually no discussions can occur. All communication becomes part of the record. The reason for this is that the Board perceives itself as an impartial judge hearing evidence as to whether the environmental guidelines have been satisfied, rather than as a participant in the planning process.

Based upon the above-noted project objective, a four-phased incremental decision process was followed (Figure 5.) The process began first with the definition of a study area and proceeded through more detailed levels of investigation to the identification of macro-corridors,⁷⁷ the selection of alternative alignments,⁷⁸ and finally, the selection of a preferred alignment (Figure 9 and 10).

The choice of an appropriate method to be applied in the study was perhaps one of the more difficult problems. Because of Manitoba Hydro's commitment to include a variety of members of the public in the review process, some of whom had considerable expertise, and others who had only limited knowledge about the environmental assessment process, it was necessary to apply a technique which would stand the test of professional scrutiny and yet convey information about the environmental effects of the project in a relatively simple fashion.⁷⁹ Therefore, on this basis, none of

⁷⁷ Macro-corridors are defined as broad, linear corridors, up to 1-2 km in width, in which a transmission line could be located with a minimum of environmental impact, as determined at a regional scale of evaluation.

⁷⁸ Alignment is used in the study as a specific transmission line route. In concept it has much the same meaning as right-of-way although the latter normally implies a legal certificate or survey has been conducted.

⁷⁹ For example, this ruled out the use of a computerized approach.

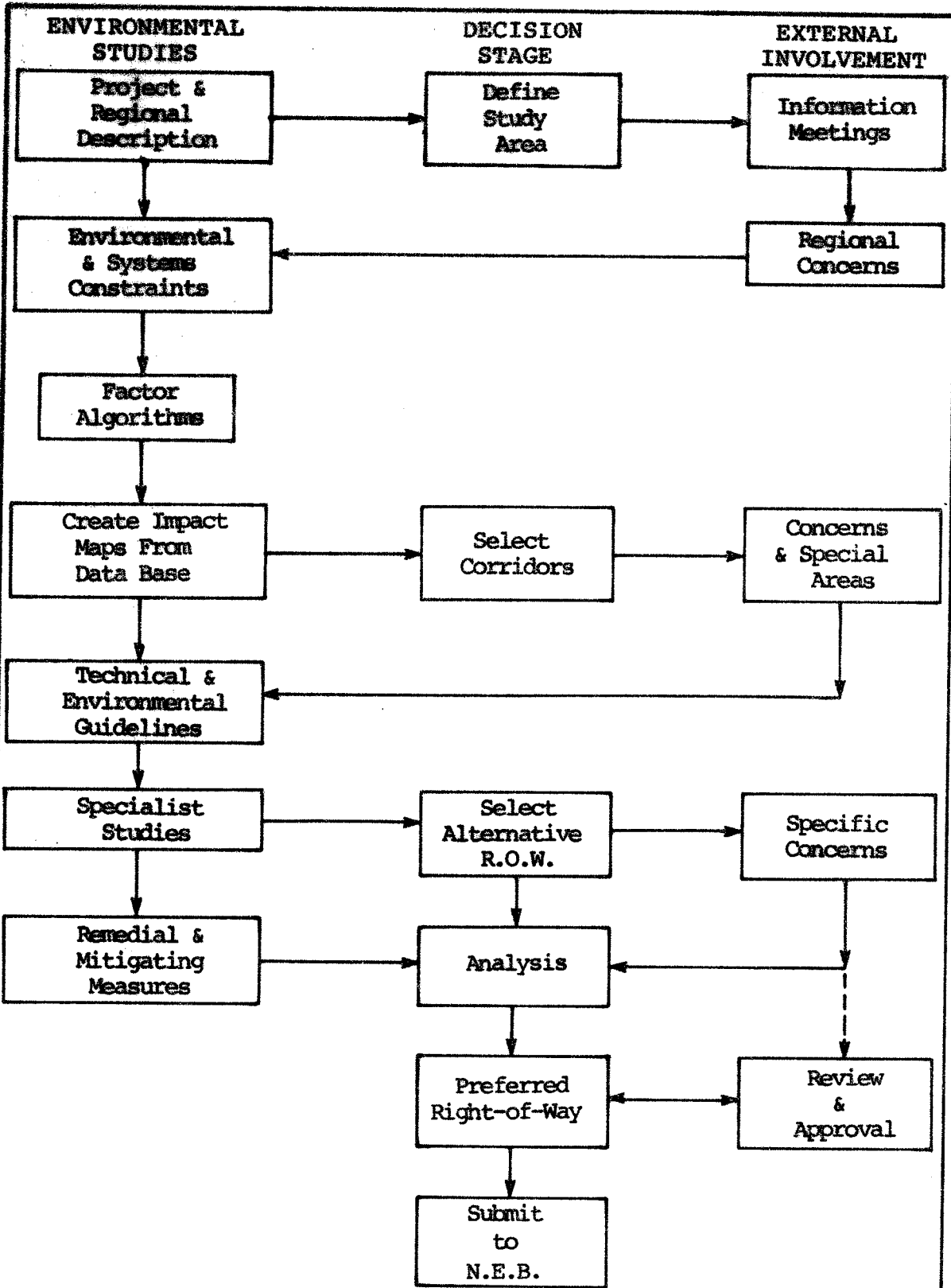
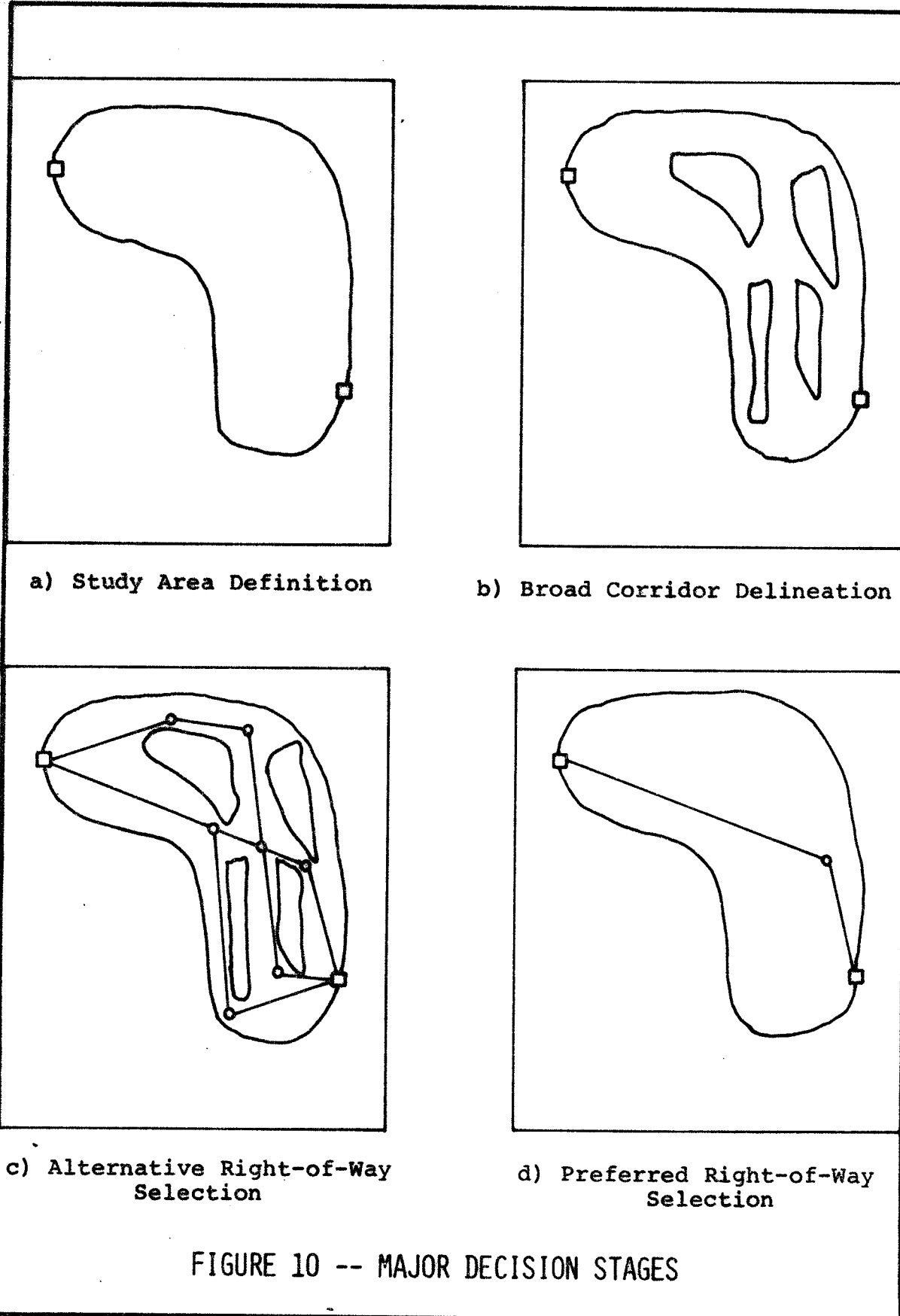


FIGURE 9 -- ENVIRONMENTAL ASSESSMENT SYSTEM
 Source: Manitoba Hydro, 1976: Volume 1



a) Study Area Definition

b) Broad Corridor Delineation

c) Alternative Right-of-Way Selection

d) Preferred Right-of-Way Selection

FIGURE 10 -- MAJOR DECISION STAGES

the methods discussed in Chapter 4 was considered to be singularly the optimal technique. Consequently, a variety of methods were used. At the broad, regional level, a modification of the map overlay technique utilizing a maximizing rule (Manitoba Hydro, 1976, p.29) and a simple checklist were employed. As part of the Manitoba E.A.R.P., a simplified version of the Leopold evaluation matrix was applied. As the study program progressed to finer levels of investigation and detail, checklists,⁸⁰ modified versions of the overlay technique,⁸¹ simulation methods,⁸² and to a degree Ad Hoc committee principles⁸³ were employed. A qualitative cause-condition-effect concept which relied on a series of large-scale aerial photographic mosaics was applied in the final stages of route evaluation and the determination of environmental remedial and mitigating measures.

In the following discussion, each of the decision phases will be reviewed in terms of the methods applied, the

⁸⁰The alternative routings were evaluated using the 'Summary Evaluation Matrix' which identified weighted values of environmental impact (Manitoba Hydro, 1976, p.45).

⁸¹For the analysis of visual and aesthetic impacts.

⁸²Simulation methods were applied in such specialist topics as the determination of electromagnetic fields.

⁸³Particularly in the External Involvement Program although no questionnaires or general opinion surveys were undertaken.

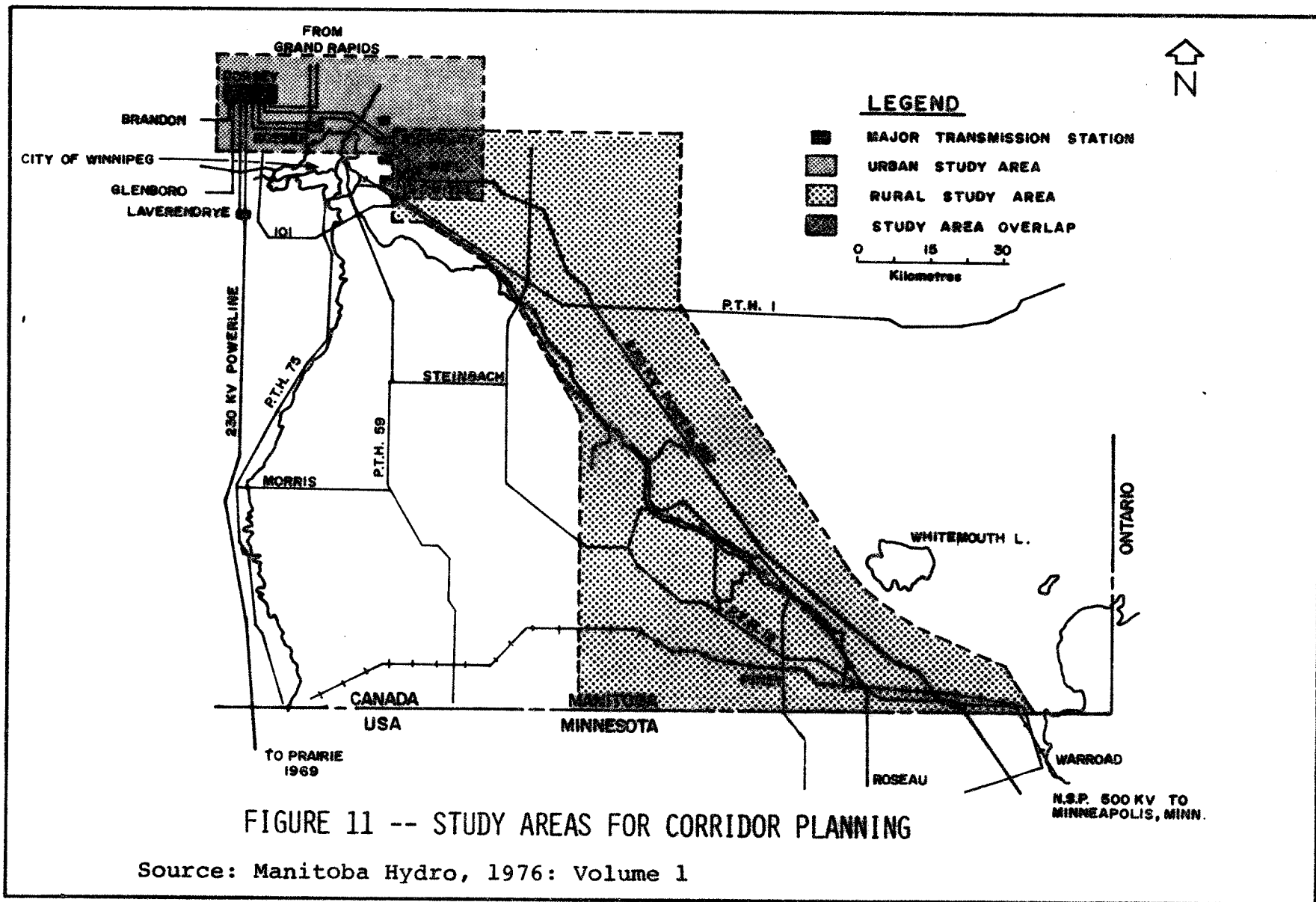
reporting and reviewing process and the results or decisions achieved. A synopsis chronology of events for the study program is provided in Appendix V.

