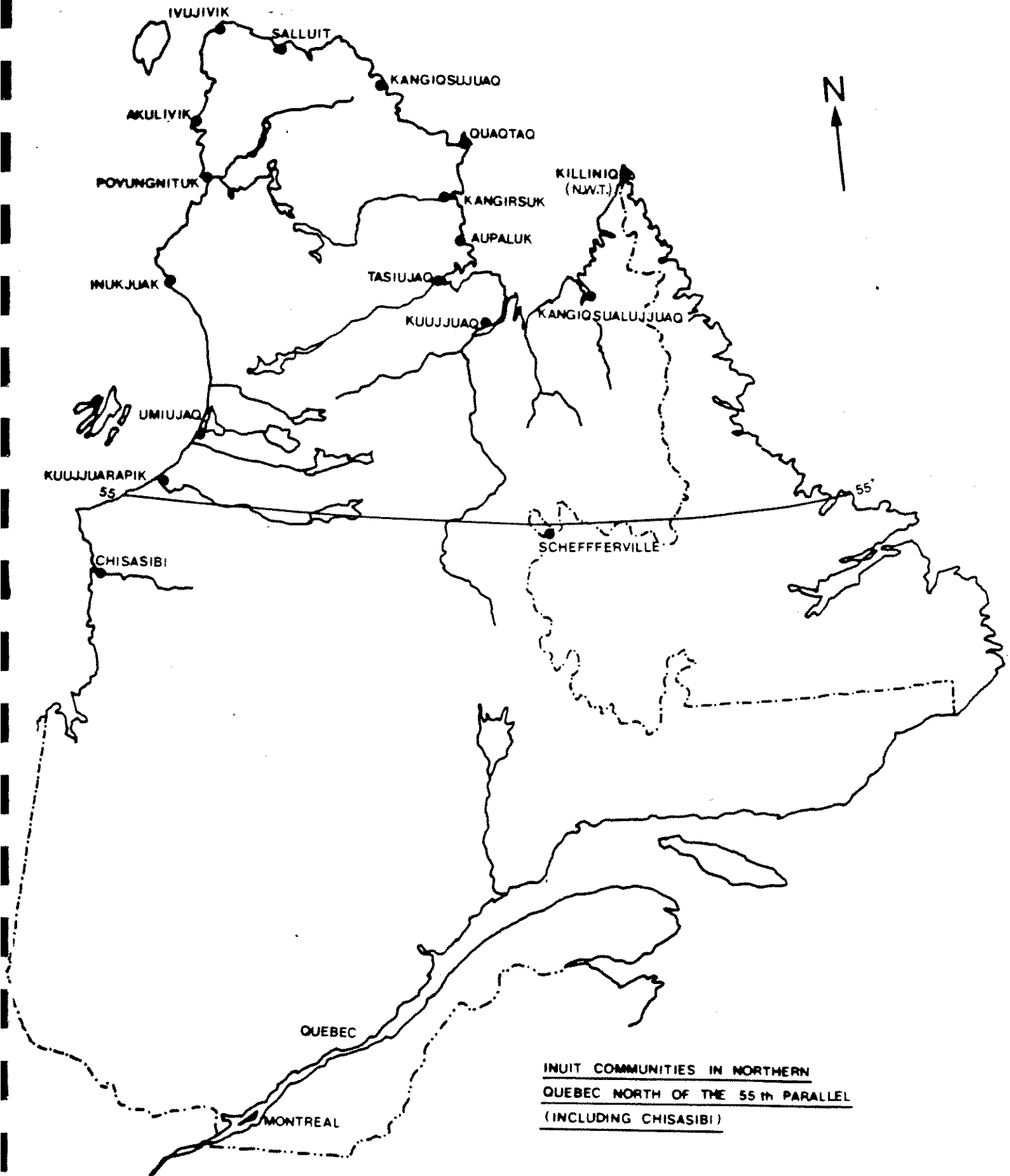


A STUDY OF THE APPLICABILITY OF SLOWPOKE  
NUCLEAR REACTORS AS A SOURCE OF  
HEAT AND ELECTRICITY IN THE  
INUIT COMMUNITIES OF  
NORTHERN QUEBEC

A PROPOSAL  
TO  
ENERGY, MINES AND RESOURCES, CANADA  
FROM  
MAKIVIK CORPORATION

December, 1983



INUIT COMMUNITIES IN NORTHERN  
QUEBEC NORTH OF THE 55th PARALLEL  
(INCLUDING CHISASIBI)

0 ————— 150 miles

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S.Q. 1978, c. 91.

