PUBLIC POLICY AND
HYDROELECTRIC DEVELOPMENT IN THE CANADIAN NORTH
THE CASE OF THE SNARE FORKS PROJECT

by

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ABSTRACT

This study of the Snare Forks hydroelectric development in the Northwest Territories has two basic objectives. The first is to provide a critical assessment of the institutional framework (both structural and procedural) within which resource planning decisions are taken in the Canadian North, with reference to the criteria of 1) democratic accountability, and 2) technical and economic efficiency. The second objective is to suggest (if shortcomings in institutional design are found) means of upgrading structures and procedures to conform with the normative criteria.

The Snare Forks (or Strutt Lake) hydroelectric development was first conceived during 1971, when the Northern Canada Power Commission (NCPC) began to consider construction of a third hydro dam on the Snare River, which flows into the north arm of Great Slave Lake, to meet the growing demands of the City of Yellowknife and adjacent mining operations, 130 kilometres to the southwest.

A water use licence, required under the Northern Inland Waters Act, was obtained by NCPC after one public hearing before the Northwest Territories Water Board in February 1974. Construction commenced during the spring of that year. However, shortly afterwards the commission was notified of a mining claim existing within the area designated to be flooded. It also became evident that bedrock and permafrost conditions at the site would not support the dyke structures.

In September, 1974, the commission decided to relocate the dam 1.4 kilometres downstream, away from the mining claim area, and at a lower elevation (173.5 m above sea level, as opposed to 183m), to eliminate the need for dyking on permafrost. Peak power output was thus reduced from 14 megawatts to 9.6 megawatts.
An amendment to the original water licence facilitating the design changes was approved by the Water Board in March, 1975. This was done without the normally required (under NIWA) public hearings, as the Board ruled that an emergency existed. It was not until after the amendment was approved that a press release was issued revealing the construction problems to the general public.

The Snare Forks plant was commissioned in November, 1976, one year behind schedule. The final cost of the project was $27.1 million, as opposed to the original estimate of $14.1 million. As a consequence of the Snare Forks cost overruns, electric power rates in Yellowknife and other Northwest Territories communities were immediately raised by as much as ninety per cent.

The account of the Snare Forks job history and planning process is based almost entirely on primary sources, including documents and correspondence of the Department of Indian Affairs and Northern Development, Environment Canada, the Northern Canada Power Commission, and the Northwest Territories Water Board.

The criteria against which the decision-making system is assessed are derived from the survey of the leading contemporary literature on public administration and organizational behaviour, with an attempt to relate the theories thus obtained to the conditions prevalent in the Canadian North.

It appears that circumstances over which decision-makers concerned had no direct control, particularly inflation and adverse weather conditions during construction, contributed in a major way to cost overruns. However, a review of the administrative and planning process reveals a failure by NCPC to adequately take into account possibilities regarding design and scheduling, as well as a closed, secretive decision-making process that effectively excluded local community interests. The failure of existing institutional mechanisms to
prevent serious conceptual flaws in a public project and secrecy in decision-making gave rise to a widespread sense of alienation and mistrust among Snare system consumers in the aftermath of the project. At the same time, the project history points to a number of social and economic conditions present in the North that act as barriers to the attainment of optimal levels of democratic accountability and technical/economic efficiency in decision-making; and cannot be fully addressed by any set of institutional prescriptions.
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CHAPTER ONE

CONCEPTUAL FRAMEWORK

1. Introduction

The public power movement, which rose to prominence in Canada and certain regions of the United States during the early decades of this century, grew around the premise that only state-operated power enterprises could be truly responsive to public needs and provide the cheap and abundant electrical power required for industrial expansion. This assumption gave rise to the formation of the Ontario Hydro-Electric Power Commission in 1911 and, later, Manitoba Hydro, British Columbia Hydro, Hydro-Quebec and other public power utilities in Canada. The movement was less active and widespread in the United States, but succeeded in bringing about the establishment of public power agencies in a number of regions, most notably the Tennessee Valley Authority in the 1930's.

In recent years, the public power industry in Canada has fallen under increasing scrutiny, the conviction growing in many quarters that it has not been living up to its initial purpose and expectations. The definition of this purpose has been complicated over the past two decades by the growth of environmental concerns, which often run counter to the objectives of economic efficiency and promotion of industrial expansion. This trend towards reassessment of the role of public power and the direction of electrical energy planning has been reflected in the 1977 appointment of a Royal Commission to review the structure and activities of Ontario Hydro, the completion of a similar inquiry into the state of Manitoba Hydro, and the 1979 presentation of the Report of the Legislative Committee on Crown Corporations in British Columbia concerning the Columbia Treaty Projects and planned B.C. Hydro expansion.
This concern has also touched the activities of a somewhat smaller public power enterprise, the Northern Canada Power Commission (NCPC), a federal Crown corporation established in 1948 for the purpose of generating electrical power in the regions north of the sixtieth parallel. The Commission came under some criticism as early as the mid-1960's for its handling of the Taltson River development. During the early 1970's, NCPC ran into costly difficulties with its Aishihik hydro-electric project in the Yukon Territory. Here, the Commission's inability to obtain initial approval for its proposal from the territorial Water Board resulted in lengthy delays, a crash construction program, and costs totalling $39 million as opposed to the original estimate of $17 million.

A short time later, in 1974, the Commission again encountered project difficulties, this time relating to the Snare Forks (or Strutt Lake) development in the Northwest Territories. Here the administrative process worked more smoothly, with approval being obtained from the Water Board after on public hearing, at which only minimal opposition was encountered from local groups. However, the discovery that the ground at the site would not support the dyke structures due to permafrost and bedrock conditions, coinciding with the belated revelation of a mining claim within the area of the proposed reservoir, forced the relocation of the dam 1.4 kilometres downstream form the original site. This move resulted in a reduction of available head by nine metres, with a consequent loss in power output (9.6 MW peak as opposed to 14 MW). The final cost of the project was $27,136,000, far exceeding the original estimate of $14,085,000, the cost overruns being forwarded to consumers in the form of rate increases of up to ninety per cent.

Cases such as Snare Forks, and the activities of the Northern Canada Power Commission in general, are of interest for a couple of reasons. Because
NCPC operates on a relatively small scale, an examination of its activities allows us to study in microcosm the workings of public utilities, as well as other autonomous public agencies and state-owned enterprises, and the political and administrative problems involved. More important, such case studies shed light on the specific problems faced by decision-makers in the northern environment.

2. Objectives of the Thesis

Our essential purpose is to provide a critical analysis of the institutional framework of decision-making in the Canadian North, as it relates to problems of economic development and resource management in general and to electrical energy planning in particular. The relevant structures and procedures will be examined on the basis of two normative criteria, Accountability (the extent to which decisions and processes conform to generally accepted liberal democratic principles), and Efficiency, (the extent to which the institutional design promotes technically well-conceived developments, efficient use of public funds, and protection of the northern environment). If we uncover shortcomings in the institutional framework, we will want to formulate recommendations as to how the system can be upgraded to conform with the above criteria of judgment.

Differing ideas exist as to how these normative goals in public administration are best attained -- the competing concepts will be spelled out below. Upon examination, we will want to assess their relevance to the particular conditions of the Canadian North, and base our recommendations and conclusions on the model(s) which best suit those conditions.

3. Normative Criteria

Differing bases exist for assessing the desirability of outcomes of decision-making processes, as well as opposing concepts regarding the kinds of
structures and procedures that best promote desirable outcomes. These will be discussed below.

1) **Accountability - Competing Definitions**

For our purposes, Accountability, as it relates to public administration may be defined in a broad sense as the extent to which decision-makers are held responsible for their actions before the public, the extent to which decisions may be influenced in a meaningful way by the members of the public affected (either directly or through their elected representatives), and the extent to which this influence is reflective of the existing spectrum of needs and opinions in society. In other words, it will be used to denote the degree to which decision processes adhere to generally accepted liberal democratic norms.

Accountability is a crucial issue in the study of public administration because, as Anthony Downs has noted, bureaucratic organizations are distinguished from non-bureaucratic organizations by the fact that individuals belonging to the former have "no direct way of evaluating their outputs in relation to the costs of the inputs used to make them." Executives in firms operating in the free market, for example, are held accountable by the discipline of the marketplace; elected politicians by periodic elections. Public and private monopolies (including utilities), and governmental bureaucracies, are subject to neither. This necessitates the establishment of mechanisms for regulation and control of the activities of governmental bureaucracies and monopolies, but disagreement exists among theorists as to what form is most effective.

The concept of accountability may be more narrowly defined in majoritarian or pluralist terms. The majoritarian view holds that the interests of the polity as a whole constitute the only legitimate basis for the formulation of public policy, and hence social conflicts should be resolved within the
political arena. Mechanisms for the special representation of group or minority interests, either formal or informal, are rejected or discouraged. The majoritarian view is rooted in classical theories of democratic representative government, which emerged as liberal theorists challenged the remnants of the class-based feudal concept of social and political organization.

The maintenance of strict political control over public policy necessitates a hierarchical and centralized administrative structure in order to sharply focus responsibility to facilitate scrutiny and control by political authorities, as well as to restrict the power of individual bureaucrats to strike independent bargains regarding policy. This notion is reflected in the classical theories of bureaucratic administration of Hegel, Weber and Woodrow Wilson.11

The pluralist definition of accountability, on the other hand, encompasses a need for some group or functional basis for representation in liberal democratic societies. It denies the existence of any single definition of the "common good", and maintains the need for alternate channels of input, so that minority interests may be protected from majority tyranny. Thus, policy-making is seen as being ideally based on consensus among groups rather than any simple majority impulse. Consequently, the bureaucracy takes on policy-making, as opposed to a purely administrative function, as administrators are charged with striking an acceptable "balance" between the various interest groups affected by a given policy issue.

Pluralist theory emerged around the turn of the century as an intellectual response to the rise of trade unions and business associations, and the beginnings of an activist state role in economic life. As the tasks and volumes of information handled by governments grew, it became increasingly expedient to pass delegated legislation extending to civil servants and autonomous boards and commissions the authority to formulate policy. The emerging
functional associations thus became increasingly inclined to deal directly with the bureaucracy. The classical pluralist models of government and administration envisioned the state as an impartial arbitrator among equal, competing interests. These interests were seen as spontaneous entities which mobilized whenever their constituents perceived something to be gained in terms of public goods through organized action. In this sense, it was highly reflective of the free-market ideology that still dominated economic thought at the time.

The classical pluralist model has been challenged from two main standpoints. The first is that of those who call for a return to majoritarian models of democracy and public administration, claiming that pluralist structures encourage political bargains struck within the bureaucracy, and thus obscured from public view, which bear little relation to existing intensities of preference among the public. Gordon Tullock warns of the dangers of "bureaucratic free enterprise", based on "multiple sovereigns", the latter term alluding to the medieval corporate state with its multiple branches of social organization. Edwin Haefele applies similar concepts to questions of resource management policy in the United States.

Orthodox pluralist assumptions have also been called into question by later pluralist thinkers who have noted a tendency of market mechanisms, when left to themselves, to render certain groups within society more equal than others. Mancur Olson observes that free-market forces tend to promote the organization of small, privileged "exclusive" groups (such as business and professional organizations) and to work against the mobilization of larger, less privileged groups, or "inclusive" interests (such as consumers or unorganized labour). He elaborates:

First, the larger the group, the smaller the fraction of the total group benefit any person acting in the group interest receives, and the less adequate the reward for any group-oriented action. Second (the larger the group), the less the likelihood that any small subset of the group, much less
any single individual, will gain enough from getting the collective good to bear the burden of providing even a small amount of it. Third, the larger the number of members in the group, the greater the organization costs, and thus the higher the hurdle that must be jumped before any of the collective good can be obtained.¹⁵

Even when organized, "inclusive" interests face difficulty in generating the resources and gaining the access to decision-makers required to compete on an equal basis with exclusive interests within administrative processes, and equally important, in conceptualizing choices (i.e. formulating viable policy alternatives).¹⁶ Some have sought to address this problem by calling for subsidization of pressure groups representing diffuse interest,¹⁷ as well as their direct representation within the administrative structure. Olson questions this type of approach on the basis that it assumes a spontaneous theory of group behaviour.¹⁸ Nonetheless, he sees a need for re-ordering governmental and administrative structures so as to correspond more closely to the needs of the particular clientele that derive the greatest net benefit from given public goods.¹⁹

Vincent Ostrom argues that both "multiple sovereigns" and "bureaucratic free enterprise" are necessary conditions of, rather than hindrances to, democratic accountability in public administration. Structures based on accountability to a single centre of power, he holds, give rise to misallocation of public goods (unsound policies), as they are incapable of responding to diverse needs and preferences in society. Furthermore, he maintains that independent policy initiatives by civil servants can perform a critical function in checking abuses of power or poor judgements by elected officials.²⁰

The majoritarian and pluralist viewpoints lend themselves to differing ideas on the proper jurisdictional division of power within federal systems. Adherents of the majoritarian view tend to favour a clear delineation of responsibilities between levels of government, and to oppose overlapping juris-
dictions and power-sharing arrangements as the latter necessarily involves political bargaining at the bureaucratic level, removed from the direct control of elected representatives. This concept finds a number of expressions in different models of federalism. At one extreme lies the centralist model, which in the Canadian context has been described as follows:

At the heart of this concept is the notion that the whole of the Canadian people constitute the only legitimate source of sovereign authority and that a government enjoying the support of a Canadian majority must be supreme over all governments.21

At the other extreme is what in Canada has been referred to as the Compact Theory, which holds that every regional unit of government is absolutely sovereign within its own jurisdiction, and that the central government owes its legitimacy to the regional governments.22 Thus, the balance of power is seen as being ideally weighted in favour of the regional units, as these are seen to be responsive to diverse needs (defined on a territorial basis) and more amenable to control through the ballot box. On this basis, a number of administrative theorists, such as Tullock and Haefele, have argued for a devolution of authority in the United States to state governments.23

In between lie models of true federalism, based on an equable distribution of power between levels of government. Classical or coordinate federalism is characterized by a clear definition of responsibilities, with each level of government sovereign within its own jurisdiction, in keeping with majoritarian principles.24

Administrative, or Executive federalism, on the other hand, involves collaboration between national and regional governments on matters deemed to be of inter-jurisdictional concern. It reflects pluralist ideas in that it envisions different levels of government acting as checks on each other's power within areas of mutual concern, and in seeing a need for federal institutions to reflect functional as well as territorial interests.25
In our analysis, we will use the above models as guidelines in discussing how existing structures and procedures influenced outcomes in this case, and how alternative structures might have produced different results. In particular, we are concerned with whether existing institutional arrangements promoted democratic control over decision-making that was reflective of the existing spectrum of affected interests, both on a socioeconomic and on a jurisdictional dimension.

ii) Efficiency

Efficiency, or Rationality, as it relates to administrative behaviour, may be defined as the degree to which the actions of decision-makers maximize a given set of values or goals in a given situation. Disagreement exists among theorists concerning the scope of rationality decision-makers should be expected to aspire to. Two basic opposing concepts exist, "pure rationality" and "bounded rationality".

The "pure rationality" approach to solving problems involves a process of logical deductive reasoning and calculation in four independent and sequential steps: Goal setting (defining a complete set of ends), Prediction (considering all possible outcomes against the individual's values or priorities), Valuation (the establishment of a scale of desirability for all the various possible results), and finally, Decision (selection of the course of action with the highest net expectation).

As an alternative, Herbert Simon presents the concept of "bounded rationality". Decision-makers, according to Simon, by nature strive to avoid uncertainty, and hence tend to concentrate on short-run objectives rather than to formulate comprehensive long-range plans which involve betting on the future. Rather than considering all possible alternatives and selecting the ones with the most desirable consequences, the administrator will search for an alternative that meets a certain acceptable aspiration level. Man, in Simon's words, is a
"satisficing" rather than an "maximizing" animal.  

Downs lists four general limitations on human decision-making capacities:

1) Each decision-maker can only devote a limited amount of time to each particular problem.
2) Each decision-maker can mentally assess and consider only a limited volume of information at one given time.
3) The functions of most officials require them to become involved in more activities than they can consider simultaneously; hence they must focus their attention on only part of their major concerns.
4) Every decision-maker has access to only a small portion of the information available regarding each problem.

Charles E. Lindblom applies the above concepts to questions of social policy, through his theory of "disjointed incrementalism", which he also refers to as "the science of muddling through". Experience with different policies, he argues, results in changes in objectives. Lindblom adds a normative dimension to Simon's behavioural analysis. Not only does he describe an observed tendency for social policy to evolve on a piecemeal basis, falling short of any comprehensive, Utopian vision, he offers it as a model for decision-makers to strive to follow. He lists three immediate advantages to such an approach to problem-solving. First, it "concentrates the policy-maker's analysis on familiar, better-known experiences," secondly, it "sharply reduces the number of different alternative policies to be explored," and thirdly, it "sharply reduces the number of complexity of factors he has to analyze."

These limitations are not universally accepted by modern scholars of public administration. Yehezkel Dror, in a critique of Lindblom's model, argues that such limited-rationality theories are merely intellectual justifications for bureaucratic inertia and political immobilism. Even in the most stable societies, Dror maintains, changing social and economic conditions may from time to time create needs for radical departures from precedent and comprehensive, long-range vision. Under such circumstances, incrementalist approaches can and do result in public policy that lags behind realities, according to
Dror. Consequently, he proposes an alternative model of decision-making that incorporates elements of both the limited-rationality and pure-rationality concepts. The principal features of this model are, 1) identification of values and broad objectives, 2) identification of existing alternatives, followed by an effort to formulate new alternatives, 3) preliminary projection of possible outcomes, followed by a choice between a minimal-risk strategy or a creative policy, depending on assessment of the situation, 4) if the latter course is chosen, selection of the alternative with the optimal long-range projected outcome, 5) further assessment of conditions, to determine whether more comprehensive analysis is required, 6) reliance on a mixture of theory, experience, rationality and extrarationality, the composition depending on the nature of the problem, and 7) ongoing efforts to upgrade the quality of decision-making through stimulation of initiative, creativity and other improvements in the quality of human and technical resources. 33

In summary, we may say that while certain important limitations on rationality exist which no organizational framework can overcome completely, decision-making structures and processes are, as Simon has pointed out, major influences on administrative behaviour and performance, and thus can have a bearing on the likelihood of optimum efficiency being attained. One of our criteria, then, in assessing the effectiveness of the structural and procedural framework for hydroelectric power planning and development in the North, is the extent to which this framework maximizes the probability of economically and technically desirable outcomes.

iii) Accountability vs. Efficiency

As we have seen, the effectiveness of decision-making structures and procedures may be measured either in terms of conformity to liberal democratic principles (accountability) or in terms of conformity to a given set of long-term or short-term technical or economic goals (efficiency). It follows, then,
that the two criteria may come into direct conflict with one another. For example, economic efficiency will tend to dictate a rapid pace of development, which will often allow events and/or important details to escape the attention of the public and its elected representatives (particularly if the development, like many northern projects, is not highly visible and does not generate immediate widespread publicity). According to the Science Council of Canada Committee on Northern Development:

A fast pace of development tends to leave peripheral actors [diffuse affected interests] outside the decision-making process. It may also lead to inadequate assessments, particularly those related to environmental and social impacts. Enlightened decision-making thus becomes more difficult. Thus, a rapid pace of development which is desirable to core actors [developers and government] may not necessarily be appropriate for the supporting actors charged with undertaking meaningful assessment studies or to affected parties who must adapt to what they see as excessively rapid social change.