Phase I - Selection of Study Area

In the first phase of the study, a broad study area, some 6,147 square kilometers in extent, was defined, (Figure 11)⁸⁴. The study area was selected on the basis of technical, engineering, and systems requirements and certain broad environmentally related parameters. Technical considerations included, among others, the long-range systems design requirements for the City of Winnipeg, future sources of generation, and the location of the two transformer stations - Dorsey and Riel. Environmental parameters related to such resource features as the extent of present and future urban land uses around the City of Winnipeg, the known location of ecologically sensitive areas (e.g., St. Labre Bog) and the property fabric of the region.

The study area which was defined included within it a broad range of environmental features. To the west, and around the City of Winnipeg, the pressures of urban development were of major importance, while to the east and southeast, more extensive uses of the land for agriculture, forestry

⁸⁴ Referring to Figure 11, the study area was approximately 215 kilometers in length, and varied in width from a minimum of 19 kilometers to a maximum of 95 kilometers.



operations, and outdoor recreation were evident. One of the initial issues in the study area was over the human environment component.⁸⁵ Consequently, in order to better reflect the policy considerations and the character of the region, the larger study area was divided into an 'Urban' and a 'Rural' section (Manitoba Hydro, 1976, p.15).

Once the study areas had been determined, maps at a scale of 1:250,000 were prepared which portrayed the areas to be investigated. These maps were then sent to all governmental departments, municipal councils and interest groups by letter of transmittal dated May 21, 1976.⁸⁶ At the same time meetings were requested by Manitoba Hydro. These meetings were considered to be primarily of an informational nature in that the utility wanted to explain the need for the project and the siting process that was about to be undertaken.⁸⁷ It is, however, apparent that the study process benefited in terms of identifying and reinforcing

⁸⁵ Above p. 128

⁸⁶ Much of the correspondence, particularly with respect to the municipal councils was undertaken by the Property Department of Manitoba Hydro. Historically, this department has been the primary contact between the Corporation and rural municipalities and as such was considered as the best agent to undertake this aspect of the project, rather than the task force. Additionally, this provided a certain measure of continuity to the overall program, since the Property Department was also on the Task Force.

⁸⁷ Interview with L. E. Poyser, Manitoba Hydro, February 14, 1978.

major issues relative to the project. For example, many of the councils contacted expressed appreciation of the initiative taken by the utility and strongly supported the environmental assessment process which was planned. Thus, while benefiting from these initial meetings in terms of gaining acceptance, the Corporation was also now committed to responding to external concerns, even if the concerns were not of primary importance to the Corporation, or were indeed contrary to the traditional transmission planning factors.

Phase II - Selection of Macro-Corridors

Once the study area had been defined and reviewed, the next step in the program involved the compilation of a regional environmental data base. This data base followed closely the National Energy Board guideline requirements. It was compiled from existing information and literature which was available from various government departments and municipal offices. This material was supplemented, revised and up-dated by field investigations, aerial photographic interpretation and discussions with the participants of the External Involvement Program. Much of the mapped information was recorded on reproducible topographic maps (1:50,000) as specified by the National Energy Board guidelines and assembled into a separate map portfolio. The variables of

the data base are presented in Table 3.⁸⁸

Using this comprehensive environmental data base, broad corridors, some 500 meters to several kilometers in width, were established on the basis of regional resource features. These resource features were designated as 'impact factors'. The development and precise definition of these impact factors is a very important function in the overall assessment process. Impact factors are intended to portray, from a particular point-of-view, the anticipated degree and direction of change to a particular part of the environment but would be anticipated if the transmission line were to be located there. Initially, a draft set of impact factors was identified by the project study group, on the basis of previous studies,⁸⁹ known government policies, and the regional issues which were anticipated in the area under study.

A final, modified set of impact factors was defined after the Phase I meetings were completed. Therefore, these impact factors are a realistic reflection of the major environmental issues that were pertinent to the area and facility under study.

⁸⁸For the specific values of each variable, reference should be made to the environmental assessment documents (Manitoba Hydro, 1976, Appendix Volume I).

⁸⁹For example, the previous 230,000 volt transmission line environmental assessment study which was completed in April, 1975 and reviewed by the N.E.B. in January, 1976.

Table 3 -- VARIABLES OF ENVIRONMENTAL STUDY
DATA BASE

1. Surface Geology
2. Landform and Drainage
3. Soil Survey
4. Soil Capability for Agriculture
5. Land Capability for Wildlife - Ungulates
6. Land Capability for Wildlife - Waterfowl
7. Biological Features
8. Land Capability for Outdoor Recreation
9. Present Land Use
10. Land Use II
11. Distribution of Electrical Users
12. Property Parcels and Land Productivity
13. Future Land Use Considerations
14. Areas of Potential and Existing Archaeological Sites
15. Linear Networks
16. Forest Inventory*
17. Land Capability for Forestry*

* Denotes variables for rural study area only.

The need for particular data variables in the data base is identified as the impact factor definitions are refined; firstly, by the determination of factor components which are, in effect, sub-factors which identify particular points-of-view or perspectives within the much broader context of the factor, and secondly, by a series of factor rules. These factor rules are the method by which the data variables and values are translated into meaningful predictions of the location and extent of anticipated impacts, at the study area level of investigation (Figure 12).

As an example, agriculture was identified as a major policy and resource issue. The siting of a transmission line on agricultural lands not only interferes with the normal cultivation practices, but also takes a certain amount of land out of production,⁹⁰ poses a possible safety hazard to certain types of practices such as the use of high pressure irrigation systems, results in soil compaction through the use of heavy equipment during the construction phase, and so forth. Furthermore, there is an important secondary aspect - the creation of property severances which can result in the loss of agricultural lands through subdivision development.⁹¹ Therefore, in addressing the agricultural impact

⁹⁰It is estimated that approximately .15 hectares/kilometer of right-of-way is lost to agricultural production.

⁹¹Above p. 121.

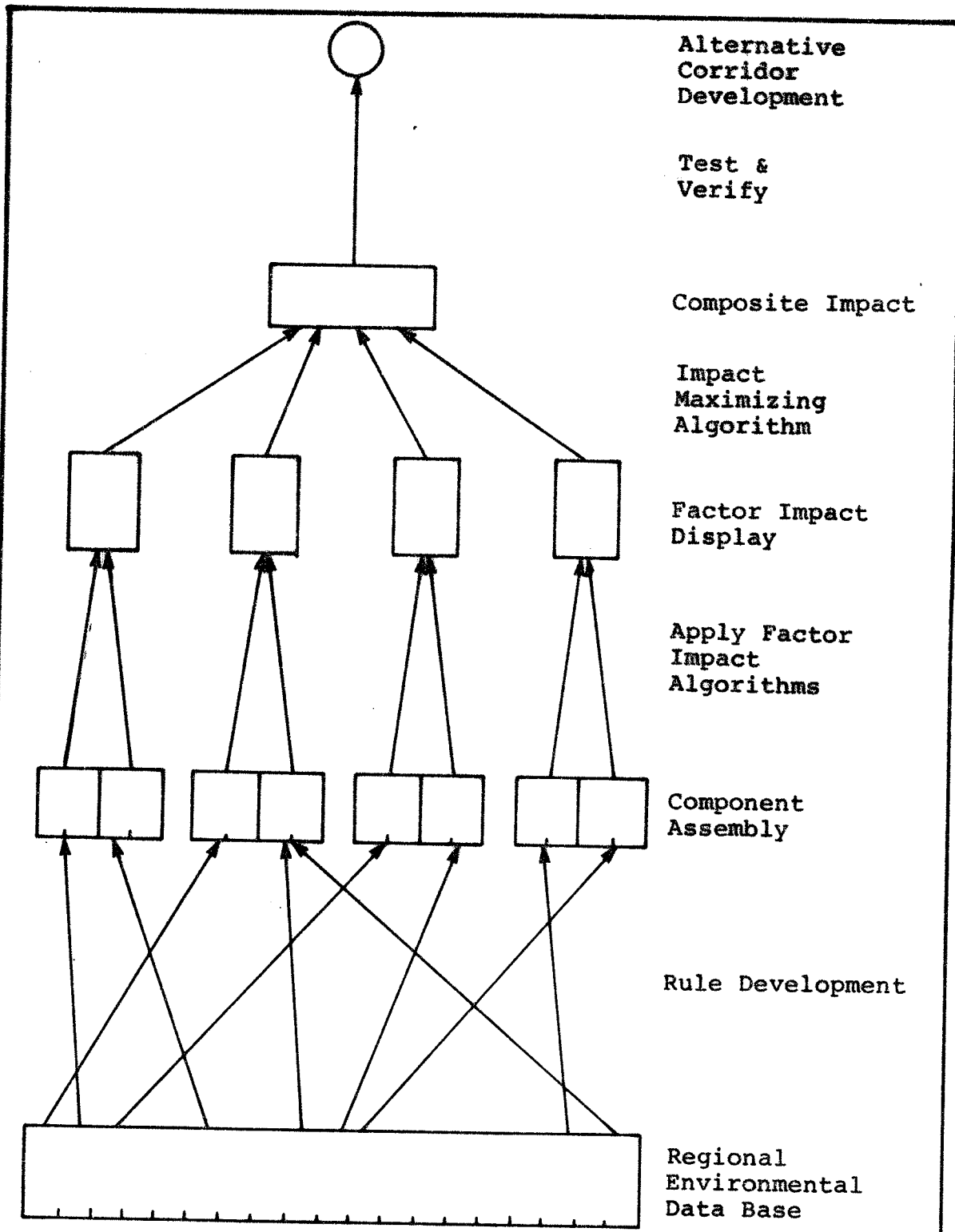


FIGURE 12 -- CORRIDOR DELINEATION SYSTEM

Source: Manitoba Hydro, Interim Report, 1977

factor, four components were identified as follows:

Agricultural Capability, which is an indicator of the inherent capability of the land for the production of food; Land Productivity, which reflects current, relative values of present production; Property Ownership, which addresses the problems of severances; and finally, Special Areas such as those where high pressure irrigation systems are utilized. For each of these impact factor components, specific variables of the data base were applied to determine the location and degree of impact (See Figure 12).

In the next step, as Figure 12 indicates, these factor impacts were used to establish a composite impact factor, using a maximizing rule (Manitoba Hydro, 1976, p.29). The composite impact was mapped on 1:50,000 scale mylar base map overlays. From this composite map, areas which presented a higher level of impact were identified and excluded from further consideration for routing possibilities. These excluded areas were termed 'Regional Avoidance Areas'. The result was the identification of a series of inter-connected broad corridors - termed macro-corridors, which offered alternative routing possibilities in later phases of the study. The process of macro-corridor identification is shown on Figure 12 .

As Figure 10 indicates, once the definition of corridors was completed, the results of this phase were

submitted to external review. As part of this review process, Manitoba Hydro prepared an Interim Report (Manitoba Hydro, Interim Report, 1976) which:

- . described the project-design, sales agreement, schedule, etc.;
- . outlined Corporate policies and practices respecting the proposed facility, and the study program;
- . described the environmental assessment approach;
- . provided documentation leading to the delimitation of the macro-corridors and;
- . provided complete mapping of all impact factors, including the composite and the macro-corridors.