## INTRODUCTION

The present proposal is a submission by Makivik Corporation.

Makivik is an Inuit association created under Québec law in 1978.<sup>1</sup> Its membership is composed solely of Inuit beneficiaries under the James Bay and Northern Québec Agreement signed in 1975. Makivik has the legal responsibility to implement and protect the various rights and benefits of Inuit under the Agreement. In addition, its objects provide that it promote «the advancement of education of Inuit» and «foster, promote, protect and assist in preserving the Inuit way of life, values and traditions». Moreover, Makivik has the responsibility «to develop and improve the Inuit communities and to improve their means of action».

The proposal relates to the region north of the 55th parallel in Québec wherein lie our communities. There are approximately 5,800 Inuit in this region. This region, in which we are the predominant population, is about one-third the size of Québec and forms part of the Inuit circumpolar homeland.

Makivik is making the present proposal largely because it has learned that Atomic Energy of Canada Limited (A.E.C.L.) is currently making attempts to apply as yet unproven nuclear technology to Canadian northern remote communities<sup>2</sup> including our communities in northern Québec. No information concerning this new technology has been provided to our communities or regional bodies; nor has any consultation taken place in this regard. The dangers of

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<sup>1</sup> See An Act to establish the Makivik Corporation, S.Q. 1978, c. 91 (A copy of this statute appears as Annex E to this proposal)

<sup>2</sup> See questions raised in this regard by Jim Fulton, M.P. in House of Commons Debates, May 27, 1983 pp. 25783-84 and June 13, 1983 p. 26286. See also article at p. 27 of Vol. 15, No. 1, 1983, Resource Development, entitled «Reactor Could Heat Remote Settlements». A copy of this article appears in Annex A of the present proposal.

introducing nuclear technology into our northern region, without knowledge of safe methods to dispose of radioactive waste and radioactive leakage are of great concern to us.

Consequently, in light of these above developments, Makivik has decided to undertake a preliminary but independant feasibility analysis of the applicability of Slowpoke nuclear reactors to the communities of northern Québec. Only through such analysis can data sufficiently accurate be obtained upon which we can make meaningful and informed choices and decisions concerning the applicability of nuclear technology in our region.

#### 1. BACKGROUND

Increased costs for energy have hit northern communities even more strongly than southern ones. Such communities have become almost totally dependant upon a small number of refined petroleum products as energy sources - mainly heating oil for household use, diesel oil for electrical generation and a variety of products for transportation - yet it is these same products whose costs have risen most sharply in the past decade and whose costs seem most likely to continue to rise in the next. Moreover, the long and sometimes uncertain supply routes bringing petroleum products to northern communities also depend upon the same fuels, thus magnifying any cost increase. Total energy use in the North is small relative to that in the South despite the fact that on a per household basis it may be greater due to colder temperatures over longer periods as well as poor insulation in older housing and other units. However, problems of supply security and of high costs combine to make pressing the search for more efficient end-use technologies and for alternative sources of energy for the North.