If goals focus on long-term rather than short-term efficiency, it may be argued that a slower rate of development might be beneficial and that it could allow outside expertise to be brought into play and result in a better-conceived project. On the other hand, it could also impair long-term efficiency by compromising technical goals with political or social considerations.

In the conclusion to our case study, we will discuss the trade-offs involved as they relate to Snare Forks. We will not, however, invoke any formula or mathematical model (such as, for example, the Pareto Scale), in attempting to define in precise terms any optimal "balance" between the two criteria.

4. Special Problems of Decision-Making in the Canadian North

Conditions in underdeveloped and peripheral areas within industrial societies (such as the Canadian North) tend to sharpen constraints on decision-making rationality and undermine accountability. Administrative bodies, and,
to a greater extent, the publics they serve, are deprived of the financial, technical and human resources required to function effectively within the decision-making process. The situation is summarized in the following excerpt from an Environment Canada internal memorandum concerning the operation of the Northwest Territories Water Board:

In the Northwest Territories, the public which the Board must serve does not conform well to the classic models of a democratic state:
- there is an extremely small number of private freehold landowners (almost all the land is Crown-owned)
- a large proportion of the population cannot be personally involved in any public hearings because of remoteness or language difficulties
- there is a paucity of 'local residents' at most sites proposed for development.
In addition, there is generally a lack of conventional scientific knowledge about the resources and areas likely to be proposed for development, and such knowledge is generally confined to a few people, predominantly employed by the development agencies and government. The body of traditional native knowledge about these areas and resources is relatively difficult for the Board to acquire and assimilate.35

Under such circumstances, decision-making processes are even more likely to be weighted in favour of the "exclusive" interests (in the North, the resource development companies and local entrepreneurs). This tendency has also been noted in the behaviour of autonomous public agencies in peripheral and underdeveloped areas in general. Philip Selznick noted that the local clientele of the TVA came to be dominated by the more prosperous white farmers of the region, with the poor whites and blacks often being effectively excluded from the decision-making process.36 Some have pointed to a parallel situation in the Canadian North, regarding the relationship between NCPC and the mining interests (see the account of the Taltson River/Pine Point development in Chapter 2).37 This pattern is, if anything, consistent with the history of the public power movement, whose leadership came to a large extent from business interests in underdeveloped or newly industrializing areas, who were concerned
primarily with the provision of infra-structure for industrial and/or agricultural expansion, rather than cheap power for the masses. It is perhaps significant that the federal government's first venture into hydroelectric development in the North was designed primarily to supply a mine rather than household users. (See Chapter Two, Section 1.)

In the North, industry maintains a distinct advantage through access to information. According to one group of observers:

The information network also appears to be a major issue. Industry uses an informal network to circumvent the publicly visible network and is constantly seeking out key government people to tap . . . These informal liaisons give industry a 'competitive' edge on other actors. Many actors who should have access are excluded. Industry and DINA have 'regularized' informal contacts and share information which is unavailable to environmentalists, nature groups, and other actors.38

In the Northwest Territories, the issue is not simply one of the general population against big business, but also one of the general population against the government. Because of the high profile the federal government maintains in the North (through the Department of Indian Affairs and Northern Development, it has complete control over resources in the Territories), against a small population lacking in technical expertise, financial resources, and political leverage (the Yukon and the Northwest Territories account for only three seats in the House of Commons, and thus the Department of Indian Affairs and Northern Development, unlike, for example, the United States Department of the Interior, does not have a substantial constituency to which it is politically responsible), it is almost impossible for the average citizen to face the planners and technocrats on equal terms. William Macleod, dealing with water management policy in the North, writes:

With the small population base in the North, the lack of expertise in the general public, and the difficulty of communication, it is hard to maintain an independent critical voice in the face of such developments, without government support. There is a real danger that decisions will be taken after a 'snow job' leaving disillusionment, mistrust, and, perhaps, an ill-conceived project.39
Differing ideas exist as to how to maintain democratic accountability in northern administration in the face of these conditions. One school of thought argues for strengthened Parliamentary control over the administration of northern development. Only the central political authority, it is maintained, can provide the support needed by native and environmental groups against the business interests and bureaucratic planners who dominate the decision-making process. According to one critic of the existing institutional framework:

> If the implementation of policy escapes the scrutiny of Parliament, civil servants will tend to prescribe bureaucratic answers to the political and constitutional problems that arise. For example, the failure to exercise supervision over water resource management has led the bureaucracy to recommend that various competing public interests be institutionalized on the Water Board. Thus one or two natives and perhaps even an environmentalist may be appointed to the Water Board to struggle for their interests within the bureaucracy. Such arrangements provide only a shadow of democratic accountability.\(^{40}\)

An alternative framework, based on "decentralized initiatives", is suggested by the authors of a Science Council of Canada study on Arctic petroleum development. They acknowledge the inadequacy of existing pluralist mechanisms in the North, such as public hearings, not because these usurp any legitimate central seat of power, but because they fail to effectively decentralize authority. Because peripheral actors lack resources, power becomes centralized in the hands of a bureaucratic hierarchy allied with industry. Institutionalized inputs by interest groups are needed, the authors argue, but they suggest that these take place at the cabinet rather than the local administrative level:

> Perhaps more important than the involvement of all affected actors . . . is the balance of power among actors. The development initiatives come from government or industry. However . . . effective societal involvement in assessment and forecasting requires instead decentralized initiatives . . . While government and industry have consulted with northern groups in the course of their programs, the consultation has been after the fact. This does not qualify as 'decentralized initiatives' . . . (The Department of Indian Affairs and Northern Development) suggests that normal machinery within the department is capable of
resolving the conflicts and is the appropriate forum. However, the pre-eminent role of the 'Northern Development Program' of (DIAND) is such that the economic development interests within the department carry more weight. If 'development-people' decisions could be made outside the department where a wider array of interests and values could be brought into perspective - such as one might expect from Cabinet - different decisions might result.41

Differing ideas have also been put forward regarding the jurisdictional division of power over resource and economic planning in the North. The Carr Commission report on economic development in the Yukon stressed the importance of the retention and strengthening of northern resource planning as an instrument of national policy.42 On the other hand, there is the suggestion of Macleod43 and others that a share of power over resources be transferred to the Territorial governments.

In our study, we will use the above models as bases on which to formulate recommendations regarding decision-making structures and processes in the Canadian North, and try to determine which one best suits actual conditions and problems relating to hydro development north of the sixtieth parallel.

5. Methodology

Our analysis will consist of a case study of the Snare Forks hydro-electric development. Snare Forks is of interest because it presents a case of administrative failure (undesirable outcomes) in the North, and also because it offers an opportunity to evaluate the operation of existing decision-making machinery in the northern environment. In this study, we will attempt to provide an accurate account of the planning, administration, and construction of the Snare, with a view towards isolating the direct and contributing causes of the administrative failure. Our analysis is based on the premise that while individual personalities and capabilities may have some bearing on the operation of any organization, its interactions with other organizations, and with the public at large, it is the structural framework of that organization, its rules
and procedures, and the human, economic, and technical resources at its disposal, that are the principal determinants of organizational behaviour and performance. Thus, our assessment of the administration of the Snare Forks project will focus not on the actions of individuals but on the institutional and organizational framework within which those actions took place.

The research comprises three basic methodological steps. The first (already presented) consists of a review of some of the leading contemporary literature on Public Administration, from which normative criteria are derived. The second will consist of a review of primary evidence, allowing reconstruction of the events related to planning and construction. The third will consist of a relation of those events to the criteria based on the theoretical literature.

With regard to the accountability criterion, this study will examine the public hearing transcript and other relevant NCPC and/or Water Board documents, to identify the actors involved, as well as to determine which actors had the greatest input into the decision-making process. In particular, we will want to determine the extent to which the institutional mechanisms for public input (public hearings and other channels of consultation) afforded all affected interests an equal opportunity to be heard, and the availability of information facilitating their involvement, as well as the involvement of interested outside parties. (The people of Canada as a whole and their elected representatives in Parliament can be said to have a legitimate interest in northern development policy and its administration, even if they are not immediately affected by a given issue.) Finally, in our conclusion, we will want to assess the relevance of each of the competing models of democratic administration to the conditions of the North, and issue recommendations as to what type of approach would best ensure accountability in electrical energy planning in the Territories, on the basis of the Snare Forks experience.

It is beyond the scope of this study to engage in a detailed behavioural
analysis of the actions of decision-makers involved in the Snare Forks process. The literature cited under the "efficiency" criterion, while behavioural in orientation (at least in the case of Simon), will be used in a normative context; we are concerned primarily with the level of aspiration northern electrical energy planning ought to be based on. The behavioural aspect is relevant principally in that it notes a set of human limitations to take into account when assessing decision-making systems. If we accept those limitations, then we must acknowledge the possibility that such human limitations, and not institutional failure, may lie at the root of any undesirable outcomes.

The principal question related to the efficiency criterion, then, is whether the administrative failure at Snare Forks can be explained in terms of the above-mentioned human limitations, or whether it reflects fundamental flaws in institutional design. To this end, we will examine NCPC planning documents and correspondence to determine the bases (available information) on which the important planning decisions were made, the alternative courses of action available, and whether the processes made provision for any outside technical expertise (aside from NCPC-hired consultants) to be brought into the picture to assess the quality and thoroughness of the Commission's planning for the project.
Notes to Chapter One


5. Preliminary plans by NCPC provided for the powerhouse to be constructed on or directly above Strutt Lake, a widening of the Snare River, and hence through much of the planning process the proposed development was referred to as the "Strutt Lake" project. After initial consultations with the Water Board, it was decided to build the powerhouse and dam downstream near a natural fork in the Snare, and the project became known as the "Snare Forks" development. After construction problems and the decision to relocate the dam at a site near the outlet of the Snare into Strutt Lake, the name "Strutt Lake" came into frequent use again. For purposes of convenience, the development will be referred to as "Snare Forks" throughout, except in discussion of the early planning stages.


Advocates of strict political control over policy-making, such as Haefele, criticize this approach on the basis that it forces governmental administrators to make judgments as to the legitimacy of groups (i.e. which ones are to receive funding). See *Representative Government and Environmental Management*, p. 139.

This concept was first advanced by turn-of-the-century reformers who saw the emerging pluralist system as being weighted heavily in favour of trusts and financial interests and against labour and consumers. See John R. Commons, *Proportional Representation*, Madison, University of Wisconsin Press, 1907. It became realized in the organization of New Deal agencies such as the TVA, which Selznick went as far to describe as "corporatist". See *TVA and the Grass Roots*, p. 220. More recently it has been seen in the form of observed informal "clientelism" within governmental departments and agencies, particularly in the United States, but also in other western democracies. See Aaron Wildavsky, *The Politics of the Budgetary Process*, Boston, Little Brown, 1974. See Olson, *op.cit.*, p. 131.


Simon, *op.cit.*, p. xxv.

Downs, *op.cit.*, p. 75.


36 Selznick, op.cit., Ch. 3, 4.

37 Macpherson, op.cit.


39 William Macleod, Water Management in the Canadian North, Ottawa, Canadian Arctic Resources Committee, 1977.

40 Kitson Vincent, Foreward to Macleod, op.cit.

41 Keith, et.al., op.cit., pp. 156-57.


43 Macleod, op.cit., p. 105.
CHAPTER TWO

BACKGROUND

Below we will identify the actors and potential actors in the Snare Forks planning process, and summarize the structural and procedural framework governing their activities and interactions, as well as describe briefly the background setting against which events the planning and construction process would take place.

1. The Institutional Framework: Introduction to the Actors
   
i) Northern Canada Power Commission (NCPC)

   The Canadian federal government first became involved in electric power production north of the sixtieth parallel in 1946, when the Department of Mines and Resources undertook construction of a hydroelectric plant at Snare Rapids on the Snare River, which flows into the north arm of Great Slave Lake. The plant was designed primarily for the purpose of supplying the Giant Yellowknife gold mine. With the completion of the project in 1948, Parliament passed legislation creating a new Crown corporation, the Northwest Territories Power Commission, to administer the plant. The Northwest Territories Power Commission Act delegated to the Commission the authority to operate under its own bylaws and formulate regulations independent of Parliament (subject to ministerial and Cabinet approval).¹

   The following year, the Commission expanded its service by connecting the Yellowknife townsite and the adjacent Consolidated Mining and Smelting (Cominco) operations to the plant.²

   In 1951, the Commission extended its activities into the Yukon, commencing construction on the Mayo River development (5.4 megawatts). In 1956, construction began on the 11.4 megawatt Whitehorse Rapids hydroelectric
facility, three kilometres upstream from Whitehorse (an additional eight-megawatts capacity was added in 1969). 3

Also, in 1956, the original legislation was amended to become the Northern Canada Power Commission Act. 4

Capacity in the Northwest Territories was expanded with the construction of the Snare Falls hydro development, sixteen kilometres downstream from Snare Rapids, in 1959-60. The power output of these two plants was augmented by a standby diesel facility installed at Yellowknife in 1965. 5

In addition to the Snare/Yellowknife system, the Northern Canada Power Commission also undertook to exploit the hydroelectric power potential of the Taltson River northeast of Fort Smith, completing the construction of an eighteen-megawatt facility there in 1965. The Pine Point Mine, on the south shore of Great Slave Lake, became the principal consumer of the plant's output, though the towns of Fort Smith, Fort Resolution and Pine Point were also served. 6

The most ambitious project undertaken by NCPC was the thirty-three megawatt Aishihik development on the East Aishihik River, 130 kilometres northwest of Whitehorse. Construction was scheduled to begin in 1972, but NCPC failed to obtain project approval from the Yukon Water Board at the first scheduled licence hearing in May of that year because the regulations of the Northern Inland Waters Act had not as yet been promulgated, and because the Commission had failed to provide notice in the local press as specified in the Act. Further technical studies were recommended by the Board, and a second licencing hearing was scheduled for January, 1973. After this hearing, a water use licence was issued, but with conditions attached limiting the level of Aishihik Lake behind the dam. Expansion of the project to full planned capacity was considered at hearings in August and September, 1975. At its
completion in early 1976, project expenses totalled $39 million, more than twice the original estimate. Also, the original plans engendered objections from environmentalists concerned with their effects on fish stocks and esthetics (particularly the scenic Otter Falls) and from natives demanding settlement of land claims, and there were accusations that information potentially damaging to NCPC was suppressed at the latter hearings.7

In 1972, the Commission took over the operation of local diesel generators from the government of the Northwest Territories. Today NCPC provides power to all communities in the Northwest Territories, with the exceptions of Hay River, Fort Providence, and Enterprise, which are supplied by diesel plants operated by the privately-owned Alberta Power Ltd. (A number of mines in the Territories operate their own power sources, including the Cominco operation in Yellowknife, which continues to draw some of its supply from its own small hydro plant at Prosperous Lake, outside the city.) In addition, NCPC supplies power to seven communities in the Yukon (others being served by Yukon Electrical Ltd., a private enterprise utility) as well as Field in British Columbia. The Commission also operates the water works at Inuvik, Fort McPherson, Frobisher Bay, and Dawson, central heating at Inuvik and Fort McPherson, and sewer systems at Inuvik, Frobisher Bay, and Dawson.9

As of 1976, about half of NCPC's total output was produced by the six then-operating hydro plants, the remainder being generated by fifty-two diesel units.

Distribution of NCPC-generated power to consumers in Yellowknife is carried out by Plains Western Gas and Electric, Ltd., a privately owned company.

Under the Northern Canada Power Commission Act of 1956, the Commission is composed of three members appointed by the Minister of Indian
and Northern Affairs, including a Chairman who is the chief executive officer. The corporate headquarters are located in Edmonton.

The operating policies of the Commission are not specified in the legislation. Control over policies and regulations is delegated to the Board of Directors (or Commission members). NCPC accounts are subject to the audit of the Auditor-General of Canada. The Commission reports to the Minister of Indian Affairs and Northern Development (though, as a separate Crown corporation, it is not actually part of DIAND), and thus the Minister is answerable in Parliament for NCPC on matters of general policy.

The Commission's stated purpose is to plan, manage, and construct public utilities, primarily electrical, on a commercial basis. Thus, NCPC is required to be financially self-sustaining, though its basic objective is to provide utility service to northern communities at the lowest possible cost. Funding for capital expenditures is obtained through interest-bearing loans from the federal government.

Rates assessed by the Commission are subject to regulation by the territorial Public Utilities Boards, but review can only take place upon intervention by a third party, who must justify a hearing. The territorial governments maintain rate equalization schemes designed to ease the burden on householders in smaller communities, where per-unit generating costs are higher. Since 1977, these have been supplemented by direct federal consumer subsidies.

Public utilities elsewhere are required to be financially self-sustaining, but in the Canadian North, with its small, scattered population and long transmission distances, such a requirement (even with limited subsidies or rate equalization plans by the territorial governments) can be
seen as running directly contrary to the traditional philosophy of public power. This philosophy, as applicable to the Canadian North, was summarized by the Carr Commission in 1968:

(The Canadian North) has reached an economic stage where power development can now be effectively used as an instrument of national policy for stimulating economic growth. Since the benefits of such economic growth may be expected to accrue to the Canadian economy as a whole, it is appropriate that power development be retained as an instrument of public policy.  

Under a situation of limited resources, high per-unit costs, and a responsibility to supply customers with power at reasonable rates, the temptation could be expected to loom large for NCPC to act as an independent agent for northern development, actively recruiting or encouraging industrial consumers to locate or expand in the Territories, in order to expand its revenue base and reduce per-unit costs. This, charge some critics, is exactly what occurred during the Pine Point development.

When Consolidated Mining and Smelting (Cominco) first considered tapping the lead and zinc deposits at Pine Point, near Hay River, in the early 1950's, it had intended to supply the needed power itself through its West Kootenay Lighting and Power subsidiary, and looked toward the Slave River for a possible site for a hydro-electric development. Feasibility studies by the Crown-owned Eldorado Mining and Refining Limited found the concept unworkable. Cominco then turned to NCPC, whose studies also concluded that a Slave River development would not be economically viable. Under pressure from the deputy minister of Northern Affairs, NCPC looked for alternate sites, and decided to develop the Twin Gorges site on the Taltson River. In 1963, a draft agreement
was drawn up between Cominco and NCPC, under which the former agreed to guarantee full recovery of costs incurred by the latter in the construction of the Taltson plant, in return for a twenty-year supply of power at well below prevailing rates. This agreement was never formally signed, but was adhered to until 1976, when rates were increased by fifty-two per cent. They were increased again in 1977 by 147 per cent.\(^\text{17}\)

The Taltson River hydro-electric development cost the Northern Canada Power Commission $93 million to complete. Since the Commission is required by law to be financially self-sustaining, rates assessed must cover principal, interest, maintenance, and operating costs. By 1975, NCPC had recovered only seven million dollars from Cominco's Pine Point Mines subsidiary.\(^\text{18}\)

The above arrangement came under fire not only from observers concerned with the use of public funds, but also from officials of the Department of Indian Affairs and Northern Development and other ministries closely involved with the North, who charged that such "cozy deals" usurped the planning jurisdiction of the federal government and threatened the emergence of a closed patron-client relationship between NCPC and the mining industry that would be removed from democratic accountability.\(^\text{19}\)

While NCPC is answerable to Parliament through the Minister of Indian and Northern Affairs, it is a separate Crown Corporation and not a part of DIAND, and in recent years the Commission appears to have jealously guarded its autonomy. Officials of DIAND have spoken of a total lack of communication between the two bodies, and complain that their proposals for integrated planning arrangements have met with little response from NCPC.\(^\text{20}\)
ii) The Northern Inland Waters Act

Prior to 1972, the Northern Canada Power Commission faced few legal restrictions in planning for hydro-electric development. The issuance of licences was governed by the Dominion Water Power Act, and the Northern Canada Power Commission Act, which contained the following clause:

The commission is entitled to receive upon application any licence or other authority under the Dominion Water Power Act necessary to enable the Commission to carry out this Act.21

After 1970, the federal government moved to establish a more coherent framework for water use planning in the North. The result was the Northern Inland Waters Act, passed in the House of Commons late in 1970 and proclaimed in force early in 1972.