This Interim Report served three essential purposes. First, it provided complete documentation of the study up to the identification of the macro-corridors. Secondly, it fulfilled the commitments made during Phase I to submit the selection of these macro-corridors to review by the external groups. And finally, the report served to assist the outside agencies and municipal councils to focus on the major land use and resource issues of the proposed transmission facility. For example, concern was expressed on several

occasions about the biological effects of high voltage lines. This expression resulted in the preparation of a special report on the subject which was widely distributed. The City of Winnipeg and the adjacent rural municipalities considered urban land use problems of considerable importance.⁹²

In a letter dated August 18, 1976, Manitoba Hydro submitted the Interim Report to the I.P.B. for distribution to the various associated agencies. The Corporation, under separate cover, sent complete copies of the report to all municipal councils in the study area, and to selected public groups who had indicated an interest in the project. This was followed by a series of meetings with each of the recipients, to discuss and explain the report findings and to identify outstanding issues which might exist. This latter point is particularly significant because the determination of the macro-corridors was based upon certain value judgements. Therefore, in effect, the assessment study team was testing those judgements in order to determine their validity and to achieve a consensus on the values which had been applied. Only after these value judgements had been

⁹²As an example, in a letter dated October 19, 1976, the Rural Municipality of Rosser expressed concern over the potential affects on future development near the Village of Gordon, and recommended avoiding building sites (Manitoba Hydro, 1976, Appendices Volume II).

confirmed was it possible to proceed to the next stage of the program.

The role of the I.P.B. was significant at this point in the study program. Not only did the Board co-ordinate the reviewing process, but it set the stage for the evaluation of the Interim Report. In an I.P.B. memorandum dated August 30, 1976, each reviewing agency was asked to comment on the following:

- a) the positive and negative implications of each of the corridors;
- b) zones wherein a transmission line might seriously conflict with existing, planned, or potential uses and the nature of the conflict;
- c) additional impact information which would be necessary for a more detailed review in Phase II;⁹³
- d) the technical method used for the impact analysis;
- e) the method of property acquisition and the type of title sought;
- f) the appropriate forum for consulting

⁹³Phase II corresponds to Phase II in this paper, as the I.P.B. review process did not recognize the Study Area selection as a separate phase.

Municipalities and the City of Winnipeg
for ratification.

Therefore, as the above suggests, the Board was fulfilling a role not just as a co-ordination agency, but as a liaison agency between the proponent and the various sectors of the Provincial Government. Consequently, a single, comprehensive forum for review of the study was available, and was able to expedite the review schedule.⁹⁴

The Interim Report was also to serve as the project description for the Manitoba Environmental Assessment and Review Agency, as part of the assessment and review process. Accordingly, the document was distributed by the I.P.B. to the Agency. The Agency, however, requested additional documentation in the form of a matrix which would identify various project activities and anticipated elements of the environment which might be affected by the proposed action.⁹⁵ The purpose of this matrix was to determine whether the project was indeed subject to the Environmental Assessment Review Process. Therefore, it would seem that the Agency had taken a somewhat adversary position early in the study program, particularly since Manitoba Hydro had agreed that

⁹⁴This is supported by the fact that the total Provincial review process was completed in approximately three weeks as compared with six to ten week review periods in the past.

⁹⁵See enclosure on back cover.

the project would be submitted to E.A.R.P., and that according to the Agency's policy statement, '230 kV transmission lines or larger in excess of five miles', would require an environmental assessment (Man. Govt., 1976, p.13).

Manitoba Hydro did comply with the request for the preparation of the matrix. This was submitted to the E.A.R.A. in October, 1976. However, it was not until March, 1977 that the Agency confirmed that the project was indeed subject to the E.A.R.P. and subsequently issued a set of environmental guidelines.⁹⁶

As part of this Phase II external review, individual presentations were made to each of the councils in the study area, and the Provincial departments and agencies which had a direct interest in the project. In point of fact, the review process was on-going and, as such, very often required a number of meetings with certain of the individual agencies in order to resolve issues early in the study program.

This Phase II review process achieved several objectives. First, the location of the macro-corridors was confirmed, although issue was taken on a number of value judgements that were made in their selection. For example, the Department of Highways in a memorandum to the I.P.B.,

⁹⁶ Refer to Appendix III for an outline of the E.A.R.A. environmental guidelines. Memorandum dated November 25, 1976 from J. T. Cawley, Deputy Minister, Department of Mines, Resources and Environmental Management, to D. Johns, Provincial Planning Branch.

dated September 30, 1976 took issue with the fact that proposed highway developments had not been adequately appraised and recommended certain changes to the impact evaluations. Secondly, the responses to the Interim Report also identified certain data gaps, and limitations to the methodology. These assisted in establishing certain priorities for the next phase - the selection of alternative alignments. Third, formal approval from the Provincial and each municipal council was obtained which provided a sound basis for proceeding to the more detailed studies.

Phase III - Selection of Alternative
Rights-of-Ways

Phase III of the environmental assessment process involved the selection and evaluation of alternative rights-of-way within each of the macro-corridors. The intent at this stage was to identify specific rights-of-way which would attempt to minimize the overall level of macro-corridor impacts. At this level of investigation, site specific information and concerns relating to individual agricultural operations, existing and potential recreation activities, aesthetics, land use, electrical effects, the natural environment and so forth, were involved. A number of specialist studies were undertaken within the scope and framework of the assessment process. A variety of methods were applied according to the nature of the specific environmental

sensitivity. Checklists, map overlays and simulation models were used. A series of alternative alignments within the macro-corridors were established, based upon a set of guidelines which had been determined from the external involvement program and the specialist studies (Manitoba Hydro, 1976, p.37-39). During this stage, a number of specific environmental resource conflicts and trade-offs became clear. These included outdoor recreation and forestry operations conflicts, agriculture and urban development conflicts, aesthetics, property severances and so forth. Each of these concerns was reviewed and documented. It must be noted, here, that an alternative right-of-way was not identified in all of the macro-corridors. This occurred either because the special environmental studies identified a constraint which precluded an alignment or because of concerns expressed during the Phase II review process, or on account of certain technical/engineering limitations.

Once the alternative routes had been established, and the details as to the potential environmental effects had been determined, they were submitted to the I.P.B., the municipal councils and special interest groups for review and critical evaluation.

It was at this point in the program that a specific resource use conflict emerged. Early in the study, the Parks Planning Branch had indicated concern over a recreation

area, which was designated at the Marchand Ridge, located about seven kilometres east of the Village of Marchand. The ridge is one of the few outdoor recreation areas⁹⁷ in south-eastern Manitoba and is used extensively by both residents from the area and from the City of Winnipeg.⁹⁸ Consequently, the ridge and adjacent lands were assessed a high impact evaluation and an alternative macro-corridor and route which paralleled an existing oil pipeline right-of-way and which by-passed the major recreation area, was identified to the east. The Department of Renewable Resources and Transportation Services, however, had managed the natural resources of the Sandilands Provincial Forest Reserve in the past. This department expressed considerable concern over the effects of the eastern alignment on forestry and wildlife programs, and recommended a route over the ridge paralleling an existing transmission line.⁹⁹

⁹⁷The Canada Land Capability classification for outdoor recreation is Class 5. The highest capability class in the area is Class 4.

⁹⁸Memorandum dated September 16, 1976 from H. D. Moffat, Acting Director of Parks to D. Johns, Provincial Planning Branch.

⁹⁹Memorandum dated November 19, 1976 from A. Murray, Associated Deputy Minister, Department of Renewable Resources and Transportation Services to D. Johns, Secretary, Inter-departmental Planning Board.

Phase IV - Selection of the PreferredRight-of-Way

The selection of the preferred route occurred primarily as a result of the rejection of alternatives and the resolution of many relatively minor resource trade-off decisions.¹⁰⁰ The alternative routes proposed by Manitoba Hydro essentially presented choices, anyone of which was technically and economically feasible. These alternatives were submitted to the external review process for evaluation. During this process a number of meetings were convened by the I.P.B. between Manitoba Hydro, the Provincial departments, and the municipal councils. Finally, a preferred routing was established and approved, first by a joint meeting of all rural municipal councils, then by all urban municipal councils,¹⁰¹ and lastly by the Provincial agencies through the Interdepartmental Planning Board. Total agreement was not achieved, however, with respect to the Marchand Ridge area. The Department of Renewable Resources and Transportation Services opposed the eastern route, around the ridge area. The following is an excerpt from the minutes of I.P.B. meeting #8, held in Winnipeg on December 8, 1976,

¹⁰⁰As compared to the scale of the trade-off decisions involved with the Marchand Ridge area.

¹⁰¹Municipal meetings were co-ordinated and chaired by the Municipal Services Branch, not by Manitoba Hydro.

IT WAS AGREED that I.P.B. approves the following recommendations to P.L.U.C.:

1. It is suggested that the I.P.B. recommend to P.L.U.C. Hydro's preferred route as having met the Departmental and Municipal concerns except for those of the Department of Renewable Resources and Transportation Services.
2. It is suggested that I.P.B. also advise P.L.U.C. that the Department of Renewable Resources is opposed to that portion of the line running through the Sandilands Forest Reserve.
3. It is suggested that these recommendations and the accompanying background memo be included by Manitoba Hydro in their submission to the National Energy Board and E.A.R.P., along with all departmental comments.

The problem of this resource trade-off decision was subsequently submitted to the political level - the Provincial Land Use Committee of Cabinet-for resolution. The Committee determined that the eastern route was not acceptable and that the preferred alignment should cross over the ridge about one-quarter mile to the east of the existing transmission line.¹⁰² This routing change was accepted by Manitoba Hydro, as the end result of the planning process.

Once the preferred route was approved, a final environmental assessment report which outlined and documented

¹⁰²Minutes of Meeting #5, Provincial Land Use Committee of Cabinet, Winnipeg, December 9, 1976.

the total process was prepared.¹⁰³ The final alignment was plotted on a set of large-scale aerial photographic mosaics (1:15,840) and specific environmental impacts and appropriate remedial and mitigating measures were developed in accordance with Corporate policies and government regulations. This information was presented in the final report as a summary 'cause-condition-effect' format.

Phase V - The Manitoba Environmental Assessment and Review Process

Once the P.L.U.C. had approved the final routing, the project entered into the E.A.R.P. The Environmental Assessment and Review Agency had been involved as a member, during the I.P.B. review program. Thus, the Manitoba Hydro environmental assessment report for the 500 kV transmission line attempted to incorporate the Agency's guidelines and intentions within the overall planning program (Manitoba Hydro, 1976, p.4). There were, however, several items requiring further attention. These items related specifically to contaminants of the air, water and soil, such as electrical effects. No public hearings were convened by the Minister,

¹⁰³ By the time this routing re-alignment was established the final report which showed the eastern alignment as the preferred route, was underway. Consequently, a supplementary report which documented the specifics of the route changes was prepared and distributed along with the main report.

as is his option. The Agency considered that the environmental process which was followed by Manitoba Hydro satisfied the intentions of public involvement.¹⁰⁴ As yet, the Agency has not released a final report on the project.¹⁰⁵

Phase VI - National Energy Board

In January , 1977, Manitoba Hydro submitted the completed environmental assessment study report to the National Energy Board in Ottawa. The report was reviewed by the Board's staff and a letter of deficiency was received by Manitoba Hydro on February 16, 1977.¹⁰⁶ A response to this deficiency letter was submitted approximately four weeks later. Subsequently, a hearing was convened by the Board to hear evidence on the application. These hearings were held between May 2-13, 1977 in Winnipeg. There were several interventions on matters relating to the environmental section of application. The Rural Municipality of Springfield and eight separate landowners intervened, as did the Manitoba

¹⁰⁴ Interview with N. Brandson, Department of Mines, Resources and Environmental Management, February 3, 1978.

¹⁰⁵ At time of writing - February 23, 1978.

¹⁰⁶ The common N.E.B. review procedure is to assess the documents against the environmental guidelines. Any deficiencies are recorded and submitted to the applicant. The applicant must respond to the letter of deficiency, to the satisfaction of the Board, before a hearing date is set.

Environmental Council, and the Manitoba Naturalist Society jointly with the Sierra Club. Very briefly, and without delving into the details of the respective interventions, the Springfield intervenors were concerned, firstly, about a routing change that had been initiated by Manitoba Hydro during the property acquisition stage, and which had not been subjected to external review. Secondly, several expressed concern over the potential health and safety aspects of such high voltage facilities. The two interventions by the environmental groups were directed primarily towards the re-alignment of the power line over the Marchand Ridge area.