Prospects for change in the three major uses of fossil fuels in remote communities differ by sector and by site. For the transportation sector, no good alternative sources are currently

available (in the South or the North) for petroleum products nor are any expected to become available in the immediate future. For heating and for electrical generation, the local harvesting and use of wood appear to offer a major potential in forested areas but not above the tree line. In areas of the sub-arctic and arctic north of the tree line, relevant options for heating include super-insulation and passive solar designs (which can greatly reduce fuel oil use), heat recovery from electrical generation systems or industrial operations (for example, mines or fish plants) and district heating systems using conventional or nonconventional sources of energy. For electricity the options include wind and wind-diesel hybrids as well as more efficient generation technologies which could significantly reduce though not eliminate the use of refined petroleum products. At present, it is not clear where the optimal balance lies between approaches focussing on the end-use (i.e, conservation) and those focussing on energy supply (i.e, new sources), nor where the optimal balance lies among the various energy sources that could be used for supply. Ultimately only site-specific studies can indicate what choices should be made in a specific community. However, initial analysis should be able to narrow the range of choice and give a better indication of which approaches and which techniques deserve most attention.

The Inuit communities of northern Québec - the communities north of the 55th parallel - all lie in the sub-arctic or arctic and all suffer from high energy costs. In searching for alternatives to the current situation, one possibility is to use an advanced version of the Canadian research reactor called «Slowpoke» which, because of its design, is compact, relatively safe and free of many of the problems that have affected larger reactors. In contrast to Canadian reactors of the CANDU design, the Slowpoke would provide mainly heat rather than electricity though models just now being developed might provide both.

In order to fulfill the objects of the present study, Makivik plans to retain Marbek Resource Consultants Limited (hereinafter referred to as the «Consultant» or as «Marbek») of Ottawa to undertake the work called for in the present study. This study should indicate whether, within a broad concept of costs and benefits, the Slowpoke option is or is not worth pursuing as a potential source of heat and electricity for those communities.

## 2. OBJECTS

The objects of this proposed project are:

- a) to review the non-transportation energy requirements for communities in northern Québec;
- b) to identify and review conventional and nonconventional techniques to satisfy those requirements;
- c) to identify, within the context set by a) and b), the potential role for use of Slowpoke nuclear reactors as indicated by first-order estimation of the costs and benefits of this technology in the environment of northern Québec;
- d) to initiate a process of discussion among the Inuit of northern Québec as to the role that the Slowpoke might play in satisfying their energy requirements; and
- e) to generally undertake an independant and preliminary analysis of the feasibility of Slowpoke nuclear reactors in northern Québec in light of studies of a similar nature currently underway by Atomic Energy Canada Limited.

### 3. APPROACH TO THE PROBLEM

#### 3.1 Pre-Feasibility Analysis

In a general sense, the proposed study can be called a pre-feasibility study. It is aimed at determining whether the subject technology - in this case, the Slowpoke reactor - appears to be a reasonable choice as an energy technology for a given location and a given set of conditions. The objective of this study is to determine whether the significantly greater time and expense of a full feasibility study can be justified, and, if so, in which directions such a study should be aimed.

However, our proposed study will differ from many pre-feasibility studies in several ways. For one thing, extensive experience in energy analysis has shown that an end-use approach to analysis of energy requirements is more illuminating than the conventional forecasting approach. Only by looking at the end uses that energy serve in a community can one readily identify not only the nature of existing energy use but also the ways in which that use might change with more growth on the one hand and with more conservation on the other. A second difference will lie in carrying the analysis beyond a narrow interpretation of technique and cost. In part, this is a matter of dealing with the unique problems of radiation protection, waste disposal and so on that would be posed by the nuclear option. However, in part it is also a reflection of the fact that due to the manner in which Inuit use the land and sea, Inuit communities of northern Québec are relatively self-sufficient living groups with strong emphasis on traditional ways of life. Hence, notions of costs and benefits must extend beyond dollars and joules to such other concerns as local and regional economic development and protection and enhancement of hunting and fishing habitats.

Third, Inuit consultation and participation in any major decision affecting their region is fundamental. The choice of



gies). As a working hypothesis, it is proposed that costs and benefits be divided into four noncomparable classes. Direct comparison would be possible within, but not between classes. By implication, the final determination of feasibility will depend upon value judgments (except in the situation where some technology is unambiguously better or worse than another for all four classes of effects). The four classes would be:

1. Actual dollar costs and energy output, including capital costs, operating costs, need for back-up etc. as adjusted for the normal range of government subsidies.
2. Known and potential external effects, including most notably occupational and community health and safety and environmental protection, including noise, oil spills and radiation.
3. Potential links to economic development activities including technology transfer opportunities and both possible uses for and the production of energy in northern Québec.
4. Community attitudes, goals and aspirations (not otherwise definable in terms of one of the preceding three classes), including social, cultural and economic effects.