The Act contains two provisions significant for hydro-electric development in the North: the institution of a formal public hearing procedure for applications for water use, and the establishment of Water Boards in each of the two territories to review the applications and grant licences.

Section 9 of the Act describes the purposes of the Boards:

The objects of the Boards are to provide for the conservation, development, and utilization of the water resources of the Yukon Territory and the Northwest Territories in a manner that will provide the optimum benefit therefrom for all Canadians, and for the residents of the Yukon Territory and the Northwest Territories in particular.

The territorial Water Boards consist of nine members each. Membership composition is covered by Section 7 (2):

The membership of each board shall include (a) at least one nominee each of the departments of the Government of Canada that, in the opinion of the Governor-in-Council are most directly concerned with the management of water resources of the Territory and the Territories, and (b) at least three persons named by the Commissioner-in-Council of the Yukon Territory in the case of the Yukon Territory Water
Board and at least three persons named by the Commissioner-in-Council of the Northwest Territories in the case of the Northwest Territories Water Board.

The above provision was amended by an Order-in-Council dated May, 1977, to reduce federal government representation to three and increase territorial representation to six.

Section 3(2) prohibits the diversion and other use of water within a water management area, except under licence. Section 15 lays down the conditions and procedures for public hearings and states (2) that hearings must be held in connection with every application for a licence and with every renewal, amendment, or cancellation of a licence. Provision is made for waiving public hearings for licence amendments if "the board, with the consent of the Minister, declares the amendment to be required on an emergency basis."

Section 17 spells out the requirements for public notice of hearings. Licence applications must "give notice of such application by publication thereof in the Canada Gazette and in one or more newspapers, including at least one that is in circulation within the area affected."

The Water Management areas are established in the Regulations for the Act.

Section 5 of the Regulations spells out different classifications of water use. These include agricultural, conservation, industrial, municipal, power, water engineering, storage, and recreational purposes. The power classification is subdivided into six classes, based on output in megawatts.

Section 8 sets forth the technical documentation required of applicants. In cases of hydro developments, these include:

a) where the proposed work consists of a dam, a plan showing the length and height of the dam with
cross-sections and elevations, the location and preliminary designs of spillways, canals, sluice pipes, and all other outlet works, and datas respecting the type and composition of materials to be used in construction.

b) where the proposed work consists of a storage reservoir, an estimate of the approximate number of acres of land to be flooded, the approximate surface area in acres of the reservoir when filled, the contemplated total storage capacity, and the representative cross sections.

The Regulations, then, specifically include only engineering data and do not explicitly mention environmental impact assessments. The Board, however, is granted the discretion to require further information of applicants, and in practice the information asked for far exceeds the provisions of the Regulations.

The Water Board is a quasi-judicial body, and thus its decisions may be legally challenged in the Federal Court of Appeal on matters of law or jurisdiction.

Board decisions regarding licence applications must be approved by the Minister of Indian Affairs and Northern Development.

Federal government appointees to the Board have in the past found themselves faced with a dilemma as to their actual role, as to whether to act as representatives of their respective departments, bound by departmental policy, or as impartial arbitrators, exercising their independent professional judgment. Some discussion emerged in response to a memorandum, dated February 8, 1974, from A. Digby Hunt, Assistant Deputy Minister of Indian and Northern Affairs, to K.C. Lucas of Environment Canada, in which Hunt advised that presentations by federal representatives at Water Board meetings "must be consistent with federal government policy, and the personal opinions of the author should be avoided."
This brought about a rebuttal from C.S. Alexander of Legal Services, Department of the Environment:

There is an important distinction in function between a person who is nominated to membership on a board to represent a client's particular interest, and one who is so nominated for his knowledge of some or all of the matters with which a board ought to concern itself. In my opinion, Parliament intended departmental nominees (and all other nominees, for that matter) to fulfill the latter rather than the former function. The territorial Water Boards are wholly different from the boards established, for example, under labour laws where members are expected to represent opposing interests.26

He continued:

Clearly, in assigning a quasi-judicial function to the territorial Water Boards, Parliament manifested its intention to require each member to exercise objective judgment rather than represent a master to whom he owes a particular loyalty.

The decision of a board may or may not be properly influenced by federal government policy. But whatever that policy is, it is certainly not the sole criterion by which a board should assess an application. If it were, the action of Parliament in passing the Northern Inland Water (sic) Act would be rendered a mere farce.27

Related to the above is the question of the legitimate extent of the Water Board's review powers. Some (particularly senior officials of DIAND) have maintained that the Board is strictly a licencing body, and thus should properly confine itself to matters specifically put forth in federal legislation. Others have advocated a more activist role for the Water Board, in which it includes economic and technical feasibility and long-range planning priorities as criteria in the issuance of licences.28 In practice, the Northwest Territories Water Board has leaned toward the former interpretation, while its Yukon counterpart has tended toward the latter.29 In the Yukon, the Board has used both government experts and private industry consultants (retained through DIAND's Water Resources Division) in preparing independent technical studies and assessments of applications.
The Northwest Territories Water Board relies on its Technical Committee (composed of nine persons, nominated by each of the sitting members) for professional advice.  

The Regulations of NIWA contain provision for public access to application documents through the Water Use Registry. The licences themselves are not legally part of the register, but in practice the licences, as well as authorizations, reports, monitoring data and correspondence are treated as being in the public domain.  

iii) The Department of Indian Affairs and Northern Development (DIAND)  

The jurisdiction of the Department is spelled out in the Department of Indian Affairs and Northern Development Act:

The duties, powers, and functions of the Minister of Indian Affairs and Northern Development extend to 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 (a) Indian Affairs (b) the Northwest Territories and the Yukon Territory and their resources and affairs.  

The Department controls the administration of lands, waters and natural resources in the two territories. It is charged with administering the Northern Inland Waters Act, and the Northern Canada Power Commission is responsible to Parliament through the Minister. Before March, 1975, the Deputy Minister doubled as the Chairman of NCPC; the Assistant Deputy Minister still sits on the Board of Directors.  

The scope of DIAND's jurisdiction and activities in the North is such that it has been referred to as a "province-like actor". Responsibilities of the Department include both conservation and protection of native interests (including settlement of land claims) on the one hand, and the promotion of
economic expansion (through its Northern Development Program) on the other. This, charge some critics, results in an internal conflict of interest that inevitably works to the disadvantage of the former, while departmental spokesmen have countered that this multiple role offers the greatest opportunity to strike a balance between the conflicting interests.

iv) Interest Groups in the Northwest Territories

The Northwest Territories, with its scattered, largely transient white population, and a largely inarticulate, and (until recently) politically passive native population, has, for obvious reasons, not developed the kind of network of interest groups characteristic of advanced industrial society.

Sustained challenges to the policies of the Northern Canada Power Commission have come largely from the Northwest Territories Indian Brotherhood, which in the early 1970's had not yet attained the level of organization and expertise it exhibits today. Natives from the Rae-Edzo area complained that the Snare hydro developments all but wiped out fishing in the upper reaches of the river and that the construction of power lines impeded the movement of the caribou. James Wah-Shee, president of the Brotherhood at the time of the Snare Forks development, expressed opposition to further expansion of NCPC's hydro generating capacity, on the grounds that new projects would prejudice a land settlement:

The people of the Northwest Territories are deeply concerned with the plans of the Northern Canada Power Commission to dam our rivers. We have consistently expressed our opposition to the insane schemes because of the enormous destruction they inflict on our way of life, and at the least because no massive development such as these should be considered in advance of a land settlement.

Local environmentalist groups were not a major factor as they were in the Yukon at the time of the Aishihik project. A group calling itself Ecology North, represented by a Yellowknife resident, Ronald Ramsey, surfaced
at the Snare Forks public hearing and presented an extensive brief critical of the proposal. Ecology North apparently folded shortly afterward, and little has been heard of Mr. Ramsey or his organization since.\(^{39}\)

Business interests in the Northwest Territories have tended to enthusiastically support NCPC expansion plans, as these have been seen as prerequisites for further economic expansion. Giant Mines, Cominco, and the Yellowknife Chamber of Commerce all presented briefs at the Snare Forks hearing urging speedy approval and completion of the project.\(^{40}\)

No group representing household consumers appeared at the hearing. Within the past several years, in the wake of the post-project rate increases, the Yellowknife branch of the Consumers Association of Canada has been actively investigating the activities and rate structure of the Commission through its Power Steering Committee. As of late 1979, the CAC was taking formal steps to bring about a public hearing into proposed NCPC rate increases before the Public Utilities Board.\(^{41}\)

One important point in our review of the relevant institutional framework is that the decision-making bodies concerned with hydroelectric development in the North are answerable to the Minister of Indian Affairs and Northern Development. The Northern Inland Waters Act makes provision for territorial input through representatives on the Water Board, but this representation is determined by DIAND. Both NIWA and the NCPC Act are examples of delegated legislation extending the Water Board and NCPC management considerable authority to formulate standards and procedures. In the case of NCPC it appears that this autonomy has been maintained, though in the case of the Water Board there is evidence to suggest that the DIAND hierarchy has attempted to exert control, giving rise to an internal debate over the merits of bureaucratic centralism as opposed to administrative activism.
2. Physical Characteristics of the Project Area

The Snare River rises in a series of lakes 290 kilometres north of Yellowknife, very near the tree line at 64°30'N. It flows in a generally southwesterly direction for about 105 km, most of the flow being through a chain of lakes, the larger ones being Whitewolf, Winter, Roundrock, Snare, and Indin. Below Indin Lake, the flow of the river changes from southwesterly to southerly, passing through Kwejinne, Bigspruce, Strutt, Silemon and Russell Lakes, and, finally into Marian Lake, which forms the north arm of Great Slave Lake.\(^2\)

Between Kwejinne and Marian Lakes, the Snare River drops in elevation from 228 m to 157 m above sea level. The steepest drop occurs between Bigspruce (221 m) and Strutt (159 m) Lakes, and it is within this stretch that NCPC's hydro developments have been constructed.\(^3\)

The area through which the Snare River flows lies within the Pre-Cambrian Shield. It is generally characterized by low relief, but there is some locally rugged topography, and a series of steep ridges rises about 150 m above the east bank of the Snare near the Snare Forks site.\(^4\) The bedrock is of a metamorphic or intrusive igneous type; it is exposed in many places, but covered elsewhere with lacustrine clays or glacial till. The area lies within the zone of discontinuous permafrost, and soil overburden is rich in ice, thawing seasonally to a depth of about 1 m.\(^5\)

The climate is classified as subarctic, and is characterized by wide extremes of temperature. The January mean daily temperature is around \(-30^\circ\text{C}\); in July it is near \(16^\circ\text{C}\). The range of extremes is roughly \(-55^\circ\text{C}\) to \(35^\circ\text{C}\). Annual precipitation averages between 200 and 250 mm, with snowfall running between 75 and 125 cm.\(^6\)

Vegetation is characteristic of the transition zone between the boreal forest and the tundra. Trees, primarily white and black spruce,
tamarack, jack pine, white birch, and aspen, are stunted and interspersed with bog, muskeg, and rock outcrops.  

3. Development of the Snare/Yellowknife System, 1946-70

The Snare Rapids hydro plant, the first component of the system, was completed in 1948. The dam is of earth-fill construction; gross head is 19.2 m with a forebay elevation (Bigspruce Lake) of 221 m. Maximum output, from a single turbine generator, is seven megawatts.

The Snare Falls development, completed in 1960, was of a similar scale. An earth-fill dam created a reservoir at elevation 202m; gross head is 18.9 m, with a single turbine generator providing peak power of seven megawatts.

The two power plants were connected to Yellowknife by a 140 km long, 115 KV transmission line. In 1968, the line was tapped at the centre and a branch extended to the communities of Rae and Edzo on Marian Lake. In 1970, the line was extended to serve the settlement of Detah, east of Yellowknife.

An additional standby diesel generator in Yellowknife, installed in 1965, provides a maximum of six megawatts of power for peak period consumption bringing the system's total output at the time to twenty megawatts.
Notes to Chapter Two


8. Ibid.


10. NCPC Act, 3(3).

11. Ibid.


13. NCPC Act, 15(1).

14. Report of the Task Force on Electrical Energy Costs in the North, pp. 7-8. As of 1976, basic rates in Fort Simpson, NWT, were approximately three times those of Yellowknife. See Table I, infra.

15. The existing program subsidizes the first 700 kwh block of power consumed down to the Yellowknife rate in all communities. Consumers' Association of Canada, History of NCPC Interventions, Yellowknife, October 1979.


18. Ibid.

20 Ibid.
21 NCPC Act, 2.
22 Northern Inland Waters Act, R.S.C. 1970, c.28, 11(2).
23 Ibid., 21(1).
24 Ibid., 10(1).
27 Ibid.
Also, interview with Arthur G. Redshaw, Controller, NWT Water Board, Yellowknife, November 2, 1979.
29 During the Aishihik development, the Chairman of the Yukon Water Board explicitly asserted the broader view of the Board's mandate against the directives of A. Digby Hunt, the Assistant Deputy Minister. See W.G. Nicholl's Hydro-electric Power Planning in the Yukon, A Case Study of the Aishihik Project, unpublished M.A. Thesis, UBC, 1979, pp. 53-55.
30 William Macleod, Water Management in the Canadian North, Ottawa, Canadian Arctic Resources Committee, 1977, p. 47-50.
31 Ibid., p. 19.
32 Department of Indian Affairs and Northern Development Act, 1970, 4.
33 Macleod, op.cit., pp. 2,3.
35 Macleod, op.cit., p. 2; see also Keith, et.al., pp. 60-65.
36 Ibid., p. 4.
37 House of Commons, Standing Committee on Indian Affairs and Northern Development, Minutes, December 12, 1974, 11:08.
38 For an account of environmentalist and native opposition to the Aishihik development, see Nicholls, op.cit., Ch. 3.
39 Macleod, op.cit., p. 25.
Snare Forks Public Hearing Transcript, pp. 53-56, 57.

Consumers Association of Canada, op.cit.


Ibid., p. 3.

Ibid., p. 4.


Ibid., p. 4.

Ibid., p. 52; also Environment Canada, Atmospheric Environment Service, Temperature and Precipitation Records, Yukon and NWT, 1941-70.

Kelly, op.cit., p. 25.

Ibid.; see also Public Hearing Transcript, p. 25.

Ibid.

Ibid.
CHAPTER THREE

THE PLANNING PROCESS

This chapter consists of a detailed account of the planning and administrative process leading up to the construction of the Snare Forks development. Below we will document the alternative courses of action available to the Commission, the investigation of those alternatives, and the final choices made, as well as the formal procedures followed, and interactions with other actors in the process.

1. Development of the Snare Forks Project

   1) Load Forecasts: Determination of the Need for System Expansion

   The 1970's saw accelerated economic expansion and population growth in Yellowknife, as a result of the relocation of the territorial capital there, and, to a lesser extent, of the expansion of the Cominco operations. Demands on the Snare/Yellowknife system increased sharply, with domestic consumption in Yellowknife accounting for most of the increase. Between 1967 and 1972, household consumption in Yellowknife grew from 15 million kilowatt-hours to 38 million kilowatt-hours. Plains Western Gas and Electric Ltd., the distributor of the NCPC-generated power to household consumers in Yellowknife, became the largest user of power in the system, accounting for 41 per cent of demand in 1972; the Giant Mine, which formerly accounted for the bulk of the system load, by then had declined to 38 per cent.\(^1\)

   At the same time, however, there was some uncertainty as to the immediate economic future of Yellowknife. There was some indication that the Giant Mine (whose production - and power consumption - had remained stagnant through the 1960's and early 1970's) might shut down its operations completely by 1977.\(^2\)

   NCPC's load forecasts, then, were based on two possible scenarios. The first assumed the continued operation of the Giant Mine, at a constant
capacity, with peak load on the system growing from 18 megawatts in 1972-73 to 30 megawatts in 1979-80. The second, assuming a shutdown in 1977, saw an increase to 25 megawatts by 1976-77, a sudden decline to 20 megawatts the following year, but increasing again to 24 megawatts by 1979-80. Under either scenario, peak demand would exceed the existing 20-megawatt capacity by the winter of 1974-75. This excess demand could initially be met through expansion of the Yellowknife diesel plant, but even with this the situation would become critical during the winter of 1976-77.

Thus, by 1971 it was concluded that large-scale expansion of the system was required. In planning for this expansion, NCPC faced three main areas of uncertainty. The first concerned the feasibility of further hydro development as opposed to alternative means of generation. The second had to do with site location. The third centred around target date for completion.

ii) Consideration of Alternatives

It would appear that the principal alternative to hydro under consideration was large-scale expansion of diesel capacity. Steam and gas turbines were apparently given some initial consideration, but were ruled out on the basis of the high cost of fossil fuels in the Yellowknife area and prohibitive transportation costs.

The following parameters were used by NCPC in projecting comparative costs for expansion of the Snare hydro system and diesel expansion:

1) Construction of the Snare hydro development would begin in April, 1974
2) The Snare hydro project would be capitalized at prevailing (1973) interest rates
3) The operating costs for the new hydro development would not increase the existing system costs above expected inflationary trends
4) The capital cost of diesel installation is estimated at $225/kwh (1973), and projected to inflate at eight per cent annually.

5) The diesel equipment would be amortized over fifteen years at interest rates near 1973 levels.

6) Diesel fuel costs, averaging 32c/gal. in 1973, would increase at an annual rate of eight to fifteen per cent.

7) Diesel efficiency is estimated at 15 kwh/gal.

8) Projected operations costs include salaries, travel expenses, maintenance, and parts replacement, with a projected annual inflation rate of eight per cent.

9) Expected average available hydro generation from the existing Snare plants is 107 x 10^6 kwh annually.

10) Present Value is calculated at an interest rate of 7\%.