Dealing with the Springfield issues first, the Board initially reserved decision until the route change had been reviewed by the municipal council and approved by the Provincial Land Use Committee of Cabinet. Once this was accomplished, the Board approved the new routing, and at the same time noted Manitoba Hydro's attempts to accommodate local issues (N.E.B., 1977, p.76). On the matter of the health and safety concerns of such high voltage power lines the Board accepted expert testimony that no ill effects would result at this voltage level and given the design parameters that were being applied by Manitoba Hydro.¹⁰⁷ The Board

¹⁰⁷ Expert testimony was presented by Dr. E. Carstensen of the University of Rochester. Dr. Carstensen has undertaken considerable research into the bio-medical effects of high voltage transmission and provided expert testimony to the Power Authority of the State of New York Hearings (P.A.S.N.Y.) in Albany, New York.

concluded that:

The evidence shows that the Applicant's transmission line design and grounding practices are safe and in accordance with modern practice. Audible noise and radio interference caused by the line are expected to be within normally accepted levels (N.E.B., 1977, p.74).

On the matter of the Marchand Ridge re-alignment, the Board accepted the western alignment over the ridge, rather than the eastern alignment around the ridge. In reaching this conclusion the Board noted that the Provincial Department of Renewable Resources is responsible for the administration of the Crown Lands in the area, and accepted this department's assessment (N.E.B., 1977, p.79). In rendering its decision, the Board noted that no evidence was introduced on the reasons for the re-routing and thus it appeared to the Board 'that neither (route) would give rise to serious negative environmental consequences' (N.E.B., 1977, p.79). The route applied for by Manitoba Hydro was approved for the issuance of a Certificate of Public Convenience and Necessity.

Observations and Summary

The environmental assessment process discussed in this Chapter contributes an interesting approach to regional analysis and to comprehensive project planning. It was designed to be compatible with and implemented in conjunction

with existing regulations, legislation and the policy intentions of the Province of Manitoba. It is a process by which certain regional and site-specific priorities can be explicitly stated. It is of particular interest in that a wide variety of opinions was presented for review in a logical and systematic manner.

The environmental assessment and planning process was successful in that it achieved the project objectives. A preferred route was established which had gained general public acceptance and Provincial approval, and yet satisfied technical, system and design parameters. This success can be attributed to several factors. Firstly, the program was very carefully planned and monitored by the proponent and the I.P.B., and any departures from the planned course of action received immediate attention. For example, the initial study process was established on the basis that Manitoba Hydro would initiate and conduct all of the meetings with the municipal councils. However, as the study progressed, it became evident that the Municipal Services Branch could assist in providing a direct co-ordinated effort. Consequently the process was amended.

Secondly, all of the information involved in the decision-making was made available to all of the individuals and agencies involved in the external involvement program. There was a high degree of openness. The extensive use of

graphics would seem to have been very successful in communicating the information about the project and the environmental effects.

Thirdly, both the project study group and the reviewing process functioned as an inter-disciplinary, multi-disciplinary team. Moreover, the approach recognized the linear nature of the facility to be developed and the characteristics of the environment to be studied. Thus, when new issues were identified as the program progressed, comprehensive and consistent response was possible.

Finally, it is apparent that there was a firm commitment on the part of Manitoba Hydro and the Provincial agencies to make the process succeed. The re-routing at the Marchand Ridge is a case in point. The proponent accepted the change in alignment as established by the process, even though another route was preferred.

A number of basic observations can be made. The study program developed a wide range of alternative locations for the proposed transmission line, at both the macro-corridor and routing phases. Alternative technical considerations such as underground facilities and the up-grading of existing facilities were identified and their reasons for rejection were documented. These routing alternatives proved to be valuable in the identification and clarification of environmental issues and community values and aided in establishing a preferred route which obtained political acceptance.

The nature of the methodologies which were applied is very important. The methods must be able to communicate the effects which might be expected by project development, and at the same time reflect the values of the people and groups involved in the study program. Some criticism was directed towards the methodology that was used to establish the macro-corridors because the values between factors were not established (i.e., weighted). The methodology itself, using the maximizing rule was, however, impartial and accurately presented the location, extent and degree of impact values, relative to the community and study area issues. Weightings of specific policy issues are best left to the political arena, whether it is provincial or municipal in scope, rather than to technicians and scientists.

The incremental approach in planning the power line appears to offer a high degree of flexibility. Had Manitoba Hydro established a preferred route, completed the environmental assessment and then submitted the final decision for Provincial approval without the external involvement in the various phases, there would have been less opportunity for adjustment and negotiation, particularly if several hundreds of thousands of dollars had been expended. The incremental process, then, by keeping options open as long as possible, offers the choice of resolving conflicts during the process, at each stage, which in turn reduces the uncertainty associated

with the future development decision.¹⁰⁸ It is apparent in such a process as this, that it is essential to have a clearly recognized final authority such as the Provincial Land Use Committee of Cabinet. However, it is equally apparent that many of the land use and resource trade-offs can be resolved at much lower levels within the bureaucratic and political sphere. The study team has a major role in achieving this goal by providing information for discussion and guiding the process to a decision that is feasible, as well as acceptable to the community and environmentally desirable.

The execution of this environmental assessment and planning study addressed the procedural framework of the Interdepartmental Planning Board rather than the Environmental Assessment and Review Agency. Several reasons for this are proposed. First are the historical or traditional procedures which were followed by Manitoba Hydro in the planning of transmission lines. Second is the nature of the project. Finally, there are the differences between the two agencies.

In the past, the utility commonly consulted with the various municipal councils and government agencies on an ad hoc, need-to-know basis. Over the years, Manitoba Hydro

¹⁰⁸Above, Boulding (1971), p. 25.

had established a routine, although perhaps informal, basis for planning transmission lines, which depended upon direct communication between individuals and councils. With the new requirements to consider and document environmental matters, it would appear that there was a reluctance to abandon the former procedures which had been reasonably successful in gaining both technical and political approval of rights-of-way. The Environmental Assessment and Review Agency, which had a very limited scope in terms of the range of considerations and issues which had traditionally been addressed, did not offer the broader level of approvals which the utility had sought and obtained in the past.

Then too, the nature of the project was important. The linear nature of a transmission line, crossing over agricultural, urban and Crown Lands (forestry, recreation, etc.) was perceived by the utility as essentially a land use problem.¹⁰⁹ The Environmental Assessment and Review Agency is directed towards specific contaminants of air, water and soil.

Moreover, even though the Agency guidelines specify the requirement to include human factors in the assessment, it is able to offer only limited expertise and professional credibility in the socio-economic factors of land use. A

¹⁰⁹ Interview with L. E. Poyser, Manitoba Hydro, February 14, 1978.

further consideration is that the authority and accountability for land use matters rests with The Planning Act (S.M., 1975) and the Department of Municipal Affairs. Therefore, Manitoba Hydro was somewhat obligated, considering the major issues - resource and land use - to employ a process which could approve the final routing before submission to the National Energy Board.

In retrospect, perhaps the most important reason for addressing the procedural framework of the I.P.B., is the nature of the E.A.R.P. institutional arrangement. The process as set out in the policy statement (Manitoba, 1976) appears to be quite inflexible. In the first place, the project guidelines issued by the agency cover a broad spectrum of environmental information which must be addressed by the proponent. There is little flexibility to focus on the major issues. For example, in the Manitoba Hydro study, agriculture and the problems of land ownership and so forth were a major concern as identified by the external reviews. The final results reflect this issue. However, had the study focused on all aspects of the E.A.R.P. guidelines in such a manner, then the study either would never have been completed - on time at least - or only at great expense. Very likely, there would have been a tendency to address all of the guideline

criteria equally, at a less intense level of effort.¹¹⁰

The process, as set out by the Environmental Assessment and Review Agency, like the Clean Environment Act (S.M., 1972) is based on the premise that a project is either approved, with or without conditions, or rejected. There would appear to be no opportunity for gaining formal approvals at incremental stages,¹¹¹ or for modifications to the process in order to satisfy interim or new project objectives, as is the situation with the Alberta Environmental Impact Assessment System (Alberta, 1977). Indeed, this aspect, when considered in the context of a narrow focus on environmental contaminants, makes it very difficult to separate the function of the Environmental Assessment and Review Agency from that of the Clean Environment Commission.

There are, however, several shortcomings in the

¹¹⁰ The same criticism may be applied to the N.E.B. process with its intense reliance on fixed procedures and guidelines. It would appear that regulatory agencies often seem to forget that guidelines are just guides to be followed, not a fixed set of rules which must be obeyed at any cost. It is recognized, however, that regulatory guidelines assist in the administrative process.

¹¹¹ There is a financial aspect to this point. These environmental assessment studies cost a considerable amount of money, particularly if extensive field programs are required. Consequently, if the E.A.R.P. guidelines were followed precisely, considerable financial resources would have been committed by the time the environmental assessment entered into the formal review process. Therefore, it is in the proponent's interest to gain incremental approvals rather than one final Go or No Go decision at the end of the review process.

environmental assessment process as applied by Manitoba Hydro. Generally, these relate to methodology, public involvement and administration.

The methods which were applied by the study, while they do succeed in communicating the anticipated degree, direction and spatial extent of the project environmental impacts, are limited in that it is often very difficult to determine the inter-relationships between factors. This is most apparent on the regional scale. This weakness is not totally restricted to this study. It is a common criticism that applies to many other approaches to environmental analysis. While a Systems Approach, combined with very large computerized data banks, may provide a partial answer, the high costs and time associated with such techniques is a disadvantage, especially if there is no long-term commitment (Lyle, von Wodtke, 1974, p.400). Moreover, few people outside of the study team would understand the complexities of such an approach.

As documented previously, there has been considerable emphasis in the past few years on extensive public involvement in the planning process.¹¹² The process which was followed for the power line project in Manitoba, while it

¹¹²Above, p. 22.

can not be considered 'ideal' in this respect, did allow for a much wider participation than has occurred in the past and did meet the specific needs of the study program. There are several points worth noting. First, at the broad, regional levels of analysis the elected provincial and local municipal authorities are often in the best position to evaluate and determine community priorities, and to arrive at a decision that reflects the community's interest. A project proponent often does not have that thorough understanding of the community which Gertler referred to (Gertler, 1972, p.23), and thus is in no position to determine and interpret community values.¹¹³

Secondly, the process followed opened several avenues for participation by individuals. The first is through the local municipal council. A second is through the Provincial Government. A third is directly with the proponent - Manitoba Hydro. A fourth is at the formal public hearings, if his interest or standing can be established.

With respect to the N.E.B. Hearings, there is some cause for concern. The Manitoba Hydro process, while it did extensively involve provincial matters, did not include representation from the National Energy Board in the course

¹¹³In a practical vein, in Canada at least there is strong evidence from the many planning studies reviewed, to suggest that traditional decision-making bodies such as the Cabinet or local Council are unwilling to relinquish their position as the final authority.

of the study. Thus, the preferred right-of-way which had been established could have been rejected or altered solely on the basis of evidence presented at the Board's public hearings, even though provincial resource concerns had been resolved.¹¹⁴ This is a very unsatisfactory situation. It is suggested then, that some change is warranted on this matter. However, it is recognized that a considerable amount of investigation is needed before a new, more functional and representative procedure can be defined.

¹¹⁴As a case in point, during the earlier Hearings into the Manitoba Hydro application for a Certificate of Public Necessity and Convenience to export power to Minnesota, (January, 1976) the Board did order a change in the alignment, based upon strong representation at the public hearings. This action created considerable confusion in that neither the Province, the local councils nor the affected property owners had been represented had given approvals to the new route. Moreover, a change in the route at the N.E.B. Hearing stage could have considerably delayed the in-service date, resulting in lost revenue to the Province and so forth. The result was that the Board was required to hold a new Hearing, and eventually decided to approve the route which had been sought in the first Hearing.

CHAPTER VI

CONCLUSION

Summary

Achievement of Objectives

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Summary

This thesis has attempted to present a contribution with respect to the evolution and application of environmental policy in Canada, and particularly in the Province of Manitoba. It is now the intention to assess this research in terms of the stated objectives and additional research requirements.

The problem of evaluating the effectiveness of the environmental assessment process as applied in Manitoba was approached by determining the nature of the basic problems of resource management and environmental quality. The trend in policy development was established and the procedures for incorporating environmental matters into project planning were reviewed by drawing upon the examples which have evolved in the Provinces of Alberta, Ontario and Manitoba. The basic intentions and requirements to accomplish this objective were identified. An environmental assessment procedure was described and evaluated in the context of these intentions and requirements. It was concluded that the environmental assessment process as practiced in Manitoba was an effective technique for including environmental matters in project decision-making. The assessment process which was followed by Manitoba Hydro facilitated a co-ordinated approach to

project planning and the final approvals procedure. Several limitations of the Provincial institutional arrangement and process for considering environmental matters in project planning were presented.

Achievement of Objectives

The first task was to examine the basic background problems which are involved with the management of natural resources and the implications to environmental quality. To achieve this objective, the environmental problem was defined as having its basis in a limited resource base and the lack of a co-ordinated effort to manage resources in a manner which reflected their inter-relationships. The example of energy generation and environment was presented. The need to include the public in the planning process was addressed and a general recognition of the trends evident in the early 1970's was portrayed.