4. WORK STATEMENT

Task 1      Consultant shall obtain and review relevant materials on northern Québec communities and on existing and projected energy balances. Consultant will meet with officials of Makivik and, if possible, with regional and local government representatives to improve understanding of the energy situation. Consultant will obtain microgeographic information.

- Task 2      Consultant will collect information on energy balances in, and energy technologies for, other communities north of the tree line in Canada and elsewhere. Consultant will separate techniques into conservation and other alternative sources and into those applicable to heating, to electricity or to both.
- Task 3      Consultant will develop an end-use framework for energy use in northern Québec and modify that framework by the introduction of what appear to be cost-effective and appropriate conservation techniques (apart from waste heat from electrical generation).
- Task 4      Consultant will identify by quantity and quality the remaining existing and projected energy requirements that must be supplied by external sources, including waste heat from electrical generation. Consultant will show which ones might be supplied by central (district) heating sources.
- Task 5      Consultant will develop a detailed technical and economic survey of advanced Slowpoke designs with special attention to:
- a) capital and operating costs
  - b) operating characteristics and reliability
  - c) unique problems
  - d) role in local development
- Task 6      Consultant will review conventional and non-nuclear nonconventional energy sources that are being or could reasonably be used for heat and electricity in northern Québec either alone or in hybrid modes.

- Task 7      Consultant will compare the Slowpoke in each of the four aspects with conventional and other nonconventional sources. Where possible with quantitative information, and otherwise with qualitative information, the Consultant will rank Slowpoke against the other options on each of the characteristics in each situation where Slowpoke might be applicable.
- Task 8      Once preliminary reviews are completed but prior to detailed comparisons, the Consultant will make one or more site visits to improve understanding of conditions and to explain the nature of the project. At least one larger and one smaller community should be visited. Consultant will meet with members of the Kativik Environmental Quality Commission.
- Task 9      After the comparisons in Task 7 have been completed, the Consultant will prepare a final report on the project and develop a plan in cooperation with Makivik for that report to be used as a basis for information and discussion in the communities and with regional government bodies.
- Task 10     Makivik will arrange for translation of the final report. That is, Makivik will take responsibility for translation of the final report into Inuktitut and French.
- Task 11     Subsequent to Task 10, Makivik will follow through with some community and regional discussions through the use of an information liaison person. The information liaison person will travel to the three communities focussed on in the present study. Upon completion of this process, up to three additional person-days would be devoted to a final round of discussions between the Consultant's staff and Makivik (and others whom Makivik may suggest) to review

our report in light of reactions, and critique from the communities.

## 5. PERSONNEL

### 5.1 Consultant's Personnel

The Consultant proposes the following team for the project; résumés are attached in Appendix B, a description of the Consultant in Appendix C and selected examples of the Consultant's studies in Appendix D.

David B. Brooks - Project Manager and Senior Consultant. Dr. Brooks will be responsible for the overall conduct of the study and for the production of reports, and will participate directly in most aspects of the study, including field work. He will be responsible for client liaison. Dr. Brooks is a senior economist, perhaps best known for his extensive analysis and publications related to Canada's energy policies. As a former senior public servant, Dr. Brooks was instrumental in establishing Canada's first Office of Energy Conservation. His long experience in non-government organizations has provided expertise in the need to develop policies that can and will be implemented at the local level. He has published widely in many aspects of energy policy.

Paul Robillard - Remote Community Specialist. Mr. Robillard will provide assistance and advice over the course of the project and in particular on field studies. Mr. Robillard has had a wide variety of recent experience in Ontario's remote communities. This experience includes: travel and living in Ontario's remote communities: compiling and assessing energy supply and demand data, including renewable resource potential; assessing alternative electricity generating and energy conservation options; and

assessing existing barriers to alternative power systems in remote Ontario communities. He has authored two recent studies of Ontario's remote communities.