The first cost estimates, including comparative cost analysis of hydro and diesel expansion, were compiled by NCPC planning staff under Douglas Steen, and tabled internally on February 13, 1973. The hydro cost projections were rather crude, being derived from existing information on site conditions on the lower Snare, and estimates of quantities of materials needed, based on previous Snare projects and indexed for inflation. At that time, the hydro alternative was calculated to be clearly more economical over an eight-year period, assuming the continued operation of the Giant Mine, though costs were projected to be roughly equal assuming a Giant shutdown. However, while the initial outlay for a hydro-electric facility would obviously be greater than for a diesel plant of equal capacity, the cost of fuel oil and mechanical maintenance meant higher long-term operating costs for diesel, cancelling out its initial cost advantage in the long term. More detailed comparative cost studies, making use of finalized schemes and consulting engineer's estimates, were tabled in October 1973 and January 1974, the latter being submitted to the Water Board. These bore out the earlier conclusions, but it appears that by early 1973 the balance had been clearly tipped in favour of the hydro alternative.
According to the Engineering Report:

Diesel generation plays a very important part in the present system, injecting power into the system for short periods during peak load conditions. Diesel plants offer better economy for such peaking requirements because of the low capital cost of installation, but as the load increases, the required diesel generation increases to a point where the hydro fixed costs are lower than the operating and maintenance cost of the diesel plant. The Jackfish (Yellowknife) Diesel Plant burns "heavy X" fuel from Imperial's Norman Wells operation. The cost of this fuel has risen this year (1973) to 31.86¢ a gallon compared to last year's price of 23.86¢ a gallon. This escalation in the fuel price is expected to continue to make the diesel alternative less attractive. The load forecast indicates that the hydro alternative would reach the "break even" point as compared to diesel in the winter of 1975-76, without any further increases in the price of diesel fuel.\(^\text{12}\)

In addition to the lower Snare, several alternate sites were considered for hydro-electric development during the early planning stages in 1972. The Cameron and Beaulieu Rivers were considered to be within economical transmission range, but were ruled out as possible sites due to lack of storage capacity. The idea of supplying Yellowknife from a plant on the Taltson was rejected on the basis of long distance and high transmission costs.\(^\text{13}\) The La Martre River, which flows into the north arm of Great Slave Lake from the northwest, was also considered. The flow and available head were calculated to generate a potential forty megawatts, far in excess of the immediate needs of the Yellowknife area. Staging (installing only fourteen megawatts at first) was considered to be too costly on a per-unit basis, and transmission distance was seen as further undermining the feasibility of the proposal.\(^\text{14}\)

The possibility of developing potential upstream of Snare Rapids was examined, but in the end this, too, was rejected:

Sites upstream on the Snare were not attractive at the time since it was believed that the requirement for
additional upstream storage on Indin and/or Snare Lakes could result in licencing delays and environmental restrictions similar to those being experienced in the Yukon (Aishihik). The additional transmission distance from the load centre was another deterrent. Furthermore, the remoteness of the upstream sites was not particularly conducive to plant operations.\textsuperscript{15}

Also considered was a scheme to divert water from the Emile River into the Snare and install a second turbine generator at Snare Falls. This was abandoned because of its ecological implications, limitations in output, and because it appeared to be less economical in the long run than a new downstream plant.\textsuperscript{16}

It was thus decided that a third hydroelectric development on the lower Snare, downstream from existing plants, presented the best alternative. Specific advantages cited included:

1) Minimal flooding and overall environmental impact
2) Proximity to the load centre, and utilization of the existing storage and river control regime
3) Proximity to existing plants, meaning ease of operation and maintenance
4) Relatively easy access to the site, resulting in reduced transportation costs
5) Easier scheduling of construction, due to location and easy access
6) Readily available river flow data and topographical information, which identified excellent potential for hydro development\textsuperscript{17}

Between the Snare Falls plant tailrace and Marian Lake, the Snare descends a total of 26.5 metres. Most of this potential head (23.5m) occurs upstream of Strutt Lake. Existing geological and topographical information indicated favourable conditions near Strutt Lake for dam construction, and by February, 1973, the Strutt Lake area appeared to be clearly favoured by NCPC as a site for a hydro development.\textsuperscript{18} Further studies were then undertaken to pinpoint the exact dams site and devise a general project layout.
The third element of uncertainty centred around the completion date of the project. Load forecasts projected that demand would outstrip the existing system's output by the winter of 1974-75. Since a hydroelectric plant could not possibly be constructed in time to meet this initial excess demand, the Commission decided to install an additional five megawatts of diesel generating capacity at Yellowknife as a temporary measure to meet projected system loads. This additional diesel capacity, according to NCPC's forecasts, could be expected to suffice until the winter of 1976-77.

The Commission, then, was faced with a three-year time frame within which to complete the project. However, cost studies pointed to long term savings if the development could be completed by December of 1975, a year ahead of the deadline dictated by projected demand:

The analyses indicate that for Strutt Lake development capital costs of up to $16 million, there is a 'long term' economic advantage for December 1975 commissioning vs. a December 1976 commissioning regardless of whether the approximately 5000 KW additional diesel installation of 1974/75 is mobilized or not. Using present value analysis, there is a weak case for the later commissioning of Strutt for a capital cost of over $14 million, in that in the initial years there are inherent savings, but 'break even' would occur within the first 15 years of capital write-off.

It was estimated that a one-year delay would result in additional total system costs of about $60,000 through to 1980, with additional annual carrying charges of $60,000 to the end of the amortization period.

iii) First Project Proposal

A tentative scheme for the development was drawn up by NCPC planning staff in early 1973. It featured a dam on the Snare River just downstream from the outlet of Judd Lake, raising the water level to 183 m (the elevation of the Snare Falls tailrace). It would create a reservoir
backing into Line Lake, via canal, where a second dam, with powerhouse, would be constructed. From the Line Lake dam, water would be channelled through a canal to Strutt Lake, about 1/2 km away. The dams would be of rock-fill construction. The plan would utilize 24.5 m of head, of which 1 m would be obtained through the future lowering of Strutt Lake. Further conceptual design awaited detailed site investigation and engineering studies.

iv) Site Investigation and Presentation of Alternative Schemes

The first investigation of NCPC personnel of the Strutt Lake area took place between March 9 and 16, 1973, and was carried out by Douglas Steen and Donald MacIntyre of the Edmonton head office. A reconnaissance program was completed, consisting of a one-day helicopter survey of the site, and a six-day ground survey to investigate general topographic conditions and record spot elevations. At the same time, an access trail was cut through from the Snare Falls gatehouse.

On the basis of information obtained on this field investigation, a number of changes were made to the preliminary scheme. It was decided that the river closure dam be moved upstream to the outlet of Judd Lake, because of more favourable topographic conditions (the bedrock abutments to the dam were closer together) and that the power dam be moved away from the head of Line Lake closer to Strutt Lake, with the power house on the shore, eliminating the need for a canal. The water flow would instead be channelled to Strutt Lake via penstocks about 200 m long.

In August, 1973, NCPC released a preliminary engineering report, *Strutt Lake Hydro-Electric Project: Report on Preliminary Engineering Investigation*. It presented a number of possible schemes. Two river closure damsites were considered; one at the outlet of Judd Lake, the other about
1/2 km downstream. The power dam would be constructed near Line Lake, either at the outlet of the lake or down towards Strutt Lake, connected to a powerhouse on Strutt Lake by canal, penstocks, or tunnel. Also mentioned as a possibility was a dam with contiguous powerhouse 7.5 km downstream from the outlet of Judd Lake, though it was felt that further site information was needed before this alternative could be fully evaluated.

Also, during the late summer of 1973, J.D. Mollard and Associates were retained for air photo interpretation and identification of construction material sources and potential soil problem areas. In early October, Mollard wrote to Douglas Steen, NCPC's chief of planning, identifying three sites for possible hydro development, tentatively identified as 1) Cowboy Lake (outlet of Judd Lake), 2) Line Lake, and 3) Fork Rapids (downstream on the Snare River). He indicated his preference, on the basis of information available, for the "Fork Rapids" site, since it presented a solid bedrock foundation for the dam and plentiful rock for construction purposes.

In early September, W.F. Kelly Associates, consulting engineers, were retained by NCPC to produce a feasibility study, which would elaborate on NCPC's preliminary design studies, and include alternative possible layouts, recommendations as to their relative economy, and a preliminary construction schedule. (Kelly Associates also undertook a hydraulic model study, and this was presented in October.)

The Feasibility Study, presented to NCPC on November 15, 1973, presented three schemes considered viable from an economic, engineering, and environmental standpoint (see Figure 1 and Appendix 3). The first scheme included a dam at the gorge about .5 km below the outlet of Judd Lake, with an adjacent dyke across the valley below Cowboy Lake, a side channel spillway
at the southern end of the dam, a dam with contiguous powerhouse below Line Lake with a tailrace excavated to Strutt Lake and a small canal cut between Judd and Line Lakes. Ground reconnaissance indicated that the gorge site was more suitable for the river closure dam than the outlet of Judd Lake, on account of shallower sediments (7 metres deep as opposed to 11 metres).

The second suggested layout was similar to Scheme I, except that the powerhouse was to be located on the shore of Strutt Lake, connected to the reservoir by a penstock and a conduit in rock.

Scheme III consisted of a dam at the rapids near a natural fork in the Snare River, with dykes to contain the reservoir running 600 metres to the northwest, a side-channel spillway on the eastern side, powerhouse in the riverbed, tailrace excavated to Strutt Lake, and a low dyke north of Line Lake to contain Judd Lake. This alternative would create a much larger reservoir, 5,800 acres as opposed to 1,500 acres with the Line Lake-Judd Lake proposals.

The study concluded that none of the three possible schemes had a clear-cut economic advantage over the others. All three layouts involved dyking to contain the reservoir, and this would be particularly extensive with Scheme III. The construction of dykes on permafrost, the report warned, would be costly, and it was further cautioned that:

The behaviour of this material under various conditions of surcharge cannot easily be predicted so that the present estimates for dams are based on the removal of all overburden to bedrock.

Kelly went on to urge that consideration be given to a plan of staged construction:

Of the total available head, the first fifty or sixty feet can be dammed without great
expense — it is damming the last twenty feet that appears at this time to be relatively costly. Since the full generating capacity of the plant will not be required immediately upon commissioning, a plan of staged construction would provide extra time for further study and observation of the behaviour of soils in the area. Furthermore, substantial savings would be realized by postponing the outlay of money required for the ultimate dam structures.36

Scheme III, it was maintained, would lend itself most easily to such a plan of staged development, since there would be no need to deepen the Judd Lake-Line Lake canal, as there would be if the other schemes were staged.37

The study included a preliminary construction schedule, which saw commencement of work on the project in January, 1975 (nine months later than NCPC had originally desired), and commissioning in March, 1977 (fifteen months later).38 The estimated cost of developing the full 23.5 metres of head was $16,230,000.39

On October 16, 1973, members and staff of the Northwest Territories Water Board were taken on a conducted tour of the existing Snare Hydro system and the site of the proposed Strutt Lake development.39

The following day, John Lowe, NCPC General Manager, Andrew Jones, Northwest Territories Regional Manager, Philip Johnson, Superintendent of Operations, and Douglas Steen, accompanied by representatives of the consulting firms, appeared before the Board to present tentative plans for the project. They were advised by Board Chairman David Gee that the Board would have to wait for final reports and design data before it could issue recommendations and schedule a public hearing. However, he promised that the Water Board would review the presentation and identify to the Commission areas that needed further clarification.41
Several Board members raised questions concerning the NCPC proposals. C.D. Forbes of the Department of Public Works expressed the fear that the open channel through the ice-rich valley between Line and Strutt Lake (under Scheme I) would melt permafrost and cause erosion of both the valley bottom and side slopes. C.A. Lewis of Environment Canada maintained that the tail-race into Strutt Lake (Schemes I & II) would flush sediment from the lake bottom into the Snare River, with detrimental effects on downstream water quality. Concern was also expressed over the time frame and extent of the environmental impact studies (this will be dealt with in detail later), and the effects of vegetation clearance on soil stability and water quality.  

These concerns were formally relayed to NCPC in a letter from David Gee to Andrew Jones, dated October 31, 1973. Gee asked that the Commission further study soil conditions in the Line Lake valley and the potential problem of siltation downstream, as well as expand on its wildlife and vegetation studies. It was requested that NCPC submit its plans for borrow pits, access roads, and disposal areas for assessment, as well as (on a confidential basis) capital cost details and cost comparisons, so that the Board could have a "full perspective" on the project proposal. This reflected something of an activist perception of the Water Board's role on the part of the Chairman and some of the members, in that they desired to examine aspects of the project not directly covered in the Northern Indland Waters Act, though it is not apparent that cost figures were considered in reaching the final decision.  

In November, after the completion of the Feasibility Study, the finalized proposals (three schemes) were submitted to the Water Board, and discussion ensued between NCPC and the Board concerning the Commission's licence application. Of the three schemes outlined in the study, NCPC found Scheme I the most economically attractive, followed by Schemes II and III.
Figure 1: Sketch Map of Snare System Showing Alternative Proposed Damsites

1. Snare Rapids Dam
2. Snare Falls Dam
3. Proposed Line Lake-Judd Lake Damsites
4. Snare Forks Damsite
5. Final Damsite
However, the Board reiterated its concern over the effects of the open tailrace through the Line Lake valley and over the prospect of siltation from the flushing action of the outflow from the tailrace. Mr. Kelly countered that any resulting increase in the sediment load would be insignificant when compared to the existing amount of suspended sediment in the lake and river system, but the Board remained firm. Moreover, the Board ruled that NCPC's request for a licence could not be reviewed in its existing form (i.e. three alternative proposals), and would have to be re-submitted as a single scheme.

With Schemes I and II judged unacceptable by the Water Board, (without costly modifications), the Commission saw Scheme III as the only viable alternative, and the proposed development became known as the Snare Forks project. Uncertainty still remained, however, regarding the type of structural designs which best suited conditions at the site.

v) Site Conditions and Structural Design Problems

Two factors strongly influenced the design of and choice of construction materials for the project: the remoteness of the site and the permafrost nature of the soils in the area.

The remote location of the Snare meant that transportation of prefabricated materials such as concrete to the site in large quantities would have been prohibitively expensive. Consequently, locally available material would have to be utilized to the greatest extent possible, meaning that the dam would have to be of earthfill or rockfill construction. The upstream Snare dams were of the rolled earth type (the most common design type in Canada), but Kelly maintained that this would be less practical at Snare Forks because of the excessive moisture content of the soils at the site. Conditions at the site of the planned new development, though, were considered ideal for rockfill construction:

Conditions for a rockfill dam at the Snare Forks site are very favourable. As mentioned earlier,
a large amount of excavated rock will be available for use in a dam. Secondly, the bedrock of the area provides an excellent solid foundation, essential for a strong rockfill dam. The rock types consist of granitic intrusive and metamorphosed sedimentary. These are predominantly hard rock types and provide a strong rockfill section with very little settlement during and after construction. \(^{45}\)

It was also pointed out that rock, unlike earthfill, could be dumped into the river without dewatering, and could be placed under all weather conditions, whereas a rolled earth dam could only be placed in dry, above-freezing conditions (a very limited period in the Far North.)\(^{46}\)

Dyking presented a more complex problem, as this would have to be built on permafrost, the ice-rich overburden being up to 15m. thick. In late summer of 1973, Ripley, Klohn, and Leonoff, consulting geotechnical engineers, were retained by NCPC to undertake a test drilling and soil sampling program, on the basis of which to provide advice on dam and dyke structures. Thirty five holes were drilled in the general area (eight at the Snare Forks site) to determine soil depth to bedrock.\(^{47}\) The results of laboratory testing of the soil samples were released to NCPC on December 18, 1973. It was concluded that dyke stability would be a problem, due to slumping caused by degradation (thawing) of permafrost around the edges of excavations, but that this could be overcome through a careful choice of materials and dyke alignments.\(^{48}\)

Kelly, as we have seen, was at first sufficiently concerned with the uncertainties presented by permafrost conditions to suggest consideration of staged construction to enable further studies, as well as excavation of the dyke alignments to bedrock. Both recommendations were dropped with the tabling of the final Engineering Report on January 9, 1974, the brief explanations being given that the former offered no tangible economic advantage while the latter was too costly.\(^{49}\) In addition, the report contained a revised construction schedule that conformed more closely with the Commission's original
As an alternative to founding the dykes on bedrock, Kelly now recommended that a special type of structure, used in the Kettle and Kelsey developments in northern Manitoba, be adopted for the Snare Forks project. The design was described as follows:

After the dam is built and the reservoir flooded, the permafrost underneath the dam and reservoir begins to thaw. As free water percolates upwards, it enters a pattern of sand drains. Finally, the dyke itself, which is of semi-pervious material, allows the water to steadily migrate out of the downstream side of the dam. The dam cross-section is relatively wide and flat to compensate for the fact that the coefficient of internal friction is low within the slowly thawing permafrost foundation. Thawing of the foundation occurs slightly faster near the upstream side of the dam because of the proximity to reservoir water above freezing temperature. This results in a closer spacing in the pattern of sand drains in this area. The entire dam, in a sense, functions as a reverse filter steadily bleeding off water from the thawing permafrost.

The design, however, presented certain drawbacks, in that it would require fairly frequent maintenance:

As time progresses the dam slowly settles and eventually requires the addition of more material to maintain a safe freeboard. Furthermore, settlement can be expected to be non-uniform, i.e. less over areas of lower ice content. Judging by the behaviour of the Kelsey and Kettle dams, repair maintenance may be required at intervals of from two to six years. A program of test pit excavation in the area of dykes on permafrost is recommended to provide a basis for predicting more accurately the expected rate of settlement of these dykes.

The permafrost dyking scheme did, however, represent a substantial saving over construction of the dykes on bedrock. Estimates released in January, 1974, projected the total cost of the development to be $14,085,000, more than two million dollars less than the October 1973 estimates which had assumed excavation to bedrock.
The recommended program of test pitting and sampling along the proposed dyke alignments was begun on February 22, 1974, more than two weeks after the public hearing before the Water Board, and was completed on March 27, several weeks after the Board decided in favour of granting the water licence, and only a few days before construction equipment was moved onto the site. The program, under the supervision of Ripley, Klohn and Leonoff, was resumed on August 31 and concluded on October 1, 1974, just before the final decision to relocate was made.

In general, NCPC's planning procedures concentrated on short-term rather than long-term objectives, presumably to allow the Commission flexibility when confronted with regulatory demands, economic fluctuations, and other changing conditions, as well as to minimize costs. Planning for the Snare Forks project did not begin until 1971, four years before the projected completion date. Technical studies were not commissioned until after the final decision to go ahead had been made in early 1973. In other areas, though, the Commission's efforts to minimize costs increased risks; the decision to use a relatively untried design for dyking on permafrost, rather than excavate to bedrock, as well as the decision to proceed with construction before laboratory sampling of soils along the dyke alignments was completed, represent examples. Another consequence of the pace of NCPC's planning process according to some was the failure of the environmental impact study described below, to adequately cover all of the project's ecological implications.

2. Environmental Impact

The reservoir formed by the Snare Forks dam would have a surface area of 5,800 acres, and would reach upstream to the tailrace of the Snare
Falls dam. About 3,870 acres of land would be inundated, as well as two small lakes, Cowboy Lake and Bow Lake. The project would also involve construction of 11 km. of new road for access, and 21 km. of transmission line to connect the development with the two upstream plants.  

In May, 1973, Pearse-Bowden Economic Consultants/Envirocon Ltd. was retained to conduct a detailed study of the environmental impact of the proposed development. Field work began in early June and continued through mid-October, at which time all reports were submitted to the Water Board. Field study ended at that time, as the Board concluded that winter studies of moose and caribou would not be required because of their apparent scarcity within the affected area. However, the abandonment of the Line Lake-Judd Lake schemes and decision to go ahead with the Snare Forks proposal meant that the report had to be rewritten, and hence it was not tabled before the Water Board in completed form until January, 1974, one month behind schedule.  