The second task undertook to investigate the development of government policies and legislation which have resulted in the requirement for environmental assessment studies. While it is recognized that interest in environmental matters by the Canadian public has arisen in the past (Burton, 1972:p.23), this research has focused on the public expressions of concern which were evident in the late 1960's and early 1970's. It was observed that the interest and involvement of the Canadian governments in environmental matters evolved as a response to these public pressures, not

in anticipation of public awareness of the quality of the environment. The situation was somewhat different in the United States. In that country, environmental policies were developed partially as a response to and partially in anticipation of the public awareness.

The jurisdictional ambiguities of the constitutional framework in Canada regarding the environment have been a major factor in the delay of environmental policy definition. The Federal Government could not and did not act until extensive negotiations had taken place with the Provinces. Thus, it was not until late in 1973, some five years after the issue was first recognized, that there was an attempt at defining an environmental policy and an environmental assessment process.

At the provincial level of government, the definition and implementation of environmental policy did not occur until 1974 through 1976. However, by the mid-1970's, a process whereby environmental matters were to be considered in project planning was established. In Ontario, this was accomplished by The Environmental Assessment Act (1975) (Ont. Stat. 1975, c.69) and in Alberta by The Land Surface Conservation and Reclamation Act (Stat. Alta., 1973, c.34, s.8) and The Environmental Impact Assessment Guidelines (Alberta, 1977). Manitoba implemented the Manitoba Environmental Assessment and Review Process and created an agency to administer the process in July, 1976.

The third task was to develop the principles and procedures which have developed for environmental assessment. The accomplishment of this objective began with a definition of the scope of environmental assessment that has evolved in legislation and the literature. It was concluded that the term 'environment' has taken on a much broader interpretation today when compared to the traditional bio-physical connotations. Today, the need to include social and community elements as part of the environment has been established by legislation in some regions of the country. The term 'assessment' has also gained a wider scope to include the decision-making and planning process of project development.

Environmental assessment as a function of the planning process must address, if it is to be complete, the nature of laws, politics and planning.¹¹⁵ Laws provide the forum for resolving problems. Planning provides the skills and information. The final decision is, however, dependent upon the involvement of people. The environmental assessment and review processes which had been developed in Alberta, Ontario and Manitoba were reviewed. It was observed, among other factors, that the trend in Alberta and Ontario is toward a broad interpretation of environmental assessment which has the force of law. Several perceived limitations to the

¹¹⁵ See discussion, Above p. 80-84.

Manitoba environmental assessment process were presented for discussion.

In concluding this task, a brief outline of various types of approaches to environmental assessment were presented. It was observed, and later supported in the discussion, that no method is singularly the best approach.

The fourth task was to describe and evaluate the effectiveness of the environmental assessment process which was followed by Manitoba Hydro, in terms of achieving designated objectives and as an aid to project planning. The project which was assessed was a 500,000 volt, extra high voltage power line which was to extend from the Dorsey Transformer and Converter Station, north and east around the City of Winnipeg, to the Riel Station, and thence to the Riel Station, and thence to the International Boundary near the Village of Sprague, Manitoba. The planning process involved four incremental phases in decision-making:

(1) selection of a study area; (2) the identification of alternative macro-corridors; (3) the identification of alternative routes within the macro-corridors; and (4) the selection and detailed evaluation of a preferred routing.

It was concluded that the environmental assessment process was effective because:

- a) the project objectives were met;
- b) the necessary governmental and corporate approvals were achieved;

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- c) a general agreement on the preferred route was achieved from a broader representation than had been possible in the past;
- d) the general 'spirit and intent' of the environmental assessment concept, as it has evolved in other provinces, including Manitoba, was met - i.e., to ensure the consideration of environmental matters in project planning, at the earliest possible stage in that planning process, before irreversible and irretrievable commitments are made.

Several apparent limitations in the Manitoba Environmental Assessment and Review Process were presented and discussed. It was observed that the M.E.A.R.P. and the administrative agency do not appear to have the mandate or the financial resources to address the range of potential environmental issues which may evolve.¹¹⁶

¹¹⁶This observation raises a fundamental question, "Should the proponent agency provide the funding?" In the past, for specific topic areas (eg. archaeology) Manitoba Hydro has funded research projects. It would seem, however, that funding for environmental assessment or resource management agencies, which represent a much broader spectrum of government policy, is beyond the obligation of any single proponent. Moreover, many regulatory agencies such as the National Energy Board, and the M.E.A.R.A. insist on an 'arms length' involvement in the development of the proponent's application, because of the potential for a 'conflict-of-interest'.

The Interdepartmental Planning Board was the government liaison agency for the Manitoba Hydro study. It was observed that the variety of member departments and agencies of the Board permit a comprehensive review of resource and land use matters, which is both credible and accountable to the political level through the Provincial Land Use Committee of Cabinet. The environmental assessment process, as practiced in Manitoba for the 500 kV transmission line, since it addresses, severally, the planning, political and legal/regulatory aspects as established by The Planning Act (S.M., 1975) and the Manitoba Environmental Assessment and Review Agency was found to be an aid to the project planning process.

The fifth and last task of this research was to focus on further research needs and investigations which may serve to improve decisions affecting the quality of the environment in the Province of Manitoba. In order to accomplish this task, one must first look at the environmental assessment process as it was applied. Research needs emanate from the weaknesses of the process.

First, there is the nature of the institutional arrangements for environmental assessment. There is a need for an arrangement which provides a minimal overlapping of regulatory and study requirements, a co-ordinating function with adequate staff and financial resources, and a formal mandate and approvals procedure within the central government.

It would seem, then, that an institutional framework which incorporates both the Interdepartmental Planning Board procedures and the Environmental Assessment and Review Process would be more effective and credible in addressing environmental matters. The nature and scope of such an arrangement was not explored by this research.

Second, certain limits or uncertainties are evident in the environmental assessment methods which were applied by the Hydro study. In principle, it would seem that such methods should attempt to incorporate the scientific evidence of environmental assessment with the legal and political values of the community. As was pointed out by the Department of Municipal Affairs, this is an obvious area for further research now that we have a better understanding of the application of environmental assessment to project planning. Variations or alternative methods which might be applied to the planning of linear facilities were not explored. There is an obvious need for further research.

In executing the External Involvement Program, Manitoba Hydro relied upon direct contact with the individuals and groups outside of the Corporation. Consequently, the scope of involvement was rather narrow in that it was restricted to the government bureaucracy, elected representatives and special interest groups. There is a need to explore alternative methods and techniques for external involvement which might serve to broaden the base of

involvement and yet satisfy the nature and objectives of the environmental assessment process in Manitoba.¹¹⁷

The cost to include environmental matters in project planning and development is a topic worthy of future research. In the course of conducting this research, the author has heard various comments on the substantial increase in project costs due to the requirement to undertake environmental assessment studies. The cost effectiveness of environmental studies was not addressed by this research. It would appear, however, that the cost of not gaining public or governmental approvals would substantially outweigh any costs associated with the preparation of project environmental assessments.

More recently, a major area of interest has centred on the socio-economic effects of project planning and development, particularly with respect to geographically large projects. Neither the Manitoba Hydro environmental assessment study nor this research addressed this topic. It is of particular interest to regulatory agencies and worthy of considerable future research efforts.

Finally, there is a need for follow-up research during the construction, operation and maintenance of the facility. This is a long-term commitment, but it is

¹¹⁷Such as the public educational and participation approaches which have been developed by other government agencies, eg. Parks Canada.

essential. It will be possible to improve future studies only by evaluating the accuracy of the predictions made today. Such research should not be restricted to the primary or immediate effects. The secondary (or even tertiary) and long-term effects need to be monitored.

Conclusion

Perhaps the most fundamental contribution of the processes of environmental assessment, such as designed for the transmission line study, is their provision of the means, with varying degrees of success, of formally introducing environmental considerations in the decision-making process. In the past, this decision process was dominated by politicians, benefit-cost ratios and technical design requirements. While these factors are still important, the need to include environment is recognized now. However, it must also be appreciated that this change did not occur solely because of any ethical responsibility. The change occurred mostly in response to governmental legislation and regulation. Thus, there is a degree of urgency in the need for empirical research in order to develop and refine new methods and strengthen existing approaches.

It has been the main theme throughout this paper that environmental assessment is a new phase and provides an additional, more comprehensive scope, to be applied to land and resource use analysis. Equally, the assessment process

can serve to assist in the resolution of resource conflicts at a lower level of decision-making than was evident in the past. This is submitted as a positive step in that local values can be reflected in project decisions which affect or influence the community.

Environmental assessment is rational and logical. The assessment framework that has been applied in Manitoba, and which has evolved in Alberta and Ontario, goes a long way toward Gertler's concept of 'optimum resource use and environment'. To date, the application of the assessment process has been directed primarily towards project development, such as the transmission line. At this scale, the process, as an element in regional analysis has proven to be a reasonably successful tool in the management of our limited natural resources. It is suggested that the next step should be to integrate the principles which have evolved into higher levels of management and planning and specific policy instruments.

The present research has been somewhat narrow in scope in that only the Manitoba situation has been fully explored. Thus, this thesis does not exhaust the topic. It does outline the courses of action which have evolved over the past few years. This is of immediate and legitimate interest if we, as Canadians, are to achieve in a rational manner, a balance between resource development and the need to maintain a high standard of environmental quality.

SELECTED BIBLIOGRAPHY
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- Ackerman, Edward, et.al. "Institutions for Land Use Planning and Guidance Systems" in D. M. McAllister (ed) Environment: A New Focus for Land Use Planning. Washington: R.A.N.N. Research, 1971.
- Alberta Environment, Environmental Impact Assessment Guidelines. Edmonton: Land Conservation and Reclamation Division, 1977.
- Allison, L. Environmental Planning: A Political Philosophical Analysis. London: George Allen and Unwin Ltd., 1975.
- Anderson, James, et.al. "Environmental Assessment" in D. M. McAlister (ed) Environment: A New Focus for Land Use Planning. National Science Foundation. Washington: R.A.N.N. Research, October, 1971.
- Anderson, Frederic R. N.E.P.A. in the Courts. Resources for the Future, Inc. Baltimore: The John Hopkins University Press, 1973.
- Andrews, Richard N. "A Philosophy of Environmental Impact Assessment", Journal of Soil and Water Conservation Vol.25, No.5 (September/October, 1973).
- Anonymous, "The Natural Land Unit as a Planning Base", Landscape Architecture. Vol.58, no.2 (January, 1968), p.145-147.
- Appleby, A. G. Environment II Seminar, The Association of Consulting Engineers of Canada (Montreal, September 28-29, 1976).
- Armstrong, J. "Systems Approach to Environmental Impact", in R. B. Ditton and T. L. Goodale (ed) Environmental Impact Analysis: Philosophy and Methods. Proceedings of the Conference on Environmental Impact Analysis. Green Bay, Wis: Sea Grant Publications, 1972.
- Barnett, J. H. and Morse, C. Scarcity and Growth. Resources for the Future. Baltimore: The John Hopkins Press, 1965.

- Barrows, Harlan A. "Geography as Human Ecology" Annals of the Association of American Geographers, Vol.13, (1923) p.1-14.
- Berlin, E., Cicchetti, D. J., Gillen, W. J. Perspective On Power. Cambridge, Mass.: Ballinger Publishing Company, 1974.
- Bernard, L. L. "A Classification of Environments" American Journal of Sociology, (November, 1925) in E. W. Zimmerman; Introduction to World Resources. New York: Harper and Row, Publishers, 1964, p. 175.
- Bird, Michael J. An Analysis of Federal Interests Affected by the Proposed James Bay Hydro Development. Department of the Environment, Policy and Planning Directorate. Ottawa: May, 1972.
- Booy, C. "Environmental Management and Public Participation in Manitoba" in P. S. Elder. Environmental Management and Public Participation. Toronto: The Canadian Environmental Law Research Foundation, 1975, p.130.
- Boulding, K. E. "On Problems of Public Policy" in S. H. Schurr (ed) Energy, Economic Growth, and the Environment. Resources for the Future. Baltimore: John Hopkins University Press, 1972.
- Buckley, H. and Tihangi, E. Canadian Policies for Rural Adjustment, Economic Council of Canada. Ottawa: Queen's Printer, 1967.
- Burton, Thomas L. Natural Resource Policy in Canada. Issues and Perspectives. Toronto: McClelland and Stewart Limited, 1972.
- Caldwell, L. K. In Defence of Earth. Bloomington: Indiana University Press, 1972.
- Caldwell, L. K. Environment: A Challenge to Modern Society. Garden City: Doubleday, 1971.
- Caldwell, L. K. "Problems of Applied Ecology: Perceptions, Institutions, Methods and Operations Tools" Bio-Science, XVI, (August, 1966) p.524-527.
- _____, Canada, 1975. Ottawa, Information Canada, 1974.
- _____, Canada, 1973. Ottawa, Information Canada, 1973.