The principal findings and recommendations of the report were summarized as follows:

1) The proposed Strutt Lake hydroelectric development is small in scale, and its impact would not be felt over a wide area.
2) There are no important historic or archaeological sites which would be disturbed, and there are no established settlements, roads, or other structures which would be directly affected.
3) The local aquatic environment would undergo substantial changes. Judd Lake would be increased significantly in size (from a surface area of 750 acres to 5800 acres) and in volume, and some 7.5 miles of the Snare River would be inundated. Lake trout and lake whitefish would probably find the reservoir to be suitable habitat. The arctic grayling which inhabit the free-flowing waters of the Snare River will be displaced, and remnant populations are expected to survive only in the areas just downstream from the dam.
4) The reservoir would flood approximately 3,800 acres of land, which could support a population of 12 to 18 moose. Caribou have not wintered in the area in recent years, and the project would not be expected to affect their numbers. The population of other large mammals, waterfowl, and other birds will in all likelihood be reduced locally, but the reductions will be small relative to the regional or continental population.

5) The project area lies within the traditional territory of the Dogrib Indians and is some 50 miles from the major settlement of Rae. The Indian people do not rely heavily on the project area at present. It is expected that the annual fur harvests would be reduced by several pelts per year (sic) as a result of the project. The area is not relied on as a source of food, other than on an opportunistic basis by people who are travelling through it.

6) If the proposed development proceeds, careful control during the pre-construction phase should be exercised over:
- disturbance of nesting sites of eagles and other predatory birds
- damage of riparian areas outside the reservoir area
- garbage disposal
- indiscriminate game harvests by construction workers

7) The overall impact of the project could be lessened or partially mitigated by:
- contouring and establishing vegetation on borrowing and disposal areas
- controlled clearing of the reservoir edge for aesthetic reasons and to encourage the development of favourable conditions for fish
- encouraging the growth of aquatic vegetation
- providing increased flows to the western channel of the Snare River below the dam to increase the habitat available for grayling.

Both the interim and final reports were subject to some criticism from members of the Water Board. It was felt that the material presented at the October 17-18, 1973 Board meeting did not adequately document the Line Lake schemes' potential environmental damage. In addition to the concern expressed over siltation, the point was raised that no plans for disposal of the 500,000 cubic yards of excavated material were included. The absence of waterfowl studies was also noted, and the Board agreed to request that Mr. Lewis have Environment Canada look into the matter.
The study was also called into question on the basis of the time frame within it was conducted. Board Chairman David Gee, in his letter to NCPC of October 31, 1973, wrote:

Very strong concern was expressed by the Board in regard to the time frame in which environmental studies were carried out. Studies which cover periods of less than one year were considered inadequate in that they did not take into account conditions under all seasons. It was recommended that all developers approach the Board well in advance of any proposed operation, allowing the Board to give guidance on what studies should be undertaken. By this method, some of the difficulties that might be suffered by the applicant when additional studies are requested by the Board could be eliminated.61

Officials of Environment Canada, under the direction of its representative on the Water Board, C.A. Lewis, set out to formulate its own set of recommendations to be presented at the public hearing, scheduled for February 6, 1974.62 However, because of the delay in completing the Pearse-Bowden study, the DOE paper could not be completed in time and was not tabled until the subsequent closed Water Board meeting. It accepted the conclusion of the former that overall ecological disruption would be minimal and highly localized, that water quality would be only marginally affected, and added that impact on waterfowl populations would be minimal. However, it warned that changes in flow patterns would threaten walleye spawning beds at the entrance to Strutt Lake, and that lake trout as well as grayling would be reduced within the 12 km. stretch of river to be flooded. Also, more was made of the Snare's recreational potential (and, hence, damage to it) than in the Pearse-Bowden study. On this basis, it was recommended that approval of the licence application by the Water Board be conditional upon the maintenance of the existing seasonal flow pattern of the Snare, and the incorporation of the
following environmental design features into the project:

a) i) Felling of all trees within the high water line of the reservoir whose tops rise above the 590' contour so that all remaining trees will be submerged a minimum of 10 feet

ii) Clearing, piling, and burning all trees in areas below the high-water mark for 2,000 yards downstream of the Snare Falls Power Station. This portion of the reservoir will have higher velocities, therefore a clearing would help to preserve portions of the grayling population

iii) Clearing, piling and burning of all trees along the east and south shorelines of Judd Lake, from the present lakeshore to two feet above the high water mark. This will promote more rapid shoreline stabilization and assist in the maintenance of the whitefish and lake trout populations in the reservoir

iv) Establishment of a program to control and dispose of floating debris

b) During construction, all normal land-use controls for waste disposal, siting of roads, work camp operations, etc., should be imposed, including reclamation of disturbed land, borrow pits and removal of construction debris.

c) The facility should be constructed and operated in such a manner as to permit the safe use by tourists and local residents for boating, hiking, and related activities. Provision should be made for the public use of the all-weather road proposed to be built to the area.

d) An attempt should be made to conserve and protect fish and wildlife populations and habitats in the vicinity of the development to prevent further losses in the future. 63

At about the same time, an Environment Canada Fisheries and Marine Service study on the effects of the proposed development on fish stocks in the Snare River and Judd Lake, by R.A. Cameron and Kenneth Weagle, was released. Its relevance was limited, since the field studies were undertaken in September, 1973, and the authors assumed a Line Lake power dam site. 64 Nevertheless, some of its recommendations, particularly regarding vegetation clearance and minimum flows, were incorporated into the DOE environmental impact brief.
Concerns express over effects on walleye spawning grounds prompted the Water Board to request a detailed study of the species in the area from NCPC. This was done by Envirocon Ltd., and presented in July, 1974. It was concluded that very little use was made by walleye of the affected reach of the Snare for spawning purposes. The Walleye Spawning Study was also called into question by members of the Water Board. An assessment of the study by an Environment Canada official, Dr. Chang-Kue, suggested that the report could have been completed before the walleye spawning run. This point was raised at the subsequent meeting of the Water Board by Dr. W.H. Frost, the representative from the Department of National Health and Welfare. The Board resolved to ask the Chairman to write NCPC informing them of this allegation, and to require in the future that licence applicants submit the terms of reference for technical studies to the Board before they are undertaken.

The important points regarding the environmental impact of the Snare Forks project, then, relate to the time frame of the study and the process in general. At issue was not only the scope of the study itself, but allowance for independent assessments by third parties. Environment Canada had intended to present such an assessment at the public hearing, but was prevented from doing so by the scheduling of the process. As a result, the public's only source of information on the matter was NCPC's consultant.

3. Licence Application and Public Hearing

Formal application by the Northern Canada Power Commission for a water use licence was made on July 18, 1973. After presentation of tentative plans, and a tour of the proposed site by Water Board personnel in mid-October, it was decided to schedule the public hearing, required under Section 15 of the Northern Inland Waters Act, for the first week of February, 1974. At the October Board meeting, NCPC proposed a public presentation of the hydro development plans to the (mostly native) residents of Rae-Edzo, with brochures
printed in the Dogrib language. This was endorsed by the Water Board. After it became apparent that the Environmental Impact Study would be completed a month behind schedule, C.A. Lewis approached David Gee to defer the hearing, arguing that Environment Canada would be put in a difficult position with regard to producing its independent assessment. This request was turned down, partially on the grounds that notices for the hearing had already been posted.

At the following Board meeting on January 17, 1974, Lewis strongly urged that in the future no public hearings be scheduled until the Board was in possession of all planning documents and other relevant information, in order to "allow adequate time for the public, the Board, and interested agencies to review the material prior to the hearing."

NCPC representatives countered allegations that its insistence on early project approval was compromising the thoroughness of its planning in general and technical reports in particular by citing Yellowknife growth projections (fifteen per cent per year) and cost figures showing a year's delay costing Yellowknife taxpayers $1,000,000 in additional diesel generation and an additional $160,000 each year thereafter because of escalating capital costs. In order to meet its deadline, it was argued, the Commission would have to begin moving equipment into the area by April, 1974, before spring break-up. The Commission received strong support in its position from the territorial government. At the fifth (December 11-12, 1973) Water Board meeting, Northwest Territories representative Joseph Bergasse expressed the N.W.T. government's opposition to any "undue delays" in the issuance of the licence for the project.

The meeting of NCPC officials with the residents of Rae-Edzo took place on January 7, 1974. Chiefs from Lac La Martre and Rae Lakes as well as Rae-Edzo attended. They requested reduced rates, and expressed concern about
NCPC's plans for lowering Strutt Lake, and over-siltation allegedly taking place in Marian Lake. Chief Arrowmaker of the Rae-Edzo band was encouraged by Mr. Gee, present along with other Water Board members as an observer, to attend the public hearing in Yellowknife.  

The public hearing took place as scheduled at the Yellowknife Inn, Yellowknife, on February 6, 1974. Business, environmental, and native groups were represented at the hearing. Of seven submissions from outside groups, four were from business interests; these were unanimous in urging speedy approval and completion of the project.

Anthony C. Rooney, president of Plains Western Gas and Electric, cited consumption growth figures for Yellowknife, maintaining that no end was in sight for the existing rapid growth rate. He also emphasized the need to have base load requirements filled by hydro power, as use of standby diesel on a regular (as opposed to peak load) basis increased costs to the consumer, particularly at post-OPEC fuel prices.

Mr. Budgeon, president of the Yellowknife Chamber of Commerce, presented a brief with a similar message:

The Chamber of Commerce strongly recommends that the Northern Canada Power Commission be given approval immediately to proceed with the construction of the Strutt Lake Dam. . . . Our reasons for supporting this project are purely economic. However, that is not to say that we are not concerned with the environmental effects of such a development. Studies in the area reveal a mere six square miles of land will be flooded and will cause little adverse effect on wildlife or fish population . . . The project planned relieves the burden of the severe fuel problem (sic) now a matter of great concern. That NCPC is proposing the use of water is a clear indication to us of their attempt to conserve our resources and at the same time avoiding a major cost increase to the public of electrical power . . . there is no doubt that without the addition of electrical power to service Yellowknife, power costs could essentially double. The result would
be a net increase in prices on all our products and businesses. Further to this it would certainly inhibit the development of existing businesses as well as to discourage any investment in our city.\textsuperscript{74}

Neither Mr. Rooney nor Mr. Budgeon were questioned on their presentations.

Their arguments were echoes in an extensive brief by George Florence of Giant Mines, as well as in submissions by A.D. McPhail of Cominco and Mayor Findlay of Yellowknife.\textsuperscript{75}

Natives in the project area where represented by Chief Arrowmaker of the Rae-Edzo band, who claimed that the previous Snare developments had reduced fish stocks in the river and were responsible for drops in the level of Marian and Great Slave Lakes. Moreover, he maintained that the construction of transmission lines after 1946 impeded the movement of moose and caribou. While he did not express opposition to the project as such, he complained about not being able to obtain straight answers from NCPC concerning lower rates or native employment on the project.\textsuperscript{76}

Gary Bowden countered the Chief's statements on the effects of hydro development on hunting and fishing, by citing Canadian Wildlife Service studies which showed the decline in the local caribou population to have begun after 1953, some years after construction of the Snare Rapids plant, and that this was probably due to forest fires and possible human disturbance. He agreed with the chief that the two upstream developments probably contributed significantly to the decline of the local moose population by flooding habitat, but added that over-hunting had likely been the prime cause in the area immediately adjacent to the proposed Snare Forks dam. Bowden also added that the area moose population was now depleted to the point that flooding by the development would be of little consequence.\textsuperscript{77}
Also critical of the NCPC proposal was a group calling itself Ecology North, represented by Ronald Ramsey and N. Cameron. First, they called into question the entire existing philosophy of northern development, charging that rapid economic growth, facilitated by NCPC hydro expansion, was giving rise to unplanned urban sprawl in Yellowknife and impairing the overall quality of life. Secondly, concern was expressed over the feasibility of constructing dykes on permafrost (it was felt that the limited experience of Manitoba Hydro was not a solid enough base on which to proceed), the effects of diversion of the river flow down the west channel during construction, and over the effects of access road construction. The Ecology North submission recommended further studies on the permafrost and diversion questions, and called for a two-year moratorium on construction, with load increases met by diesel expansion. It also asked for more detailed information on NCPC's future hydro development plans, and called for the Commission to place a deposit with the Water Board to be available in the event of a major ecological accident.

Mr. Kelly replied to the questions raised about permafrost dyking by saying that further site investigations by Ripley, Klohn and Leonoff should resolve any remaining uncertainties regarding feasibility and design.

Mr. Gee agreed to have the Board look into the matter of a security deposit at the upcoming meeting. (Section 13 of the Northern Inland Waters Act gives the Board the authority to require applicants "to furnish security in an amount determined by the Board, but in no case shall the amount exceed $100,000 or 10 per cent of estimated capital cost of the work, whichever is greater.") He was less agreeable, however, when Mr. Ramsey reiterated Ecology North's demand for published information on NCPC's future plans:

I must say that it is not the role of this particular meeting to gaze into the crystal ball as to what NCPC
might or might not do. We are dealing with a specific application, and I think we should leave it at that. 81

A planning role for the Water Board was, in other words, explicitly rejected.

One government official appeared to question NCPC on its proposal. Kenneth Weagle of the Fisheries and Marine Service, Environment Canada, asked about the effects of the plant on downstream discharges, and about the effects of diversion of the Snare through its silt-rich west channel (which is usually dry except during peak flow periods) on downstream water quality. Mr. Bowden responded to the first question by citing figures from the Engineering Report pointing to no significant changes in discharge patterns. Mr. Kelly countered on the latter point, maintaining that any additional silt load would settle in the normal sedimentary pools just below the confluence of the forks and that, at most, only a small amount of very fine particles would find their way downstream to Slemon Lake. 82

Only two Water Board members involved themselves in the questioning to any degree. Both their questions related to general NCPC matters rather than the Snare Forks proposal itself. C.A. Lewis asked Douglas Steen about NCPC's long-range hydro development plans, the apparent lack of which he had criticized the Commission for in the past. Mr. Steen countered that the Commission was actively investigating alternatives for the 1980's, and that the La Martre River appeared at the moment to be the favoured alternative. A.K. Campbell, president of Giant Yellowknife Mines and a Territorial representative on the Board, asked about the feasibility of a grid connecting the Snare and Taltson systems (Yellowknife's power supply at that time rested precariously on a single transmission line, as it still does) to which Mr. Jones, the regional manager, replied that loads were not as yet sufficient to warrant such a move. 83
While a range of different interests were represented at the hearing, this range cannot be said to have represented a cross-section of interests in the Northwest Territories. Business groups had a disproportionate input, some others, such as household consumers or organized labour, were not represented. The problem of inequality of access to resources also was apparent; while the environmentalist brief reflected a fair command of relevant technical information, the native submission appeared to be hampered by an incongruity between traditional knowledge and the technical data presented by NCPC.

4. Issuance of Licence

After the public hearing, the Water Board staff went to work on a draft licence, which was circulated among Board members several weeks later. The draft licence came up for consideration at the following Board meeting on March 12, 1974.85

The Water Board's Technical Committee, under the chairmanship of Arthur G. Redshaw, the Controller of Water Rights, produced a set of general recommendations concerning the licence, and these were presented at the meeting. The recommendations themselves were not part of the licence, though points were included throughout it. Some of the actual conditions placed on the licence reflected concerns expressed at the public hearing and at previous Board meetings. (The Conditions were divided into three categories, General Conditions, Conditions Applying to Construction, and Conditions Applying to Operation.) The Commission was required to maintain minimum flows of 200 cfs during and after construction, to clear all trees within the flooded area whose tops extended above 590' (180 m), as well as all shrubs and trees in the flooded area 1,800 m downstream from the Snare Falls dam, and all shrubs and trees between the existing Judd Lake shoreline and elevation 602' (183.5 m), and to undertake further studies on the ecological effects of the diversion of
the Snare through the west fork during construction.\textsuperscript{86}

The third requirement was the cause of some discussion. Mr. Lewis maintained that it was a stopgap measure, and that NCPC should have considered the problem earlier. It was finally agreed, however, that this requirement not be included as a condition of the licence, but rather be negotiated with the Commission.\textsuperscript{87} (Final studies on the diversion were submitted to the Board in early July.) \textsuperscript{88}

It was voted to approve the draft licence as amended.\textsuperscript{89}

Several steps remained before the licence could be finalized. First, the final draft licence was submitted to NCPC for possible further negotiation of terms. The land use implications of the licence were forwarded to DINA's Land Use Administrator, who would consider them and issue the final Land Use Permits. After the terms were agreed to by NCPC, the licence was sent to Ottawa to be scrutinized by DINA's legal advisor. Following final approval by the Board and signing by the Chairman, the licence was signed by the Minister, Jean Chretien, in mid-May, 1974.\textsuperscript{90}

5. \textit{Summary}

The institutional framework is reflective, to a considerable extent, of pluralist assumptions, particularly the Northern Inland Waters Act and its provision for interest-group input. NCPC has also taken initiatives in this direction, as evidenced in its own public meeting held at Rae-Edzo. The operation of these mechanisms in the Snare Forks process, however, did not conform completely to classical models of pluralism. The majority of presentations from outside groups at the Water Board public hearing were from business interests. There was no presentation from any group representing household consumers. A brief was heard from an environmentalist group, but the group in question (Ecology North) disappeared from public view shortly
after the hearing, and thus an established environmental lobby cannot be said to exist in the Northwest Territories. Input from native groups was actively encouraged by both NCPC and the Water Board, but in practice this appeared to be confined to anecdotal evidence against the technical analysis of NCPC planners and consultants (as evidenced in the exchange between Chief Arrowmaker and Gary Bowden). The process appears to be weighted against certain broad "inclusive" interests; in many respects, it presents a classic example of Olson's model.

The Water Board appeared to take a relatively narrow interpretation of its mandate, as defined in Section 9 of NIWA. A planning function was explicitly rejected by Mr. Gee at the public hearing. Thus, important questions relating to the project remained obscured from public view. This can be considered significant when the above-mentioned lack of organization and technical expertise among the population is taken into account. The Environment Canada ecological assessment, which could have put some issues before the public at the hearing, could not be presented because of constraints posed by scheduling. Aside from the DOE paper, no outside technical expertise was brought into the picture; the studies of NCPC's own consultants constituted the only source of technical information on which the Board or the public could formulate judgments.