- Canada Land Inventory. Objectives, Scope and Organization. Ottawa: Department of Regional Economic Expansion, 1970.
- Canadian Council of Resource Ministers, Pollution and Our Environment. Proceedings of the National Conference. (Montreal; October 31 to November 4, 1966).
- Canadian Electrical Association. Environmental Guidelines. Task Force on the Environment (May, 1975).
- Cano, G. J. A Legal and Institutional Framework for National Resource Management. Rome: F.A.O., 1975.
- Canter, L. W. Environmental Impact Assessment. New York: McGraw-Hill Book Co., 1977.
- Caplice, D. P. Environmental Assessment in Ontario: Where It's At and How It Got There. Ontario Ministry of the Environment, Environmental Approvals Branch (1975).
- Carson, Rachel L. The Sea Around Us. New York: Oxford University Press, 1950.
- Carson, Rachel L. Under the Sea Wind. New York: Oxford University Press, 1941.
- Coomber, N. H. and Biswas, A. K. Evaluation of Environmental Intangibles. Bronxville, N.Y.: General Press, 1973.
- Cooper, W. E. and Vlasin, R. D. "Ecological Concepts and Applications to Planning" in D. M. McAllister (ed) Environment: A New Focus for Land Use Planning. R.A.N.N. Research, Washington: National Science Foundation, 1973. p.183-215.
- Crabbe, Philippe and Spry, Irene M. Natural Resource Management in Canada. Ottawa: University of Ottawa Press, 1973.
- Cressman, E. M. Planning the North Georgian Bay Recreation Reserve. Toronto: Ontario Department of Lands and Forests, 1971.
- Crowley, J. M. "Ecoregions of South Wellington County and Their Implications for Planning" in A. G. McLellan (ed) The Waterloo County Area: Selected Geographical Essays. Department of Geography. Waterloo: University of Waterloo, 1971.

- Dalkney, Norman C. The Delphi Method: An Experimental Study of Group Opinion. United States Air Force - Project Rand. Santa Monica, California: Rand, June, 1969.
- Dansereau, Pierre, "Diversite Des Ressources Dan L'Environnement Canadien". The Canadian Geographer. Volume XX (1) (Spring, 1976), p.4-14.
- d'Arge, R. C. "Economic Policies, Environmental Problems and Land Use" in D. M. McAllister (ed) Environment: A New Focus for Land Use Planning. R.A.M.M., Research, Washington: National Science Foundation, 1973. p.176-182.
- Darling, Frank F. "Future Environment: A Reflective View of the Background" in N. Polunin (ed) The Environmental Future. London: MacMillan Press Ltd., 1972. p.3-13.
- Department of Energy, Mines and Resources. An Energy Strategy for Canada: Policies for Self Reliance. Ottawa: 1976.
- Dee, N. et.al. Environmental Evaluation System for Water Resource Planning. U.S. Bureau of Reclamation. Columbus: Battelle Columbus Laboratories, 1972.
- Dickert, T. G. "Methods of Environmental Impact Assessment: A Comparison" in T. G. Dickert and K. R. Domeny (ed) Environmental Impact Assessment: Guidelines and Commentary. Berkeley: University of California, 1974, p.127.
- Dickert, T. G. and Domeny, K. R. Environmental Impact Assessment: Guidelines and Commentary. Berkeley: University of California, 1974.
- Dickert, T. G. and Sorensen, J. C. "Some Suggestions on the Content and Organization of Environmental Impact Statements" in T. G. Dickert and K. R. Domeny (ed) Environmental Impact Assessment: Guidelines and Commentary. Berkeley: University of California, 1974, p.35.
- Dooley, J. E. "Decisions on Social and Technological Tasks Incorporating Expression of Preference and Environmental Insult". Management Science. Vol.20, No. 6, (February, 1974).
- Dooley, J. E. and Newkirk, R. T. "A Planning System to Minimize Environmental Impact Applied to Route Selection" Kybernetes. Vol.5, (1976) p.213-220.

- Dorney, R. S. "Role of Ecologist as Consultants in Urban Planning and Design". Human Ecology. Vol. 1, No.3, (1973), p.183-200.
- Dorney, R. S. and Rich, S. G. Urban Design in the Context of Achieving Environmental Quality Through Ecosystem Analysis. School of Urban and Regional Planning. Waterloo: University of Waterloo (mimeograph).
- Dreyfus, D. A. and Ingram, H. M. "The National Environmental Policy Act: A View of Intent and Practice". Natural Resources Journal, Vol.16, No.2 (April, 1976) p.243-262.
- Drobny, N. L. and Smith, M. A. Review of Environmental Impact Assessment Methodologies. Columbus: Battelle Columbus Laboratories, 1972.
- Dubos, Rene. A God Within. New York: Charles Scribner Sons, 1972.
- Dubos, Rene. "Man and His Environment: Scope, Impact and Nature" in T. R. Detwyler (ed) Man's Impact on the Environment. New York: McGraw-Hill, 1972, p.688.
- Duffy, P. The Development and Practice of Environmental Assessment Concepts in Canada. Environment Canada, Planning and Finance Service, Occasional Paper #4, Ottawa: 1975.
- Dwivedi, O. P. "The Canadian Government Response to Environmental Concerns" International Journal (Toronto), Vol.28, Winter (1972-1973) p.134-152.
- Engler, Frank E. "Science, Industry and the Abuse of Rights-of Way" Science. Vol.127, #3298 (1959) p.573-580.
- Environment Canada. The Winnipeg Tribune. March 3, 1978. p.20.
- Environment Canada, "Guide for Environmental Evaluation" June, 1976. (mimeograph).
- Environment Canada, "E.A.R.P. Procedures" Memorandum from Deputy Minister Environment Canada, J. B. Seaborn to all A.D.M. and Regional Board Chairmen (October 2, 1975) (mimeograph).
- _____, Environmental Planning: An Approach to Environmental Analysis. Toronto: Plantown Consultants Ltd., October, 1974.

- , Environmental Studies: James Bay Territory and Surrounding Area. James Bay Development Corporation, 1973.
- Estrin, David. "Annual Survey of Canadian Law", Ottawa Law Review, Vol.7(1975), p.397.
- Flamm, Barry R. "A Philosophy of Environmental Impact Assessment: Toward Choice Among Alternatives", Journal of Soil and Water Conservation. Vol.28, No.5, (September/October, 1973), p.201-204.
- Fox, Irving K. "Institutions for Water Management in a Changing World" Natural Resources Journal, Vol.16, No.4 (October, 1976), p.743-758.
- Fox, Irving, K. and Wible, Lyman, "Information Generation and Communication to Establish Environmental Quality Objectives" Natural Resources Journal. Vol. 13, No. 1 (January, 1973), p.134-149.
- Franson, R., Lucan, A. R., and Thompson, A. R. "Dossier on Legal Problems in the Canadian North" Canadian Arctic Resources Committee Workshop, (May 24-26, 1972).
- Funnell, J. "Presentation to ECON '77". Winnipeg, Manitoba. (November 24, 1977).
- Gertler, L. O. "Regional Planning and Development" (1961) in L. O. Gertler, Regional Planning in Canada. Montreal: Harvest House, 1972, p.13-33.
- Gertler, L. O. Regional Planning in Canada. Montreal: Harvest House, 1972.
- Gibson, Robert B. "The Value of Participation" in P. S. Elder (ed) Environmental Management and Public Participation. Toronto: The Canadian Environmental Law Research Foundation, September, 1975.
- Glikson, A. The Ecological Basis of Planning. The Hague: Martinus Nijhoff, 1971.
- Graham, J. "Reflections on a Planning Failure". A submission prepared for the Soldandt Commission (Toronto: September 20, 1972).
- Haefele, E. T. Representative Government and Environmental Management. Resources for the Future Inc. Baltimore: The John Hopkins University Press, 1973.

- Hamill, L. "Analysis of Leopold's Quantitative Comparisons of Landscape Esthetics" Journal of Leisure Research. Vol.7, No.1 (1975), p.16-28.
- Hamilton, Roy. "The Senate Select Committee on National Water Resources: An Ethical and Rational Criticism" Natural Resources Journal, (April, 1962), p.45-54.
- Hare, F. K. and Jackson, C. I. Environment: A Geographical Perspective. Geographical Paper #52. Ottawa: Department of the Environment, 1972.
- Hausmanis, I. "Computer Aided Analysis of Alternative Route Locations Within the Guelph-Dundas Test Area", M. Eng., Thesis. Department of Civil Engineering, University of Toronto, (1971).
- Hills, G. Angus. "A Philosophical Approach to Landscape Planning". Landscape Planning. Vol. 1, Amsterdam: Elsevier Scientific Publishing Company, 1974, p.339.
- Hills, G. A., Love, D. V. and Lacate, D. S. Developing a Better Environment. Ontario Economic Council, August, 1976.
- Hills, G. A. The Ecological Basis for Land Use Planning. Research Report #46. Ontario Department of Lands and Forests, December, 1961.
- Hills, G. A. "Regional Site Research", The Forestry Chronicle. Vol. 36, No. 4 (December, 1960), p.401-423.
- House, John. "Geographer, Decision Takers and Policy Makers" in M. Chisolm and B. Rodgers (ed) Studies in Human Geography. Social Science Research Council. London: Heinemann Educational Books, 1973. p.272-305.
- Hufschmidt, Maynard M. "Needs for Research on Planning and Decision-Making Aspects of Human Uses of the Atmosphere", Human Dimensions of the Atmosphere. National Science Foundation, Washington: U. S. Government Printing Office, February, 1968. p.21-28.
- Hufschmidt, Maynard M. "The Methodology of Water Resource System Design" In I. Burton, R. W. Kates (ed) Readings in Resource Management and Conservation. Chicago: The University of Chicago Press, 1965. p.558-570.
- Huntington, C. C. and Carlson, F. A. The Geographical Basis of Society. New York: Prentice-Hall, Inc., 1934.

- Hoffman, David W. An Evaluation of Environmental Health Effects Associated With High Voltage Transmission Lines. University of Minnesota, School of Public Health, (October, 1975).
- Jain, R. K., Urban, L. U. and Stacey, G. S. Handbook for Environmental Impact Analysis. U. S. Department of the Army. Champaign, Illinois: Construction Engineering Research Laboratory, April, 1974.
- Johns, David H. Environmental Quality Evaluation and Impact Analysis Methodology. Centre for Settlement Studies. Series #2, Research Report #14. Winnipeg: University of Manitoba, March, 1973.
- Jordan, James J. "A Philosophy of Environmental Impact Assessment: Some Considerations for Implementation", Journal of Soil and Water Conservation. Vol.28, No.5, September/October, 1973, p.205-207.
- Kahn, Alfred E. The Economics of Regulation: Principles and Institutions. Vol.2, New York: John Wiley & Sons Inc., 1971.
- Kates, Robert W. "Geography: The Case for the Specialized Government in a Science of Environment" in M. E. Garnsey and J. R. Hibbs (ed) Social Sciences and the Environment. Boulder, Colorado: University of Colorado Press, 1967. p.53-76.
- Kay, David A. and Kolnikoff, Eugene B. (ed) World Eco-Crisis. Madison: The University of Wisconsin Press, 1972.
- Kneese, Allen V. "Regional Water Quality Management" in A. de Vos et.al. (ed) The Pollution Reader. Montreal: Harvest House, 1968. p.188.
- Krauskopf, T. M. and Bunde, D. C. "Evaluation of Environmental Impact Through a Computer Modelling Process" in R. B. Ditton and T. L. Goodale (ed) Environmental Impact Analysis: Philosophy and Methods. Green Bay: University of Wisconsin, 1972.
- Lacate, D. S. "The Role of Resources Inventories and Landscape Ecology in the Highway Route Selection Process" Theses. Department of Conservation. Cornell University, 1970.
- Lash, T. J. F. and Maasland, D. E. L. "On Doing Things Differently - An Essay On Environmental Impact Assessment of Major Projects." Science Council of Canada. (mimeograph).