The Commission's planning practices have characteristically been based on short-term objectives rather than long-term strategy. Macleod notes:

NCPC does not undertake . . . detailed environmental studies until a final decision is made on a project. By then preliminary engineering has been completed, and NCPC begins to urge the speedy completion of the project because of rapidly increasing needs and the rising costs of construction. By this time perhaps only a year is left, at the most, before the construction is to start.91

By the time Snare system expansion was contemplated in 1971, the Commission's load projections indicated that demands would exceed then-existing output within two years; diesel expansion was necessitated as an interim measure.
There is also little doubt that the speed of the planning process undermined its thoroughness and effectiveness, particularly with regard to environmental impact assessments. Because of its desire for early project completion, the Commission decided to act against the initial advice of the consulting engineer concerning dyke design and construction scheduling. These issues were not raised by the Water Board, either publicly or privately.
Notes to Chapter Three


2 Ibid.

3 Ibid.

4 Ibid.; see also Public Hearing Transcript, p. 15.

5 Public Hearing Transcript, p. 18.


9 NCPC, Strutt Lake, March 29, 1976, 6.1.

10 Steen to Olson et.al., February 13, 1973.


13 Public Hearing Transcript, p. 19.


15 Strutt Lake Hydroelectric Development, 1.1.

16 Steen to Olson et.al., February 13, 1973; see also NCPC, The Proposed Strutt Lake Hydro Scheme, March 15, 1973.


19 Public Hearing Transcript, p. 15.


23 Engineering Report, p. 10.

24 The Proposed Strutt Lake Hydro Scheme, p. 1.
25 Ibid., pp. 3-6.

26 NCPC, Strutt Lake Hydroelectric Project: Report on Preliminary Engineering Investigation, 4.3.


29 Ibid., p. 27.


31 Ibid., p. 27.

32 Ibid.

33 Pearse Bowden, op.cit., p. 6.

34 Feasibility Study, p. 3.


36 Ibid., p. 4.

37 Ibid.

38 Ibid., Appendix.


41 Ibid., p. 6.

42 Ibid., p. 7, 8.


45 Engineering Report, p. 34.

46 Ibid., p. 35.

47 Feasibility Study, pp. 33-35.

48 Earle Klohn to Donald MacIntyre, December 18, 1973.

49 Engineering Report, p. 3.
50 Ibid., Appendix.
51 Ibid.
52 Ibid., p. 37.
54 Klohn Leonoff International Ltd., Snare Forks Hydroelectric Development
   (Report on Site Investigation), December 1974, p. 3.
55 Pearse Bowden, op.cit., p.6.
56 Ibid.
57 Ibid., p. 1.
59 Pearse Bowden, op.cit., p. 1.
60 C.A. Lewis to DOE Regional Directors, October 23, 1973.
62 Environment Canada, Consolidated Paper by Environment Canada Respecting
   Application to the NWT Water Board Regarding Snare Rapids, Snare Falls and
63 Ibid.
64 R.A. Cameron and K.V. Weagle, The Impact of the Strutt Lake Hydro Project
   on the Snare River, NWT, Environment Canada, Fisheries and Marine Service,
   1974.
65 Minutes, NWT Water Board Meeting No. 10, November 5, 1974, p. 15.
66 Minutes, NWT Water Board Meeting No. 4, October 17-18, 1973, p. 10.
69 Lewis included the following comments in his notes on the fourth Water Board
   meeting:
   I asked for an indication of how long this expansion
   would suffice at the present rate of increase in demand
   - the answer was early 1980's. NCPC appears to have
   done very little to date in planning for that time.
   Of interest is the fact that nearly 2 1/2 years ago
   NCPC started considering this expansion while environ­
   mental impact work commenced this past August.
   C.A. Lewis to DOE Regional Directors, October 23, 1973.
Ibid.

Minutes, NWT Water Board Meeting No. 5, December 11-12, 1973, pp. 3, 4.

Ibid.

Ibid.

Ibid., p. 54.

Ibid., p. 59-60.

Ibid., p. 62.

Ibid., p. 69-72.

Ibid., p. 73.

Ibid., p. 77.

Ibid., p. 77.

Minutes, NWT Water Board Meeting No. 7, March 12, 1974, pp. 2-4.


Ibid., p. 49.

Ibid., pp. 46-47.

Ibid.

Ibid., p. 3.

Minutes, NWT Water Board Meeting No. 9, July 9, 1974, p. 6.

Minutes, NWT Water Board Meeting No. 7, March 12, 1974, p. 3.

Ibid.

Minutes, NWT Water Board Meeting No. 8, May 7-8, 1974, p. 6.

Macleod, op.cit., p. 42.
CHAPTER FOUR

CONSTRUCTION AND COMPLETION

This chapter covers events during the course of the construction of the Snare Forks project, as well as events directly related to the outcome in the period immediately following completion.

1. Beginning of Construction

Late in 1973, NCPC officials met with representatives of Poole Construction Ltd. of Edmonton to obtain current construction bid estimates, based on quantities of materials identified in the Feasibility Study. These estimates provided a basis for later cost projections.\footnote{1}

Tenders were called in January, 1974, (four months before final approval of the licence). These were arranged by the consulting engineer, Mr. Kelly, though NCPC management participated in bid evaluation. It was concluded that the Commission could save money by purchasing its own construction equipment and materials, including light trucks, camp, warehouse, and storage facilities, as well as raw materials and heavy equipment. No bids were received on a general contract call, so it was decided that the Commission would hire its own personnel and act as its own general contractor.\footnote{2}

Heavy equipment and camp facilities were moved onto the site in early April via a winter road (this had to be completed before spring break-up if construction was to proceed during 1974). Actual construction work began in May after the signing of the Licence and the issuance of Land Use Permits. By July, the work camp had been set up, the access road and airstrip had been completed, and the diversion channel to the west fork had been blasted open. Construction crews were, however, impeded by record levels of summer rainfall (almost three times the normal amount according to records kept at Snare Rapids and Yellowknife) which turned the road beds to quagmire, resulting in a need
for tens of thousands of cubic yards of additional quarry rock for stabilization. The excess runoff caused the reservoir to fill, and regulation of the river proved impossible as average daily flows reached 6700 cfs (about four times normal). Larger cofferdams were needed, and these in turn required additional quantities of rock and gravel. Many thousands of cubic yards of rock, gravel and sand for construction were washed downstream. Inadvertent removal of topsoil during airstrip construction resulted in thawing of permafrost and stability problems. Here again, additional materials were required to rectify the situation.³

At the same time, two other major problems were developing at the site which would radically alter the outcome of the project.

2. **The Mining Claim**

On June 27, 1973, NCPC filed application for a land reservation in the area of the proposed development with the Supervisor of Lands, Department of Indian and Northern Affairs, Yellowknife. A revised application was filed on December 6, 1973, after the Line Lake schemes had been abandoned and the Snare Forks site decided upon. The Supervisor of Lands, Mr. N. Adams, acknowledged the application but did not issue a decision. It was apparently assumed at the time that the reservations would be granted when the final exact flooded area was delineated.⁴

As a matter of routine, NCPC personnel moved to check the possibility of existing land claims within the area to be reserved. On December 18, 1973, Donald McIntyre of the NCPC Edmonton office wrote to Philip Johnson at the Yellowknife regional office, asking him to investigate the possibility of mining or other claims. No reply was received, but Mr. Johnson later maintained that he had contacted Mr. Adams, who referred him to the Mining Inspector, Mr. M. Brown, who was to report back to NCPC. No reply was received, even after several call-backs by Johnson. A second check was made in late February,
1974, when Mr. Lowe asked Joseph Long, the Assistant General Manager for Planning, to confirm that all reservations were in order. Mr. Long discussed the matter with Douglas Steen, who assured him that the matter had been taken care of.  

At that point the matter was apparently forgotten and construction plans proceeded.

In late May, 1974, however, Trigg-Wollett and Associates, Geological Engineering Consultants, of Edmonton, acting on behalf of the Anglo-United Development Corporation of Toronto, contacted the NCPC head office by telephone informing it of possible mining claims existing within the reserved area. Mineral claim documents forwarded to NCPC on July 18 revealed that the reservoir behind the Snare Forks dam would flood about 570 acres (one third) of Anglo-United's mining claim, which was situated around Camp Lake beside the Snare River.  

On July 9, David Gee, acting in his capacity as Regional Manager of Water, Lands, Forests, and Environment, DIAND, telephoned the Commission offices and announced that no authorization to flood land would be granted until the mining claim issue was resolved. On July 26, he wrote to J.M. Lowe, advising him that a Water Licence does not automatically entail land rights, and that Land Use permits authorizing construction did not include the right to flood land - the latter was the responsibility of the applicant. Approval in NCPC's case, he went on, must derive from a permanent alienation of lands under the Territorial Land Use Regulations. The Department apparently took the view that the claim was a matter to be worked out between NCPC and Anglo-United, and took a hands-off approach.

On July 31, the Commission contacted Anglo-United by letter, and a meeting was arranged between representatives of the two for August 8. Here it was revealed that the mining claim dated back to 1959. The meeting was inconclusive, as Anglo-United refused to relinquish its claim without compensation.
On September 6, Elizabeth Kroon, NCPC Planning Geographer, was contacted by B. Williams, DINA Mining Recorder, who suggested that the Commission required a land reservation by Order-in-Council. (This was confirmed by the Assistant Deputy Minister, A. Digby Hunt in a letter to John Lowe.) He also revealed that a claim had been staked within the reserved area (though not within the area to be flooded) in March, 1974, and went on to state that even if the Commission had obtained the land reservation through the Supervisor of Lands, this would have been a reservation "by notation" only, and would not have prevented claim staking.  

During the fall of 1974, the Commission approached DIAND for an Order-in-Council, but was informed by a senior DIAND legal advisor, Pierre E. Cote, that an Order could not be issued until a formal agreement was reached between NCPC and Anglo-United. At this time the Commission retained the services of a mining consultant, Walter Clarke of Precambrian Shield Resources Ltd., in order to obtain an independent assessment of the value of the mining claim. The estimates were sufficient to induce NCPC to look at alternative schemes that would eliminate or minimize flooding of the mining property.  

The problems appeared to be rooted in crossed signals between NCPC and DIAND, and in a lack of familiarity among NCPC staff with the recently amended Territorial Land Use Regulations, which decentralized procedures by putting land reservations in the hands of DIAND's Yellowknife Regional Office rather than Ottawa. 

Assessing these developments in late October, 1974, George Olson, NCPC Special Projects Manager, wrote in a memorandum to J.M. Lowe:  

It seems clear that no one at NCPC considered the claims in the area to be a viable mining prospect and as a result the earlier brief mention of mining claims was not adequately followed up . . . to learn at such a late date that the reservations on which planning, engineering Water Board hearing presentations, and construction
to date have been based, were almost meaningless, was an almost incomprehensible happening which should be avoided in the future...

Included in Olson's memorandum were a number of recommendations. In general he advised that "NCPC should set up an orderly and reasonable time schedule for the development of hydro sites" and that closer coordination be maintained between long range forecasting, planning, and construction. Specifically, it was recommended that, a) NCPC should apply for a land reservation by Order-in-Council at least five to six years prior to estimated commissioning date; this Order-in-Council should expressly state that the area applied for is withdrawn from mineral claim staking, and, b) that NCPC should, immediately upon receipt of the above noted reservation, search out and assess the significance of any other reservations, claims, leases, timber rights, trap lines, etc., that may give rise to a conflict.

3. Structural Problems

As previously mentioned, test drilling and soil sampling to determine permafrost and bedrock conditions along the proposed dyke alignments began after the Public Hearing, and was completed after Water Board approval of the licence application (and only days before construction equipment was moved onto the site). The dyke alignments had not been finalized at the time of project approval, so part of the purpose of the test-drilling program was to determine the final, optimal dyke alignment.

The findings of the geotechnical consultant were far from encouraging. The results of the test-drilling program indicated that large and abrupt changes in bedrock elevations existed, and that this would preclude the construction of dykes on permafrost similar to those in the Manitoba Hydro developments. Differential settlement of the thawing permafrost over short distances, combined with
the thawing of the highly plastic lacustrine clay overburden by the reservoir water, would tend to result in transverse cracking of the dykes, giving rise to instability. The consultant recommended, then, that the dykes be founded on solid bedrock, as proposed originally in the Feasibility Study. This would have to be done in winter, since permafrost excavation becomes nearly impossible during the warmer months. In cold weather, it is still difficult and highly expensive. The amount of material that would have to be moved at Snare Forks was considered to be far in excess of the capacity of available equipment at the site. Additional equipment would have to be moved in to complete the work in one winter, adding at least several million dollars to the original cost estimates.

The geotechnical consultants also dictated a change in plans for the construction of the main dam, advising that it would have to be built in the dry, with fine-grained channel sediments excavated to bedrock, and not, as proposed in the Engineering Report, by dumping coarse rockfill across the river and sealing with successively finer material dumped upstream. A lack of sufficient suitable fill material near the site made the Kelly proposal impractical. This too would significantly increase total costs.

4. Decision to Relocate

The prospect of an indefinite delay in construction, resulting in millions of dollars in additional overhead and diesel generation costs, as well as the likelihood of an additional outlay of several millions for structural design changes, led NCPC to consider radical alterations to the project design by September 1974. A memorandum from Douglas Steen to Joseph Long, George Olson, and Bruce Christie dated September 30, 1974, presented two alternatives. The first involved moving the damsite upstream towards the outlet of Judd Lake; the second consisted of a staging plan to develop the 23.5 metres of head in
two sites, the first stage consisting of a dam on the Snare just above Strutt Lake, 1.4 km downstream from the existing site (14.6 m head), and the second stage utilizing the remaining 9.2 m at a site near a series of rapids about 3 km downstream of the Snare Falls plant. 17

Steen clearly favoured the latter alternative. The Judd Lake option, it was pointed out, would entail abandoning the existing campsite and other works and building new structures at the upstream site at an estimated cost of $2 million and several months construction time. The downstream alternative, on the other hand, would utilize the existing work camp and diversion channel, and, in addition, would flood only a small portion of the claim property, eliminating access problems, would reduce the need for clearing of vegetation, and would cost about the same as the existing Snare Forks scheme (now estimated at $17 million). 18

At first, three possible combinations were considered to develop the full 23.8 m of head, with 11.9 m, 14.6 m or 16.2 m of head at the lower site, with the remainder to be captured at the upper site. It was decided that 14.6 m represented the optimum amount of head to be developed at the lower site (this would bring the reservoir level to 174.5 m, or 570'). This alternative appeared to be the most economical in terms of cost in mills/kwh, and best suited the turbine units available (lower head would have meant a loss in efficiency or possibly a need to order new turbine units). Moreover, permafrost dyking and flooding of the mining claim would be minimized (both would still be significant if the higher head were developed). 19

Additional head (3 m) could be obtained in the future by means of blasting open the rapids above Slemon Lake, thereby lowering the level of Strutt Lake, followed by lowering of the relocated plant's tailrace. As completed, the plant, with 14.6 m of head, would produce a maximum output of 4.8 MW from
each turbine unit, or 9.6 MW total compared with 7 MW each (14 total) under the original plan. 20

On November 19, 1974, J.M. Lowe and Walter Clarke presented the relocation scheme to Anglo-United officials, who reacted favourably. Under the revised plans, about 213 acres of the claim would still be flooded, but access problems for the mining company would be eliminated. 21

5. Application for Licence Amendment

Further reconnaissance of the site was undertaken, and design details further developed. On November 5, 1974, NCPC officials presented their plans before a meeting of the Water Board.

John Lowe began the presentation by outlining the problems encountered with the existing scheme, including adverse summer weather conditions, permafrost dyking problems, potential litigation stemming from mining claims, and lack of gravel near the site. He then launched into a description of the Commission's alternate proposal. At this point the Water Board Chairman, M.J. Morrison, asked for clarification as to what NCPC was actually applying for. Mr. Lowe replied that the Commission was applying for "approval in change of concept" from a one-stage development as licenced to a two-stage development as presented. Mr. Morrison indicated that the licence would have to be amended because of the changes in elevation from the existing licenced scheme. He referred to Section 15 (2)(c) of the Northern Inland Waters Act, which stipulates that public hearings must be held in connection with amendment of as well as issuance of water use licences, barring situations that are declared emergencies by the Board with the consent of the Minister. The Chairman further added that he felt that the Board had a responsibility to the public in this matter, and that if the Commission wished to circumvent a second public hearing, it would have to prove to the Board that an emergency indeed existed. 22
The Board resolved to ask for the following from NCPC:

1) a conceptual review of hydro-electric development between Snare Falls and Slemmon Lake
2) a complete review of the circumstances which led to the relocation plans
3) a detailed reclamation plan to restore the area disturbed in accordance with Part A, Section 4 of the Licence
4) immediate submission of finalized design plans and construction drawings of the "lower site" development
5) immediate engineering data on the "lower site" development
6) a formal request from NCPC for amendment of their present licence
7) a detailed justification from NCPC as to why the situation should be considered an emergency under Section 15 (2)(c) of the NIWA.

On December 10, the Commission tabled a report entitled "Snare River Hydro Development Below Snare Falls Plant" with the Water Board, included a conceptual review, a summary of the reasons for relocating the dam, design details and geotechnical data, an attached formal application for a licence amendment, and a list of reasons as to why the existing situation constituted an emergency. These included 1) additional diesel generating costs of $40,000 to $130,000 a month after August 1976, 2) additional carrying charges on capital expenditures of $50,000 per month, 3) camp maintenance costs, including overhead and skeleton staff, of $80,000 per month, and 4) possible disruption of orders for equipment and materials.

In January, 1975, the Commission finally obtained its Land Reserve. Since formal agreement with Anglo-United, which would have facilitated an Order-in-Council, had not as yet been concluded, Mr. Lowe wrote to Mr. Hunt, asking for a land reserve by "administrative action." This request was granted, with the area of the reserve redefined to exclude several blocks of active mining claims.
NCPC's application for a licence amendments came before the Water Board at its meeting of February 5, 1975. Arthur Redshaw, Commissioner of Water Rights and chairman of the Water Board Technical Committee, presented the Committee's recommendations on the matter. These included a call for a second public hearing, and a recommendation that NCPC be required to file an entirely new application for a water licence, rather than an amendment to the existing licence. Mr. Redshaw expressed concern that the public would be denied its right to know should the situation be declared an emergency and the public hearing waived. He further stated that the Committee was concerned with NCPC's future plans for lowering Strutt Lake. Mr. Morrison countered that the public could be kept informed through the existing "community consultation" process, and that NCPC's required application for a Land Use permit would be publicized. Mr. Bergasse informed the other Board members that he had been asked by the Deputy Commissioner of the Northwest Territories to support NCPC's application, as the Territorial government felt the need for completion of the plant should be treated as an emergency.²⁷

C.A. Lewis again attacked the Commission for poor planning, which he argued lay at the root of the current problems. E.W. Humphrys, the Department of Transport representative, came to the defense of NCPC, stating that planning was made very difficult by conditions in the North, and repeating the Commission's argument that delay would mean failure to meet the 1976-77 winter peak without extensive and costly use of diesel facilities. He warned that the Water Board would bear the brunt of public criticism arising from rates increases should it delay the application.²⁸

It was agreed by all the sitting Board members (including Mr. Lewis, despite expressed reservations about the amendment being a "band-aid" approach) that an emergency did exist, and the NCPC application for a licence amendment
was passed unanimously. However, the Commission's application consisted only of a written request for an amendment, and had not filled out a full application. It was agreed to ask NCPC to furnish the latter and this was done on February 13. The Chairman also informed Mr. Lowe that the amendment did not commit the Board to approval of any additional changes to the Snare system (i.e. the proposed lowering of Strutt Lake), and that full application must be furnished for any such development. The application was then forwarded to Ottawa, and on February 27 the Minister, Judd Buchanan, informed the Board that he concurred with its assessment of the situation as constituting an emergency, and had thus approved the amendment.

Public notice of the application for the amendment, in the Edmonton Journal, News of the North (Yellowknife) and the Rae-Edzo News was given on March 5, almost a week after formal approval by the Minister. The events leading up to the amendment were revealed in the press for the first time the next day.

6. Description of Revised Scheme

i) Dams

The main powerhouse dam, now known as the Strutt Lake dam, was to be located at a narrow point in the river near the entrance to Strutt Lake, about 1.3 km downstream from the Snare Forks site. Solid abutments would be provided by rock outcrops on both sides of the river, and the dam's proximity to Strutt Lake would keep tailrace excavation requirements to a minimum.