- Leopold, L. B. et.al. A Procedure for Evaluating Environmental Impact. U.S. Geological Survey. Circular #645. Washington: Government Printing Office, 1971.
- Leopold, L. B. and Marchand, M. O. "On the Quantitative Inventory of the Riverscape:", Water Resources Research. (August, 1968), p.710-717.
- Lewis, Philip H. Recreation in Wisconsin. Madison: Wisconsin Department of Resource Development, 1962.
- Lewis, Philip H. Landscape Analysis I: Lake Superior South Shore Area. Madison: Wisconsin Department of Resource Development, 1962.
- Lewis, Philip H. "Quality Corridors for Wisconsin", Landscape Architecture Quarterly. (January, 1964), p.100-107.
- Lloyd, Trevor. "Canada's Arctic in the Age of Ecology" Foreign Affairs. Vol.48, No.4 (July, 1970) p.726.
- Lucas, A. "Legal Foundation for Public Participation in Environmental Decision Making", Natural Resources Journal. Vol.16, No.1, (1976).
- Lundqvist, L. J. Environmental Policies in Canada, Sweden and the United States: A Comparative Overview. London: Sage Publications, Inc. 1974.
- Lyle, J. and von Wodtke, M. "An Information System for Environmental Planning", American Institute of Planners Journal. (November, 1974), p.394-413.
- James F. MacLaren Limited. Methodology of Environmental Impact Evaluation. A Report to Environment Canada - Toronto, 1973.
- MacNeil, J. W. Environmental Management. Ottawa: Queen's Printer, 1971.
- Manitoba Government, Environmental Assessment and Review Process, Department of Mines, Resources and Environmental Management. Winnipeg: July, 1976.
- Manitoba Hydro. Environmental Assessment: Ridgeway to Sprague. Winnipeg: James F. MacLaren Limited, 1975.
- Manitoba Hydro. Environmental Assessment for a 500 kV Facility: Dorsey Riel-Minneapolis. Winnipeg; James F. MacLaren Limited, December, 1976.

- Manitoba Legislative Assembly, Debates. 4 March 1976: p.635.
- McAllister, Donald M. (ed) Environment: A New Focus for Land Use Planning. National Science Foundation. Washington: R.A.N.N. Research, October, 1971.
- McHarg, Ian L. Design with Nature. Philadelphia: The Falcon Press, 1971.
- McHarg, Ian L. "An Ecological Method for Landscape Architecture" Landscape Architecture. Vol.57, No.2, (January, 1967).
- Meadows, D. H. et.al. The Limits to Growth. New York: Universe Books (Publishers), 1972.
- Munn, R. E. (ed) Environmental Impact Assessment: Principles and Procedures. S.C.O.P.E. Report #5. Toronto: S.C.O.P.E., 1975.
- Muntz, G. H. "Federal Government Policy and the Issue of Inland Water Pollution" M.A. Thesis, University of Guelph (unpublished).
- Nancarrow, D. R. "What Does Environmental Assessment Mean to Project Development?" Environment II Seminar. Association of Consulting Engineers of Canada. (Montreal: September 28-29, 1976).
- National Research Council, Environmental Quality and Social Behaviour: Strategies for Research. Washington: National Academy of Sciences, 1973.
- Nelson, J. G. "Recreation, Land and Life", The Canadian Geographer. Vol. XX, (1) (Spring, 1976), p.111-121.
- Nelson, J. G., Scace, R. C., Kouri, R. (ed) Canadian Public Land Use in Perspective. Ottawa: Social Science Research Council of Canada, 1974.
- Odum, E. P. Fundamentals of Ecology. Philadelphia: W. B. Saunders Ltd., 1971 (revised edition).
- Odum, E. P. "Relationships Between Structure and Function in the Ecosystem" in G. W. Cox (ed) Readings in Conservation Ecology. New York: Meredith Corp., 1969. p.6.
- Odum, Ziemien et.al. Optimum Pathway Matrix Analysis Approach to the Environmental Decision-Making Process. Institute of Ecology - Athens, GA.: University of Georgia 1971.

- Ontario Ministry of the Environment, "Green Paper on Environmental Assessment" (September, 1973).
- O'Riordan, T. Perspectives on Resource Management. London, England: Pion Limited, 1971.
- Ostrom, Vincent. "The Water Economy and Its Organization" Natural Resources Journal. (April, 1962) p.72.
- Reitze, A. W. and Prezyna, A. E. "Utilizing Solar Power - The Institutional Challenges" Environmental Comment. April, 1976. p.1.
- Richardson, H. W. Regional Economics. London: Weidenfeld and Nicolson, 1969.
- Robinette, Gary O. Energy and Environment. Dubuque, Iowa: Kendall/Hunt Publishing Corporation, 1973.
- Rowell, C. H. "Power Transmission Lines - A Future Scenario", Public Utilities Fortnightly. Volume 98, no.3 (July 29, 1976) p.15-19.
- Saumier, A. "The Closing Plenary Session" Pollution and Our Environment. Proceedings of the National Conference. Montreal: Canadian Council of Resource Ministers, November 4, 1966. p.99.
- Sauve, Jeanne (The Honourable). "Presentation to the Association of Consulting Engineers of Canada", Workshop on Environmental Assessment, (October, 1975).
- Schellenburg, H. O. 'Identification, measurement and incorporation of environmental quality objectives in natural resources development.' Ph.D. Dissertation. Iowa State University, 1973. (unpublished).
- Schramm, Gunter. "Human Institutional Factors", Natural Resources Journal. Vol.16, No.4, (October, 1976). p.923-937.
- Smil, Vaclav. Energy and the Environment: A Long Range Forecasting Study. Manitoba Geographical Studies #3. Winnipeg: The University of Manitoba, Department of Geography, 1974.
- Shelton, R. L. "Evaluation of Intangibles" Aspects of Planning, Evaluation and Decision-Making in Sport Fishery Management. Department of Conservation, Extension Series #1, Cornell University, May, 1968.

- Sorensen, J. C. A Framework for Identification and Control of Resource Degradation and Conflict in the Multiple Use of the Coastal Zone. Department of Landscape Architecture, Collage of Environmental Design, Berkeley: University of California, June, 1971.
- Spafford, G., Haberman, L. P. and Young, D. A. "Guidelines for Inter-Utility Energy Exchange Agreements". Halifax: E.I.C. - I.C.I. Congress, October, 1976.
- Stoddard, D. R. "Geography and the Ecological Approach: The Ecosystem as a Geographical Principle and Method", Geography. Vol.50, (July, 1965). p.242-251.
- Teclaff, Ludwik A. "Humanizing Water Resources Development and Use with Environmental Protection in Municipal and International Law", Natural Resources Journal. Vol. 16, no.4, (October, 1976). p.807-861.
- United Nations, General Assembly, "Report of the United Nations Conference on the Human Environment , Stockholm, june 5-16, 1972", U.N. Doc.R.C 48/14, (1972).
- United States Department of the Interior and United States Department of Agriculture. Environmental Criteria for Electric Transmission Systems. Washington: U.S. Government Printing Office, 1970.
- Utton, A. E. and Henning, D. H. Interdisciplinary Environmental Approaches, Costa Mesa, California: Educational Media Press, 1974.
- Walden, F. A. and Griffiths, M. An Ecological Study of The North Pickering Project Area and Toronto Airport II Toronto: Ontario Ministry of Natural Resources, March, 1974.
- Warner, M. L. and Bromley, D. W. Environmental Impact Analysis: A Review of Three Methodologies. Institute for Environmental Studies. Madison Wisconsin: University of Wisconsin, 1974.
- White, Gilbert F. "Introduction: World Trends and Needs", Natural Resources Journal. Vol.16, No.4, (October, 1976), p.737-741.
- White, L. (Jr) "The Historical Roots of Our Ecological Crisis", Science. CLV (March, 1967). p.1203-1207.

- Wichelman, Allan F. "Administrative Agency Implementation of the National Environmental Policy Act of 1969: A Conceptual Framework for Explaining Differential Response", Natural Resources Journal. Vol.16, No.2, (April, 1976). p.263-300.
- _____, Workshop on the Philosophy of Environmental Impact Assessments in Canada (Proceedings) Winnipeg: Environmental Protection Board, October, 1973.
- Young, D. R. "Ontario's Environmental Assessment Act: How It's Going to Work", Speech to the Canadian Society of Environmental Biologists, Toronto (January 7, 1976).
- Young, L. B. "Lighting Up in America" Sierra Club Bulletin. October, 1974, p.21.
- Young, L. B. "Forests of the Future" Sierra Club Bulletin. September, 1973, p.11.
- Zimmerman, E. W. Introduction to World Resources. H. L. Hunker (ed) New York: Harper and Row Publishers, 1964.

APPENDICES

Appendix I: Legislation Responsibilities of the Federal
Department of the Environment

1. Canada Water Act
2. Canadian Wildlife Act
3. Clean Air Act
4. Coastal Fisheries Protection Act
5. Eastern Rocky Mountain Forest Conservation Act
6. Fish Inspection Act
7. Fisheries Act
8. Fisheries Development Act
9. Fisheries Price Support Act
10. Fisheries Research Board Act
11. Forestry Development and Research Act
12. Freshwater Fish Marketing Act
13. Game Export Act
14. Great Lakes Fisheries Convention Act
15. International River Improvements Act
16. Migratory Birds Convention Act
17. North Pacific Fisheries Convention Act
18. North Pacific Habitat Fishery Convention Act
19. Northwest Atlantic Fisheries Convention Act
20. Pacific Fur Seals Convention Act
21. Pacific Salmon Fisheries Convention Act
22. Salt Fish Act
23. Weather Modification Information Act
24. Whaling Convention Act

Appendix II: National Energy Board Guidelines on the
Environmental Information Required with Applications
for Certificates for International Power Lines

1. General Requirement

Section 44 of the National Energy Board Act requires the Board, before issuing a certificate for an international power line, to take into account all matters that appear to it to be relevant. The Board deems the environmental impact of a line to be one such matter. Accordingly, every applicant for a certificate is required henceforth to provide an assessment of the environmental impact of the facility for which authorization is requested. The detail of the assessment should be commensurate with the magnitude and complexity of the expected impact.

2. Application for Exemption

Applicants for certificates for lines of voltage less than 50 kV, on single poles on the right-of-way of a road or railway, may apply to the Board for exemption from these requirements.

3. Submission of Studies and Other Applications

With the environmental assessment, the applicant shall submit copies of:

- a) any studies that have been made on the environmental impact of the proposed line or any part thereof; and of
- b) any applications to and decisions by public bodies, relating to the line.

4. The Existing Environment

The applicant shall provide:

- a) a map or maps of scale at least 1:50,000 based on either maps of the National Topographic System or on aerial photographs, to show the proposed right-of-way and for a width of at least one kilometre on each side of the power line to portray the following:
 - (i) the surface and near surface geology,
 - (ii) soil types, classified in the Canadian system,
 - (iii) any recognized geological or hydrological hazards such as landslides, mudflows, floods, earthquakes,

- (iv) the habitats of terrestrial animal life, wetland furbearers and waterfowl, of recognized importance,
 - (v) the habitats of rare or endangered plant species,
 - (vi) spawning beds of fish species of recognized importance,
 - (vii) the locations of public recreational areas,
 - (viii) special areas such as national and historical parks, provincial parks, historic and archaeological sites, ecological reserves, conservation areas, Indian reserves,
 - (ix) existing land use,
 - (x) water supply intakes,
 - (xi) existing and proposed transmission towers and other power facilities, and
 - (xii) any proposed construction roads and camps; and
- b) a description of the environmental components listed in subsection (a).

5. Environmental Standards

The applicant shall state what environmental standards,

specifications or guidelines, if any, would be followed in the planning, design, construction and operation of the line.

6. The Environmental Impact

The applicant shall state:

- a) what width of right-of-way is proposed, and why this width was selected,
- b) what changes the construction and operation of the line and of any associated temporary or permanent roads would cause to:
 - (i) land drainage and erosion,
 - (ii) vegetation,
 - (iii) wildlife, especially rare or endangered species,
 - (iv) fish spawning and productivity,
 - (v) agriculture, recreation and other human activities,
 - (vi) water supplies, and
 - (vii) land values,

showing in each case what methods would be used to minimize undesirable effects, and why such effects should not be further reduced:

- c) what efforts would be made to ensure that the right-of-way:
 - (i) avoids scenic, historic, residential and recreational areas, and
 - (ii) minimizes conflict with any present or approved future land use,
- d) what efforts would be made to minimize the marring of the landscape by the right-of-way, to improve the appearance of the line, to screen it from highways and other areas of public view, and to blend it into the environment,
- e) what plans have been made for surface restoration after construction, and for the disposal of construction excavation, debris and wastes,
- f) what pesticides or herbicides would be used in the construction and maintenance of the right-of-way, including quantities, methods of application, and effects,
- g) what supervision and inspection of environmental effects and protection would be provided:
 - (i) during construction, and
 - (ii) during subsequent operations,
- h) what steps would be taken to minimize radio interference and T.V. interference, and what

- levels would be expected in decibels above 1 microvolt per metre at the edge of the right-of-way under fair and foul weather conditions,
- i) for transmission voltages above 240 kV, what levels of:
- (i) audible noise in decibels, and
 - (ii) ozone concentration in parts per billion,
- would be expected at ground level at the edge of the right-of-way under fair and foul weather conditions,
- j) for transmission voltages above 240 kV, what values of electrostatic field gradient in kilovolts per metre would be expected at mid-span:
- (i) directly under the outermost conductor, and,
 - (ii) at the edge of the right-of-way,
- and what measures, if any, would be taken to protect people or livestock contacting vehicles or metallic structures under the line from electric shock resulting from induced voltages, and
- k) for any substation facilities forming part of the international power line, the audible noise

in decibels that would be caused at the property line, a description of the public exposure to it, and what steps would be taken to minimize the noise.

7. Alternatives

The applicant shall state what consideration was given to alternatives such as:

- (i) different routes,
- (ii) replacing or upgrading existing lines,
or
- (iii) multiple-use right-of-way with other
utilities,

and why such alternatives were rejected.

Appendix III: General Guidelines for the Environmental Assessment of Electric Transmission Lines Issued by the Manitoba Environmental Assessment and Review Agency - November 26, 1976.

1. Overview Summary

The important findings of the report should be summarized under this heading in terms understandable to the general public and those unfamiliar with scientific usage. The summary should contain a description of the probable major environmental impacts, the amelioration and mitigation measures and a documentation of the significance of the residual impacts. The summary should also clearly identify data gaps or knowledge deficiencies and the limitations they have imposed on the impact assessment.

2. The Project Setting

2.1 Project Proponents

The project proponent should be identified and should accept responsibility for statements and judgements in the environmental impact assessment statement.

2.2 Need for the Project

The need for the power transmission project should be outlined in terms of historic, existing and forecasted demands. Interrelationships between existing and

proposed power sources should be discussed in terms of demand.

2.3 Alternatives

The proponent should present and discuss the benefits and disbenefits in terms of environmental factors of each feasible alternative in relation to other alternatives for the proposed project. The proponent shall state what consideration was given to alternatives such as:

- (i) different routes,
- (ii) replacing or upgrading existing lines,
or,
- (iii) multiple-use right-of-way with other utilities, and why such alternatives were rejected.

2.4 Associated Projects

All projects, existing or proposed, which may be affected by the electric power transmission line and which in turn may cause environmental concern should be identified. Broad long-term probable spin-off developments should also be discussed in terms of their environmental effects.

3. Characteristics of Proposal

All alternatives not discarded in 2.2 above should be discussed. Factors common to all alternatives

and factors unique to individual alternatives should be presented and discussed.

3.1 General Layout

The proposed power corridor and/or right-of-way location should be illustrated on maps of the National Topographic System or on aerial photographs of a scale suitable for the clear identification of roadways, access routes, substations, work camps, power sources and other utility corridors or of a scale of at least 1:50,000. The topographic maps or aerial photographs must show for a width of at least one Kilometre on each side of the power line the following:

- (i) the surface and near surface geology,
- (ii) soil types, classified in the Canadian system, utilizing the Provincial Department of Agriculture soil survey,
- (iii) any recognized geological or hydrological hazards (such as landslides, mudflows, folds, earthquakes, etc.),
- (iv) the habitats of terrestrial animal life, wetland furbearers and waterfowl, of recognized importance,
- (v) the habitats of rare or endangered plant species,
- (vi) the spawning beds of fish species of recognized importance,

- (vii) the locations of public recreational areas, .
- (viii) special areas such as national and historic parks, provincial parks, historic and archaeological sites, ecological reserves, conservation areas, Indian reserves, etc.,
- (ix) existing land use including agricultural ... Department of Agriculture cropping practices, intensive agricultural development and farmsteads,
- (x) water supply intakes,
- (xi) existing and proposed transmission towers and other power facilities,
- (xii) any proposed construction roads and camps and,
- (xiii) the route number of any Provincial Trunk Highway ... Department of Highways (PTH) or Provincial Road (PR).

3.2 Construction Details

The proposed construction program should be described in its entirety. Major components for consideration include:

- nature and extent of right-of-way surveys,
- clearing boundaries, methods, scheduling and disposal of cuttings,

- extent and nature of severance of existing
... Department of Agriculture, parcels of land,
- location and design of crossings at streams
... Department of Mines, Resources and Environmental Management, rivers, lakes, drains, floodways and roadways,
- tower and line heights, spacing intervals and variations along the right-of-way,
- location and quality of access roads,
- techniques followed in erecting the line and its supporting structures, to include tower and line heights, spacing intervals and variations along the right-of-way, detailing ... Department of Highways, the crossing of highway routes,
- schedules of construction.

3.3 Operation and Maintenance

The scheduling and methods of inspection and maintenance of the transmission line should be detailed.

3.4 Abandonment and Rehabilitation

The proponent should describe the expected life of the project, disposition of redundant facilities, closure, revegetation or alternate use of right-of-ways and access roads.

4. Description of the Existing Environment and Resource Use

4.1 Air

A description of the historic climatic conditions that prevail in the vicinity of the proposed transmission line should be provided. Factors discussed should include: temperature, precipitation, wind speed and direction, the frequency of temperature inversions, fog, smoke, haze, freezing precipitation and high winds.

4.2 Land

The proponent should provide descriptions of the topographic, physiographic and geologic features within the proposed corridor. Soil chemistry, physical characteristics and soil stability should be discussed.

The proponent should provide information on the present use of land and any conflict which would result with other projected uses.

4.3 Water

The biological, chemical and physical characteristics of surface and ground water and its present and proposed use should be described.

4.4 Biological

The proponent should provide documentation and an evaluation of biologic communities, within the right-of-way, considered to have a significant agricultural,

commercial, recreational, educational, sport, ecological or scientific value. The description should include the following factors: species composition, seasonal fluctuations, movements, reproduction, trophic structure, population dynamics, critical parameters, rare and endangered species and the ability of the biologic communities to withstand increased pressure as a result of improved access to the area.

4.5 People

The proponent should describe the communities in the areas, their composition, facilities and attitude toward the proposed development. The proponent should report on consultation with communities and residents affected and the results of such consultation. Municipal Services should corroborate such consultation. Special attention is to be paid to the manner in which property owners are approached. Describe what affects occur to the local tax base.

4.6 Land and Resource Use

An extensive description of the present, proposed and potential land and resource uses should be provided. Major factors to be considered include: agriculture, forestry, mining, recreation, archaeological, historic, ownership and water resources and traditional land

useuse; effects on native peoples and non-native peoples in terms of jobs, income and income-in-kind. This should include the type of property rights sought and the effects on land subdivision; a description of any district or municipal planning schemes should be included and any inconsistencies noted.

4.7 Other

A description of any other items not mentioned above (Section 4) but identified in Section 3.

5. Environmental Standards

The proponent shall identify all legislation, regulations and guidelines that apply to the proposed project and state how they propose to comply with them. Furthermore, the proponent shall identify what additional environmental standards, specifications, objectives or guidelines, if any, would be followed in the planning, design, construction and operation of the line.

6. Environmental Impacts and Mitigating Measures

The proponent should consider and discuss all potential impacts, both short and long term, in the area to be affected by the proposed electric power transmission

project, in terms of the categories listed below and any others considered pertinent. Options and measures available to avoid, minimize or mitigate harmful effects should be investigated and discussed under each topic.

The proponent shall state:

- a) what width of right-of-way is proposed, and why this width was selected,
- b) what changes the construction and operation of this line and of any associated temporary or permanent roads would cause to:
 - (i) land drainage and erosion,
 - (ii) vegetation,
 - (iii) wildlife, especially rare or endangered species,
 - (iv) fish spawning and productivity,
 - (v) recreation and other human activities,
 - (vi) water supplies,
 - (vii) land values, and
 - (viii) agriculture: present as well as proposed and potential land and resource use,

showing in each case what methods would be used

- to minimize undesirable effects, and why such effects should not be further reduced,
- c) what efforts would be made to ensure that the right-of-way:
- (i) avoids scenic, historic, residential and recreational areas, and,
 - (ii) minimizes conflict with any present or approved future land use,
- d) what efforts would be made to minimize the marring of the landscape by the right-of-way, to improve the appearance of the line, to screen it from highways and other areas of public view, to enhance habitat biological production and, to blend it into the environment,
- e) what plans have been made for surface restoration after construction, and for the disposal of construction excavation, debris, and wastes,
- f) what pesticides or herbicides would be used in the construction and maintenance of the right-of-way, including quantities, methods of application, and effects,
- g) what supervision and inspection of environmental effects and protection would be provided:

- (i) during construction, and
 - (ii) during subsequent operations,
- h) what steps would be taken to minimize radio interference and TV interference, and what levels would be expected to decibels above 1 microvolt per meter at the edge of the right-of-way under fair and foul weather conditions. What standards will be employed to minimize reception and transmission interference in highway vehicles,
- i) for transmission voltage above 240 kV, what levels of:
 - (i) audible noise in decibels, and
 - (ii) ozone concentration in parts per billion,would be expected at ground level at the edge of the right-of-way under fair and foul weather conditions,
- j) for transmission voltages above 240 kV, what values of electrostatic field gradient in kilovolts per meter would be expected at mid-span:
 - (i) directly under the outermost conductor, and
 - (ii) at the edge of the right-of-way,and what measures, if any, would be taken to protect people or livestock contacting vehicles

- or metallic structures under the line from electric shock resulting from induced voltages,
- k) for any substation facilities forming part of the international power line, the audible noise in decibels that would be caused at the property line, a description of the public exposure to it, and what steps would be taken to minimize the noise,
 - l) what steps would be taken to dispose of or utilize slash and any other wastes to be generated, and
 - m) will the land within the right-of-way be leased for other uses and state the conditions of the lease.

7. Residual Impacts

The nature, extent, duration and significance of environmental impacts that will remain despite the undertaking of all proposed mitigating measure, should be detailed.

8. Supporting Documentation

To include: an annotated list of references cited, copies of reports developed from studies associated with the evaluation, summaries of field data used to develop the description of the existing environment.

Appendix IV - Manitoba Hydro Engineering and Design Criteria
for the 500,000 Volt Transmission Line

- Operating Voltage - 500,000 volts
- Cable Arrangement - Quadruplex bundle phase arrangement
- Aluminum conductor, steel reinforced
- 1" diameter
- Delta configuration
- Ruling Span - 395 metres (5 towers every 2 kilometres approximately)
- Minimum Conductor Clearance - 12.2 metres
- Tower Type - Self-supporting lattice
- Guyed structures in remote areas
- Tubular steel under review in aesthetically sensitive areas
- Right-of-Way - Dorsey Station - 152.4 metres
- Eastern corridor - 213.4 metres
- Single circuit - 76.2 metres

Appendix V: Chronology of Major Events During the
Manitoba Hydro Environmental Assessment and
Planning Study

April, 1976	Study program for 500,000 volt transmission line refined and initiated by Manitoba Hydro
May 21, 1976	Manitoba Hydro sends letter to all councils in proposed study area, outlining study program and requests meeting
June 1-14, 1976	Manitoba Hydro meets with all councils in urban and rural study areas
June 18, 1976	Meeting with City of Winnipeg Environment Committee
June 22, 1976	Meeting with Manitoba Naturalist Society to review project
July-August, 1976	Field studies, selection and verification of macro-corridors
August 18-Sept. 30, 1976	Review of macro-corridors through I.P.B.
September 22, 1976	Initial meeting with staff of M.E.A.R.A.
October 12-26, 1976	Review of alternative rights-of-way within macro-corridors
November 4, 1976	Completion of special studies - eg., electrical effects of high voltage transmission lines
November 8, 1976	Review of alternative routings with joint meeting of all urban study area councils

November 15, 1976 Submission of preliminary preferred routes to I.P.B.

November 29, 1976 Review and acceptance of preferred route by all councils at a joint meeting in Steinbach

December 6, 1976 I.P.B. approval of preferred route with exception of Marchand Ridge routing

December 7, 1976 Provincial Land Use Committee of Cabinet orders re-routing of powerline to cross Marchand Ridge and gives approval to routing

December 16, 1976 Urban study area municipal councils approve urban routing at joint meeting in West St. Paul

December 16, 1976 Meeting with the Manitoba Department of Renewable Resources to determine an acceptable routing over the Marchand Ridge

December 23, 1976 Publication of Manitoba Hydro environmental assessment report

January, 1977 Supplementary report prepared to document Marchand Ridge re-routing. Submissions to the N.E.B.

February 16, 1977 Deficiency letter received from the N.E.B. and response prepared

March 29, 1977 Manitoba Hydro receives notification that the transmission line will be subject to the M.E.A.R.P. and received environmental assessment guidelines

May 2-13, 1977 N.E.B. Hearings in Winnipeg

August, 1977 N.E.B. approves 500,000 volt inter-connection with Northern States Power

June 10, 1977 M.E.A.R.A. requests additional data regarding the transmission line

July 13, 1977 Manitoba Hydro responds to above request

January 24, 1978 Manitoba Hydro sends additional data to the M.E.A.R.A.

March 8, 1978 E.A.R.A. approves Manitoba Hydro environmental assessment report and recommends ministerial approval