The dams would be constructed of rockfill, and sealed with compacted silt on a gravel filter zone, as under the original scheme.

ii) Spillway

The spillway, as under the original plan, would be of a side channel overflow type, spilling into the diversion channel through the west fork of the
river. The overflow section would be about 145 m long, and the spillway would allow maximum reservoir levels of 175.3 m with a dam crest elevation of 177 m.35

iii) Intake

The intake structure was designed to be founded on bedrock as close as possible to the powerhouse, and where a minimum of excavation would be required. In its principal design details, including trash racks, gate hoist house, gate gains, hoist housing, air vent shafts, and water level indicator, the intake in the revised scheme would be essentially similar to that of the original.36 (see Appendix C).

iv) Penstocks

The two penstocks would be constructed of 1/2" thick fibreglas. The initial design, which called for welded steel construction, was abandoned as it was found that fibreglas construction would cost roughly half the amount required for steel. Cost analyses, which compared incremental costs for penstock length with corresponding savings in tailrace and powerhouse excavation, coupled with relative values of hydraulic efficiency, indicated that the penstocks should be as short as possible. Throughout their length the penstocks would be covered by dyke material or backfill sufficient to eliminate any requirement for insulation.37

v) Powerhouse

As under the original scheme, the powerhouse superstructure would consist of a steel frame with a metal sandwich wall and metal deck cladding. The general layout was designed around two used turbine generator units purchased from Ontario Hydro.38

Capacity flow was rated at about 1600 cfs for each of the two turbine units, compared to 1525 cfs for each of the upstream plants. This would require careful integration of the amount of water passed through each of the
four units to avoid wastage. Heavy demand would result in the lowering of the reservoir level, and the storage would have to be replenished during periods of light load. Maximum daily fluctuation would be about one foot.\textsuperscript{39}

The tailrace was designed to rise during peak flow periods when water levels rise all the way downstream to Marian Lake. This would diminish power output somewhat, but only for brief periods during the summer when demand is low.\textsuperscript{40}

The design placed the powerhouse sump and draft tube dewatering pump between the two scroll cases and a short distance directly downstream from the centerline of the units. The service pumps and air compressor would be located on the turbine floor level, and these fixtures, as well as all water piping, would be placed so as to avoid the possibility of being frozen by the air cooling system in winter.\textsuperscript{41}

vi) Estimated Cost

The estimated cost for the lower site development in November, 1974, was $13 million.\textsuperscript{42}

7. Completion of Construction

Construction proceeded relatively smoothly through 1975. Excavation of the Strutt Lake dam began in April and work on the Snare Forks dam commenced in June. The only significant problem encountered concerned blasting of the spillway channel; this was halted in May after blasting activity resulted in cracked rockface and rock falling into the diversion channel.\textsuperscript{43} Work on the penstocks was near completion by December.\textsuperscript{44}

Cost estimates, however, climbed steadily throughout this time. The November 1974 estimate for the lower site, at $13 million, was lower than the original project cost estimate, this being largely due to its smaller scale and savings on dyke construction. In March, 1975, however, the estimate given by
Douglas Steen to the Toronto Globe and Mail was $18 million. Costs incurred by relocation included camp maintenance expenses (estimated at about $300,000), as well as interest on capital and costs of reclamation (as required under the amended licence). The Commission's Northwest Territories Regional Manager, Anthony Yewchuk, told an interviewer from the Edmonton Journal that relocation costs would be "unlikely" to run into the millions of dollars. Outside economic forces were having a more significant effect, as high inflation rates characterized all sectors of the national economy through 1974 and 1975, the construction industry being especially hard hit.

Relations between NCPC and the local news media were often strained during 1975. After revelation of the site problems, the Commission was attacked in News of the North editorials for incompetence. In an interview with the Yellowknife weekly, NCPC comptroller Albert Watkiss offered the defense, "it's a smart engineer who has the courage to change a plan when more information becomes available." Other NCPC personnel, it appears, were somewhat less gracious, and an editorial in the same issue complained that Snare Forks Project Manager Bill Julien was "rude and uncouth" when approached by a News of the North reporter.

After the winter slowdown, major construction work resumed during the spring of 1976. By this time, however, the cost estimate had risen to $24,050,000. The access road to the upper site was completed by April: tailrace excavation was finished in June, and the transmission line was completed in July. Major construction was finished by late October, and the plant was formally commissioned on November 15, 1976.

Finishing work, in the form of spillway construction, carried on into 1977, and this was completed by the end of April.

The final cost figure for the Snare Forks development, furnished by the Northern Canada Power Commission, is $27,143,000.
8. The Snare Cascades Proposal

i) Licence Application Process

The Northern Canada Power Commission filed an application with the Water Board for a licence for development of the Snare Cascades site on September 26, 1975.54 The application was reviewed by the Water Board at its meeting in October, and a public hearing was scheduled for January 14, 1976 (later rescheduled to January 15) at the Rae-Edzo Community Hall. The application was approved, and a licence issued, effective October 1, 1976.

ii) Description

Most of the nine-metre drop in the Snare River between the Snare Falls plant tailrace and the Snare Forks forebay occurs within one set of rapids about three kilometres downstream from the Snare Falls dam. The Snare Cascades scheme consisted of a rockfill dam across the river at this site, with a forebay elevation of 183 m, a crest elevation of 186 m, and a crest length of 152.5 m. The reservoir would flood 1100 acres.55

The design incorporated a 175 m-long intake canal on the south bank of the river, which would act as a spillway during times of excess flow. A single short penstock would direct water to turn two vertical fixed-blade hydraulic turbines directly coupled to generators, providing a maximum output of 1.5 megawatts each with a stable flow of 1500 cfs and a head of 9.2 metres.56

Development of the Snare Cascades site was designed to meet demand levels projected in the early 1970's, assuming a continuation of that period's rapid growth. Construction did not proceed immediately after the issuance of the licence, as NCPC planners waited for indications as to immediate future load growth in Yellowknife. The postponement of construction of the Mackenzie Valley Pipeline in the wake of the release of the Berger report, combined with economic recession, resulted in a marked slowdown in growth by 1977. It was
concluded then that the additional output to be generated by Snare Cascades would not be needed in the immediate future, and that construction should be postponed indefinitely. The Commission approached the Water Board and asked that the licence be put "on hold" (the licence stipulated a project completion date of no later than October 1, 1978) until such time as the additional output would be needed. The Board, however, moved to cancel the licence rather than extend it, arguing that it could not grant NCPC's request without more detailed information on its future plans for the project.

9. **Cost Overruns: Origins and Consequences**

The final cost of the Snare Forks development, as previously mentioned, was $27,136,000. This compares with a January 1974 estimate of $14,085,000 for the original scheme and a November 1974 figure of $13,000,000 for the lower site development. The cost overrun was to have far-reaching consequences for consumer rates, and for the financial and political position of NCPC.

The Commission followed standard accounting procedures through the duration of the project. Its accounts were reviewed by representatives of the Office of the Auditor-General of Canada, as stipulated under the **NCPC Act**, and no irregularities or deviations from proper procedures were found.

By late 1975, however, mounting costs on the Snare Forks project, coinciding with the Aishihik overruns, prompted the Minister, Judd Buchanan, to launch an investigation into NCPC's handling of the project. R.N. Dalby and Associates, consulting engineers, of Edmonton, were retained to prepare a report detailing the reasons behind the excess expenditures and issuing recommendations on the commission's organization and planning procedures. Based largely on interviews with NCPC officials and reviews of Commission documents and reports, the Dalby Report went into much greater detail concerning Aishihik than Snare Forks. Nonetheless, the report did offer a number of general
conclusions and recommendations that were relevant to the Snare Forks case.

Dalby concluded that there was no evidence of "gross negligence, wrongdoing, or misconduct" and that a judicial inquiry into NCPC's conduct regarding the Aishihik and Snare Forks developments would not be justified. However, he saw room for upgrading in the Commission's planning procedures and administrative structure, and included the following among his recommendations:

We recommend that the Chairman of NCPC give high priority to a review of NCPC organization, and the responsibility and accountability of the company's management team. . . . NCPC's management should review its forward planning procedures to ensure it will have the necessary information to identify the need for new plant additions, the need to arrange financing, and the need to increase rates, etc., well in advance of the time when a final decision must be made or action must be taken . . . we recommend that NCPC take appropriate action to strengthen communications within the company, with its customers, and with governments, and to discuss more openly the company's operations, its challenges, and opportunities, with special emphasis on replying to customer concerns and criticisms and to giving the reasons for rate increases.

Another recommendation deals specifically with Aishihik, but has some possible relevance to the Snare Forks case. Aishihik saw considerable friction between NCPC and the Water Board, focusing to a considerable extent on the nature and scope of the Board's mandate. In this matter, Dalby came down solidly on the side of the Commission and against the concept of an activist Water Board, advising that the Minister "take appropriate action" to "prevent the intrusion of government officials and agencies into those areas which are the responsibility of NCPC's management."

A somewhat more detailed account of the sources of the Snare Forks overruns was contained in a March, 1976 report prepared by W.F. Kelly Associates for NCPC entitled Consultant's Report on Strutt Lake Investigation of Job History and Cost Overruns, which reviewed contract, material, and equipment costs. The figures pointed to inflation rather than the need to relocate as
the primary reason behind the cost increases. Projected costs rose significantly in most job categories. Figures for dam, dyke and spillway construction show a decrease from November 1973 estimates, reflecting the much less extensive dyking of the lower site (and the fact that the original estimate assumed stripping overburden to bedrock; also, this estimate did not include the cost of works already completed, such as dewatering and road construction to date). However, by 1976 some job cost estimates (roads, intake and penstocks, and transmission line) had tripled over the original estimates (see Appendix 3).

Certain factors present in the North exacerbated the inflationary conditions which characterized the North American economy during the 1974-76 period. Equipment and skilled manpower were in short supply, partially because of the rapid expansion of the Athabasca Tar Sands operations. Higher fuel prices were translated into increased transportation costs, and this was especially felt north of the sixtieth parallel, where long distances and small quantities were the norm. In the report, Kelly cited a construction project in downtown Vancouver which, within the same period, doubled in projected cost from $60 million to $120 million, though no outstanding problems were encountered, as an example of the type of situation facing the construction industry everywhere at the time. 62

The forwarding of the cost overruns to consumers in the form of massive rate increases in late 1975 left NCPC subject to mounting public criticism concerning its conduct of its affairs. It was, as we have seen, known to NCPC as early as the beginning of 1973 that system expansion of any kind would incur costs that would have to be passed on to consumers in the form of substantial rate increases. As cost estimates for Snare Forks rose steadily through 1975, the Commission, already reeling from its losses on the Aishihik development, found itself in a decidedly precarious financial situation, with
a deficiency of $1.2 million in working capital, and it became apparent that rate increases would have to be even steeper than originally thought. The publicity campaign called for in the February 1973 memorandum was never implemented. Thus, when NCPC announced in the autumn of 1975 that it was applying to the Public Utilities Board for new rate structures that would see the Yellowknife domestic rate rise by 90 per cent, area consumers were caught by surprise. The application was approved, and the reaction in many quarters was, predictably, one of outrage. The City of Yellowknife formally petitioned against the increase at the rate hearings, the first intervention regarding NCPC rates since the inception of the P.U.B. in 1963.

Early in 1976, the Yellowknife chapter of the Consumers' Association of Canada, in conjunction with local labour and small business groups, formed an independent investigative body known as the Power Steering Committee. The Committee presented a written brief to the Parliamentary Standing Committee on Northern Affairs. The local chapter of the CAC also lodged a formal complaint with the Anti-Inflation Board and widespread pressure was brought to bear on the Minister to publicly justify the rate increases. As a result of these pressures, the Minister asked NCPC to submit all its proposed rate increases before the Anti-Inflation Board. The AIB ruled that the rate increases were highly inflationary, and, while recognizing the Commission's need to be financially self-sustaining, recommended that an alternative solution be found.

In order to find such a solution, the Minister appointed a Task Force on Electrical Energy costs in the North, which released its report on November 15, 1976. The Task Force rejected increased subsidies to cushion household consumers against rate increases, arguing that this would only benefit the more affluent, since low consumption (low income) households were already largely covered by the existing 300 kwh cross subsidy, and because rates in most
communities were seen to be comparable to those existing in other parts of Canada. Instead, it was recommended that the federal government defer loan repayments on the Yukon and Yellowknife systems, allowing NCPC to stagger the projected rate increases over several years. With the loan deferrals, it was estimated that NCPC could stabilize its financial situation with rate increases of ten to eleven per cent annually over the ensuing three to four years, after a higher initial increase of about 40 per cent.

A second, more comprehensive federal inquiry, the Task Force on Northern Energy, was initiated in early 1977. The Task Force proposed a subsidy program to offset the rate disparities existing within the Northwest Territories, bringing rates for the first 700 kwh of power consumed down to the Yellowknife rate, and this was adopted. Moreover, as a result of the Task Force proposals, it was decided to require NCPC to appear regularly before the Public Utilities Board to justify proposed rate increases, and to place the Commission under the PUB's jurisdiction in all matters where the NCPC Act was not directly contradicted. At this time, the composition of the Board was changed. Previously, the three members of the Board were Territorial civil servants; now, they were replaced by independent, non-government members. This was significant, in that the tendency of the N.W.T. government had been to adopt an uncritical attitude toward NCPC, as reflected, for example, in the submissions of its representatives on the Water Board. An independent Board could be expected to take a more activist approach.

It is worthwhile to note that intervention by third parties at rate hearings is still inhibited by the absence of a well-defined mechanism for cost recovery. Section 30 (3) of the Public Utilities Board Ordinance of 1963 gives the PUB the authority to order applicants to reimburse intervenors for intervention costs. NCPC has refused to recognize this clause, and the Consumers' Association was prevented from preparing a formal intervention at the 1978 rate
increase hearings by the Commission's refusal to pay costs. The PUB, out of frustration, attempted to include compensation for intervention costs in its own budget, but this was vetoed by the Executive Committee of the Territorial government.

The shadow cast by Snare Forks on NCPC's Northwest Territories and overall operations persists to the present. The Commission's financial situation did not show a significant improvement between 1976 and 1979. In 1977, it was unable to meet repayments due on a loan from the federal government. As of March 31, 1979, NCPC had no common equity, and reported a deficit of $4,512,000 in the N.W.T. rate zone for the completed fiscal year. The overall economic slowdown in the North had considerable bearing on this. NCPC's capital expansion plans assumed a continuation of the rapid growth of the 1960's and early 1970's, but consumption within the Commission's service area actually declined by three per cent in 1976-77 over the previous fiscal year, and it was faced with maintaining a large amount of excess capacity. The Commission again came under fire for mismanagement of the Snare Forks project (though the management personnel most responsible for the planning and administration process had since left NCPC). Mayor F. Henne of Yellowknife put forward a brief at the February 1979 rate hearings, stating the City's position that it was not fair to burden its householders with paying for past NCPC bungling. He also proposed that the federal government take an equity participation in NCPC, as it had in several other financially troubled Crown Corporations in the past. Similar concerns were expressed by a representative of the Northwest Territories Association of Municipalities. Incompetent handling of Snare Forks, mismanagement of computer installations and programming, and over-expansion of certain generating facilities, were singled out. The Association urged that NCPC's debt be converted to equity, and that the
Commission be split into two Crown utility companies, one for each Territory.  

It is worthwhile to note that until March, 1980, Cominco's Con Mine operations and the Giant Yellowknife mine continued to receive subsidized power from NCPC (69.7% of full cost for the former, 61.1% for the latter), the rationale being that Cominco contributed to the Snare/Yellowknife system through its Bluefish (Prosperous Lake) hydro plant, and that demand generated by both lowered per unit costs and hence rates for other consumers. In its application, NCPC asked that rates be raised to 82.4% of cost, but the PUB ruled that they be increased to 87.5% in 1979 and 100% in 1980.  

At this hearing, NCPC applied for a 9.5% domestic rate increase. This was rejected on the basis of insufficient documentation and the Commission was asked to formulate a new rate based on actual revenue requirements. The PUB also expressed agreement with the notion put forth by the City of Yellowknife and the N.W.T. Association of Municipalities that northern consumers should not be burdened with paying for NCPC's past mistakes and oversights:

The PUB is not persuaded that NCPC's existing deficit should be collected from their future customers. The PUB agrees with the general regulatory principle that past earning deficiencies should not be borne by future consumers.  

10. Summary

We see during the construction period some more consequences of NCPC's hurried planning and preparation. No test pitting and soil sampling was undertaken along the proposed dyke alignments until well after the public hearing, and only days before the movement of construction equipment onto the site. By the time the geotechnical consultants had completed their site investigation and concluded that the dyke design was unfeasible, construction was already well underway.

The mining claim problem was partially an outcome of crossed signals between NCPC and DIAND. However, the recommendations in Mr. Olson's memorandum
would point to a tacit admission that the pace of NCPC's planning procedures was a factor.

It is difficult to pinpoint the exact sources of the cost overruns, since such information (apart from a general breakdown of costs by job) was not included in the NCPC documents examined. According to the consultant's report inflation accounted for the vast bulk of the discrepancy between original estimates and final costs. No permanent works were in the ground when relocation was ordered, and the existing temporary structures were incorporated into the revised scheme. Also, the Auditor-General's Office uncovered no evidence of irregularities or negligence in accounting and cost control. Costs directly related to site problems consisted of maintenance of temporary structures, payroll of skeleton staff, and capital carrying charges during the period of delay, plus some additional outlays for basic materials as a result of adverse conditions during the summer of 1974.

However, the public was never presented with any hard evidence, in the form of a detailed independent investigation (the Dalby Report was based solely on material supplied by NCPC), as to the actual origins of the cost overruns, and this obviously contributed to the climate of suspicion which prevailed in the aftermath of completion.

We also see some evidence of actors who might have been involved being excluded from the process due to a lack of informational resources. Ten months elapsed between the first indications of possible site problems in May, 1974, and the revelation of the facts to the public in March, 1975. NCPC did not issue public notices of its application for a licence amendment until a week after its approval by the Minister. Relevant documents and correspondence were, in accordance with Water Board practice, available to the public through the Water Use Register, though there is no evidence of any individual
coming forward during this period to review the Register and draw attention to the developments. A second public hearing could have provided a forum through which members of the public at large could have expressed concerns and gained information, even if the outcome could not have been changed at that point.

Also in evidence, not so much in the Snare Forks project itself as in the operation of the Snare system in general, was something of a special relationship between NCPC and industry. The Public Utilities Board was sufficiently concerned with the special treatment afforded Giant Mines and Cominco regarding rates that it recently ordered these to be raised to full cost level.

The rate increases which occurred in the aftermath of the Snare Forks project provided a stimulus to interest group activity. Household consumers organized behind the Consumers' Association of Canada and began to actively investigate NCPC procedures and activities, and the Public Utilities Board began to operate in a truer sense as an independent regulatory body. Lack of resources has remained an obstacle, however, as evidenced in the CAC's inability to present a brief at the 1978 rate hearings, and the PUB's inability to provide support in the matter.
Notes to Chapter Four


2 Ibid.


4 George Olson to J.M. Lowe, October 17, 1974, p. 3.

5 Ibid., pp. 3,4.

6 Ibid., p. 1.

7 David Gee to J.M. Lowe, July 26, 1974.

8 George Olson to J.M. Lowe, October 17, 1974, p. 4.

9 NCPC, Snare Forks Hydro Development, February 13, 1975, p. 5.

10 Ibid., p. 4.

11 Ibid., pp. 3,4.

12 Ibid., p. 5.

13 Snare Forks Hydro, p. 2.


15 Snare Forks Hydro, p. 3.

16 Report on Site Investigation, p. 12.


18 Ibid., pp. 1,2.

19 Ibid., p. 4.


21 Snare Forks Hydro, pp. 4,5.

22 Minutes, N.W.T. Water Board Meeting No. 10, November 5, 1974, pp. 16-17.

23 Ibid.

24 Snare River Hydro Below Snare Falls, December 10, 1974, pp. 8,9.
26 A.D. Hunt to J.M. Lowe, n.d.
27 Minutes, NWT Water Board Meeting no. 11, February 5, 1975, pp. 13, 14.
29 Ibid., pp. 14, 15.
31 Telex, Hon. Judd Buchanan to M.J. Morison, February 27, 1975.
34 Ibid.
36 Ibid., p. 8.
37 Ibid., p. 9.
38 Ibid., pp. 9, 10.
39 Ibid.
40 Ibid., p. 10.
41 Ibid.
42 Ibid., p. 12.
43 NCPC, "Snare Forks Progress Report No. 5, April, May, June 1975".
44 "Progress Report No. 6, July, August, September 1975".
46 Ibid.


56. Ibid.


60. Ibid., pp. 7,8.

61. Ibid., p. 7.


64. Ibid.

65. Ibid.


67. Ibid., p. 7.

68. Ibid.


70. Ibid., pp. 2,3.

71. Public Utilities Board, Northwest Territories, Decision 2-79.


73. Ibid., p. 6.

74. Ibid., pp. 6,7.

75. Ibid., pp. 5,7.

76. Ibid., pp. 15, 16.
CHAPTER FIVE

CONCLUSION

This chapter consists of a discussion and analysis of the Snare Forks project history in the context of the theory reviewed in Chapter One, with particular reference to the criteria of efficiency and accountability.

1. Summary of Problems

The problems encountered during and immediately after the planning and construction of the Snare Forks hydro development may be divided into two categories. The first consists of oversights in planning which contributed directly or indirectly to the need to relocate the project and to the cost overruns. The second includes instances where the public was denied access to information and/or resources required to facilitate full participation in the planning and administrative process. Those under the first category include:

1) NCPC planners failed to uncover the existence of a mining claim held by Anglo-United Development Corporation within the area designated to be flooded until after construction had commenced. The prospect of a protracted legal dispute and/or hefty compensation payments to Anglo-United was a major factor forcing the Commission to radically alter the Snare Forks scheme. A breakdown in communications between NCPC and DIAND, complicated by an unfamiliarity with procedures on the part of the NCPC planners, appear to be partially responsible, but an internal assessment by NCPC suggests that the Commission did not allow itself sufficient time to thoroughly investigate the matter.

2) NCPC failed to pinpoint site conditions which rendered the dyke design unworkable until after construction began. The pace of the planning and administrative process was a major factor here; the public hearing
was held and Water Board approval granted before test pitting and sampling along the proposed dyke alignments was carried out. The Commission also increased risks in the cause of cost savings by rejecting the consulting engineer's original proposal that the dykes be founded on bedrock, in favour of a less costly but less tried design. The Water Board did not question NCPC on this matter either before or during the public hearing, as the majority of its members did not interpret its role as including a planning function or assessment of project proposals from the standpoint of technical feasibility.

3) The load growth forecasts on which the Commission based its decision to proceed with the Snare Forks hydro development were high. As a consequence, the Commission found itself faced with surplus capacity and stagnating revenues after 1976, further undermining its already shaky financial position. This problem was rooted in the "boom-bust" nature of the North's resource-based economy; the sudden sharp slowdown in economic growth in Yellowknife (and elsewhere in the Territories), resulting from nationwide economic recession and the deferment of the Mackenzie pipeline, was difficult to foresee or predict.

Problems under the second category, relating to accountability, include:

1) The pace of the planning and administrative process meant that the public was denied the full picture of the technical aspects and environmental implications of the project. The matter of permafrost dyking was one example. Also, the public hearing was scheduled before the environmental impact study was completed, and thus Environment Canada, which had expressed a desire to prepare and publicly present as assessment of the study, was left without sufficient time to do so. The
study itself was criticized by members of the Board as inadequate in its scope and time frame, as was the walleye spawning study released the following summer.

2) The public was denied information as to developments during construction leading up to an "emergency" amendment that was granted in secret. The first indication of potential problems regarding the mining claim appeared in May of 1974, while the structural unfeasibility of the design became apparent by the fall of that year, but no press release was issued until March of 1975, after the Water Board and the Minister had approved an amendment to the original licence allowing for relocation of the dam and other design changes. Relevant documents and correspondence were available for examination through the Water Use Register in Yellowknife, but apparently no members of the public came forward during this period to examine them.

3) Input at the public hearing was weighted heavily in favour of business interests, who, because of their dependence on NCPC power for operation and expansion, tended to maintain an uncritical view of NCPC practices and procedures. No groups representing household consumers appeared at the hearing (this interest organized in the aftermath of the rate increase, but was hampered at times by a lack of financial resources). An environmentalist pressure group, Ecology North, presented a well-prepared brief, but disappeared from view shortly afterwards, and thus environmentalists cannot be said to constitute a permanent and established force in the Northwest Territories. Native input was encouraged, but this turned out to be largely in the form of anecdotal evidence, against the technical information commanded by NCPC and industry representatives. A special relationship between NCPC and industry is also evidenced in the operation of the Snare system, with
preferential rates being extended to the major industrial consumers until recently.

4) A climate of suspicion continues to prevail in the Yellowknife area towards NCPC. While available information indicates that inflation was the principal source of cost overruns, this is based on data and assessments supplied by the Commission, and therefore has not been established beyond doubt. Consequently, charges of mismanagement and incompetence continue to be made by local public officials and community groups.


From the standpoint of efficiency, then, the essential problem concerns NCPC's choice of the short-term rather than the long-term view. A review of the planning and administrative process leading up to the construction of the Snare Forks development leaves an impression of a hastily-conceived project, designed to meet the short-term needs of the early 1970's economic boom in the Northwest Territories, that was not integrated into any long-term set of objectives. Planning for expansion of the Snare system's hydro capacity began in 1971, only three years before the system load was projected to exceed then-existing capacity. Expansion of the Jackfish (Yellowknife) diesel plant was necessitated, and even this provided the Commission with a limited period within which to work. This was cut shorter by NCPC's decision to opt for a target completion date one year before the deadline dictated by the load forecasts, in order to save capital carrying costs. The Commission then approached the Water Board, emphasizing the rapid growth in demand on the Snare/Yellowknife system and the need for speedy project approval. Environmental and engineering studies were undertaken, and land use permits and reservations applied for, only after the decision to proceed with the project was made, and construction began before the site investigation by the geotechnical consultant was completed. The lack
of long-term planning, the limited time for preparation, and the apparent emphasis on short-term economic efficiency over long-term considerations, compromised (according to some) the quality of the environmental assessments and inhibited the thorough investigation of the administration, legal (i.e. mining claim) and technical (i.e. permafrost dyking) implications of the development. Had the original construction schedule presented in the Feasibility Study been followed, the permafrost and land claim problems would have been discovered before construction began.

The cause of long-term technical efficiency was further undermined by the fact that the existing administrative framework provided no mechanism for bringing outside technical expertise into the planning process. The Northwest Territories Water Board explicitly declined to assume a planning role, while the community groups which were organized and wished to question NCPC on the development were limited in their access to and grasp of (at least in the case of the natives) the technical details of the project. The technical judgement of NCPC's consultants thus went unchallenged until the negative outcomes became evident.

We are hampered in our analysis by a lack of complete data. In particular, we do not have access to any figures as to the actual extra costs incurred by the relocation of the power dam, or by factors other than inflation, which NCPC and its consultant maintain to be the single dominant source of the cost overruns. If we accept the Commission's account, which holds that no permanent works were in the ground at the time the decision to move the damsite was made, then it is unlikely that following the initial recommendations of the consulting engineer would have left NCPC in a more favourable financial position in the end, especially given the considerable extra cost of excavating to bedrock for the dykes. However, the risks taken in the scheduling and design of the project could, under different circumstances, very conceivably have led to more serious consequences, and thus might be deemed inappropriate for a public project.
The problem here, though, goes beyond questions concerning the technical judgement of NCPC management. As we have seen, NCPC, while being charged with supplying power to a number of small, widely-dispersed population centres, and with doing so cheaply and in a manner as to promote economic growth (a task to which a Crown corporation was seen as being more suited to than a private enterprise utility), receives no direct subsidies from the federal government. As a result, the Commission has found itself chronically undercapitalized, and, under such circumstances, the level of cost savings yielded through the kind of "short-cuts" engaged in during the planning of the Snare Forks development may be seen as significant.

Another constraint on the Commission's ability to plan on a long-term basis is the unstable nature of the North's primary resource-based economy. For example, the Commission's financial position, already precarious in the wake of the Snare Forks and Aishihik cost overruns, was further weakened by an unexpectedly sharp economic slowdown after 1976, which left it servicing considerable excess capacity in both the Yukon and the Northwest Territories. In this regard, NCPC is left with little choice but to "muddle through", as long-range planning becomes difficult and fraught with risk.


  Secrecy is a key word here. The pacing and staging of the development inhibited participation by members and representatives of the public affected,
and obscured information which could have provided a stimulus to discussion and involvement. For example, the licencing hearing took place less than a month after the completion of the environmental impact and engineering studies. Mobilization of public opinion within an environment such as that of the North-west Territories is a slow process, partially because of the need to find individuals who are technically qualified to render assessments. Also, the scheduling of the hearing prevented the public from getting a full perspective on the technical details of the project; the hearing took place before the site investigation was completed, and an independent environmental impact assessment by Environment Canada could not be presented because of time constraints.

Probably the most obvious example of secrecy in decision-making concerned the licence amendment. The public was effectively denied information about developments leading to relocation of the dam until after the necessary licence amendment had been approved by the Water Board and the Minister. Macleod is very critical of the Water Board's conduct of the matter:

There was no emergency here that required the omission of a hearing. Delays in start-up would have been costly, but if notice had been given at the time when the problems became apparent in the fall of 1974, a public hearing on the facts of the situation could have been held. If the Snare Forks amendment is to serve as a precedent, practically any amendment of a licence could pass without the holding of a public hearing. The public's right to its say on such changes may often create what are called "delays" by northern developers. However, it has to be recognized that the public right to a hearing is a normal part of the development process. Scheduling of development which does not take account of time for public discussion should not be countenanced.¹

The Water Board's desire to spare the public the costs of further delays may be understandable, but the secrecy within which the Board and NCPC dealt with the matter is less so. Certainly, if both were convinced that an emergency amendment to the licence was in the public interest, then nothing would have been lost in requiring the Commission to publish an application notice as soon as it approached the Board in November, 1974 and was told that
its proposed changes required an amendment. Public reaction could at least have enabled the Board to gauge whether deletion of the public hearing was indeed appropriate or justified. A public hearing in itself could not, at that stage, have altered the outcome, though this fact does not negate the public's democratic right to know. That the public was denied knowledge of such a major development in the decision-making process until after the fact is demonstrative of serious weakness in the existing institutional design.

Another factor inhibiting participating through denial of information was the absence of mechanisms for independent assessment, or to put technical and planning issues before the public to stimulate discussion. The only relevant technical information at the public's disposal was that furnished by NCPC consultants. In keeping with established practice, the Water Board did not actively question NCPC on the technical aspects of the proposal. According to Macleod:

As the hearings take place early in the licencing process the Water Boards do not expect that the applicant should be able to answer all questions of detail that the Board is aware cannot be answered by the applicant. In the NWT the Board maintains its 'neutrality' by not asking questions that may reveal the faults with the application. In the view of the Water Board, this questioning can best be done later with the applicant behind closed doors. The result is that 'neutrality' is in no way achieved. By maintaining public silence on the faults of development proposals, the Boards favour the applicants.2

Also at issue is the representativeness of public inputs into the decision-making process. The majority of the outside groups presenting briefs at the licencing hearing were business interests. Native input was encouraged, both by the Water Board and NCPC, but it came about in the form of anecdotal evidence against the technical information commanded by the applicant and allied actors. No group representing household consumers of NCPC power appeared at the hearing.

The public hearing mechanism provided for in the Northern Inland Waters
Act appears to reflect classical pluralist assumptions as to group behaviour, i.e. that, given a channel for input, differing interests in the community would spontaneously mobilize whenever perceived gains from such a course of action exceeded perceived losses. Such reasoning does not take into account impediments to organization among broad interests (such as the consumers), and the advantages enjoyed by small groups with a strong commonality of interests (such as business associations). This imbalance could be expected to be particularly pronounced in the North, where the technical expertise and political leadership which could mobilize "inclusive" interests is lacking. At the time of the hearing, little incentive was present for the consumer interest to become active, particularly in light of the task faced in organizing so diverse a group. (One item of information that might have stimulated involvement was the fact that NCPC knew as early as a year before the hearing, that hydro expansion, regardless of the outcome of the project, would have to be paid for through substantial rate increases; this fact was not publicized by NCPC -- contrary to recommendations of its planning staff -- and, of course, did not come out at the public hearing, since the Water Board declined to discuss economic or planning matters.) The incentive finally materialized after the fact, in the form of massive proposed rate increases. In this respect, the consumer interest in Yellowknife represents a classic example of Olson's economic theory of groups.

The jurisdictional division of power is an important issue in our case study as well, because the decision-makers directly involved were all responsible to the federal level of government. The economic and social functions performed by provincial governments in southern Canada are largely carried out in the Territories within the Department of Indian Affairs and Northern Development, and both NCPC and the Water Board are ultimately responsible to the Minister. The Northern Inland Waters Act provides for territorial representation on the Water Board, but this representation is determined by DIAND through
the territorial Commissioner. The territorial representatives at the time of the development were civil servants, though the basis of representation has since been broadened to include representatives of the public at large. Consequently, the institutions involved lacked a local basis of legitimacy, and this could be expected to breed mistrust among the residents of the Territories, as materialized in the aftermath of the Snare Forks cost overruns and subsequent rate increases.

Economic development and resource management in the North are issues of national importance, which affect the future development of the country as a whole, and hence there is a strong case for a substantial central government role in the management of northern affairs, including hydroelectric development. However, the resident population of the North, which is most affected on a day-to-day basis by the decisions of the federal government's northern planners must also, according to generally accepted liberal democratic and federalist principles (unless one adheres to a rigid centralist view) be said to have a legitimate interest in northern policy. Existing institutional arrangements overlook the latter need. Ideally, a framework for water resource management and hydroelectric power development north of the sixtieth parallel should seek to reconcile the local and the national interest through some form of shared jurisdiction (we draw here on pluralist theory, particularly on Olson's "Principle of Fiscal Equivalence" and Ostrom's model).

Despite the existence of institutional mechanisms designed to promote community participation in water resource planning in the North, this participation in the Snare Forks case was limited to a relatively narrow spectrum of affected interests, while significant events and questions remained hidden from public view and decision-makers were allowed to avoid responsibility. Pluralism failed because existing structures failed to take into account a lack of what Olson termed "selective incentives" among the population affected.
Enhancement of pluralist structures, such as direct governmental support of intervenors, might have enabled those groups that were organized (the natives and Ecology North at the Water Board hearing, and the consumers at the P.U.B. hearings) to compete on a more equal basis within the process, but would have done nothing to mobilize the most important affected interest, that of the household consumers, during the planning stages.

On this basis, it might be argued that alternative structures, based on majoritarian models of democratic accountability, might have proved more effective in preventing decision-making secrecy. It is difficult, however, to imagine federal Parliament concerning itself in a major way with the details of a relatively small-scale project such as the Snare Forks hydro plant. At issue here is not only the capacity of legislators in Ottawa to process information related to local concerns, but also the political dividends to be reaped from detailed attention to northern problems; the Yukon and the Northwest Territories account for only three seats in the House of Commons. Territorial government officials, on the hand, scarcely displayed any inclination at the time to raise substantive questions about the merits of the proposal, if their intervention before their Water Board representative is any indication (see Chapter Four, Section 5). Centralization of control over NCPC within the bureaucratic hierarchy could not have been expected to alter the course of events, given the observed intimacy between senior DIAND officials and industry representatives, as well as the predisposition among those senior officials towards limiting regulatory powers (see Chapter Two).

Thus, both the majoritarian and pluralist models break down when applied to the Snare Forks case. Neither can, in itself, fully address the fundamental problem posed by a low level of political organization among the small and widely scattered population in the Northwest Territories.

Given the fact that the dissatisfaction expressed in the aftermath of
the project focused on the practical matters of cost overruns, rate increases, and suspected mismanagement, rather than environmental impact, native rights, or other social, moral, or "special interest" concerns, questions might arise as to the relevance of the issue of accountability in this case. Our concern is based on the premise that democratic participation carries an intrinsic value, that in a liberal democratic social order, the right to know and the right to a fair hearing transcend the extent to which they might influence outcomes in a practical or normative sense. The suppression of information concerning the licence amendment, the sudden announcement of rate increase, as well as the "foreign" nature of the institutions involved (giving rise to a general notion that northern residents have been burdened with paying for the incompetence of remote federal government bureaucrats) contributed to a prevalent sense of alienation among the Yellowknife area population. Such widespread feelings of mistrust towards governing and administrative institutions, even on a localized scale, can conceivably lead to imbalances and distortions in the political system which can seriously undermine or threaten the effective operation of democratic institutions. Thus, impediments to accountability within the Snare Forks decision-making process should be seen as constituting as much a part of the problem as the inflated construction costs and consumer rate increases.

In conclusion, we may see the fundamental problem in the Snare Forks case as lying in a lack of resources among both core and peripheral actors. In the former case, it encouraged a piecemeal planning process which failed to adequately take into account all possibilities; in the latter, it prevented representatives of the community from playing the kind of full role in the decision-making process that is considered healthy in a liberal democratic society. Different procedures could, to some extent, have attenuated the problems which materialized, but we are unable to offer any institutional pre-
scription which could have completely overcome the fundamental problem and induced all actors to function more effectively within the process.
NOTES TO CHAPTER FIVE


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APPENDIX A

LOCATION MAPS

Reprinted by Permission, NCPC
NORTHERN CANADA POWER COMMISSION

W.F. KELLY ASSOCIATES
CONSULTING ENGINEERS

SUBJECT: LOCATION PLAN

SCALE: 1:500,000

DATE: JAN. 4, 1974

DRAWING: 2
APPENDIX B

SCHEMATIC DRAWINGS—ALTERNATIVE PROPOSALS

Reprinted by Permission, NCPC
Line Lake
W.L. 582.

STReTT LAKE POWER
DEVELOPMENT
LINE LAKE TO STRUttt LAKE
DAM - POWERHOUSE LAYOUT
SCHEME 1
Scale 1" = 500"
Line Lake
W.L. 582.0

Intake Structure
Rockfill dam

Tunnel

Penstock
Powerhouse

Surge tank

Tailrace

Note: Spillway is adjacent to Judd Lake dam.

Strutt Lake
W.L. 522

STRAUTT LAKE POWER DEVELOPMENT
LINE LAKE TO STRAUTT LAKE
DAM - POWERHOUSE LAYOUT
SCHEME 2
'Scale 1" = 500'

APPENDIX C

SCHEMATIC DRAWINGS-
SNARE FORKS PROPOSAL

Reprinted by Permission, NCPC
NORTHERN CANADA POWER COMMISSION

W. F. KELLY ASSOCIATES
CONSULTING ENGINEERS

SUBJECT: PROJECT LAYOUT
1" = 500'

APPROVED: W.K.
DATE: JAN. 4, 1974
SCALE: 1" = 500'
DRAWING: 3
Northern Canada Power Commission
W.F. Kelly Associates Consulting Engineers

Subject: Powerhouse Plan

Scale: 1/48" = 1' 0"

Approved: JAN. 4, 1974

Drawing: 6