Roger Peters - Staff Engineer. Mr. Peters will provide technical assistance to the Study Team throughout the project's duration. In particular, Mr. Peters will provide technical expertise at the key analytical and strategy stages of the project. He has had a lengthy involvement in the development and application of both energy conservation and renewable energy technologies. Prior to joining Marbek, he was a research scientist with the National Research Council and was coordinator of their Solar hot water R & D program. Mr. Peters has also worked extensively on community energy conservation techniques, appropriate technology, and water resource assessment.

Gillian Mason - Research Assistant and Community Planner. Ms Mason will provide research assistance over the course of the project in assessing energy requirements and conventional and nonconventional technologies, in developing energy use profiles and in determining the role of energy sources in local development. Ms. Mason will also assist in assessing the impact of growth on conservation and in defining community reactions. She has experience at various levels of government, including municipal and provincial. For the past 2 1/2 years she has acted as a consultant to municipalities dealing specifically with community energy conservation. Her consulting work has also involved policy review and development for local and provincial governments.

## 5.2 Makivik's Personnel

- Resource persons
  - a member of Makivik's Executive and certain research staff within Makivik

- Translators

- one for English to Inuktitut
- one for English to French

5.3 Other Personnel

- Information liaison person (preferably with facility in Inuktitut and English)

5.4 Subcontractors

The Consultant proposes to engage subcontractors in four areas:

1. For assistance in preparing material for and conducting community consultations (approximate requirements - 2 weeks): Glen Milne, Nepean Development Consultants (Ottawa).
2. For information on waste heat availability and recovery in the north (estimated requirements - 3 days): Ferguson, Semak, Clarke (Yellowknife).
3. For information on diesel technologies and waste heat recovery (estimated requirements - 3 days): Robert Bell (Toronto)
4. For information on energy-efficient northern construction techniques (estimated requirement - 3 days): Chris Jalkotzy, Solarctic Inc. (Ottawa).

## 6. TIMING

### 6.1 Schedule

Exclusive of Task 11, the timing for which has to remain open, the proposed project will require approximately four months. The Consultant would initiate work in February 1984 and, subject to possible delays related to northern travel, present a final report in May.<sup>1</sup> A tentative schedule is as follows:

- |             |   |  |
|-------------|---|--|
| 1 February  | - | Project start-up   |
| 28 February | - | Completion of Tasks 1 through Progress Report No. 1                      |
| 30 March    | - | Site visits and preliminary discussion (Task 8)<br>Complete Task 5 and 6 |
| 30 April    | - | Completion of Task 7<br>Progress Report No. 2<br>Draft consultation plan |
| 30 May      | - | Complete Final Report, translation and discussion plan (Tasks 9 and 10)  |

### 6.2 Travel

The timing and funding are designed to allow for a moderate amount of travel:

1. One visit to Chalk River, Ontario, by David Brooks for discussions with John Hilborn of Atomic Energy of Canada Ltd. (designer of the Slowpoke). Late February

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<sup>1</sup> The actual months would have to be adjusted according to when funding is actually obtained from Energy, Mines and Resources, Canada.

2. Six round trips between Ottawa and Montréal for consultant for with Makivik about the contract. Also contacts with Hydro-Québec. Early February (Brooks and Robillard); early March (Brooks with Milne); mid-April (Brooks); late May (Brooks).
3. One visit to northern Québec by David Brooks and Glen Milne to present the preliminary results of the study as part of Task 8.
4. One follow-up visit to northern Québec by David Brooks. (If this meeting takes place in Montréal, costs would be reduced accordingly.)
5. Trip to certain northern Québec communities for information purposes by Information liaison person in Task 11.

7. PROPOSED BUDGET

FEES\*

Brooks	
30 days @ \$425.	\$ 12,750.
Robillard	
12 days @ \$360.	4,320.
Peters	
5 days @ \$400.	2,000.

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\* Note: All Marbek fees are subject to an upward revision of up to 5%. As a maximum this would increase the contract price by about \$1,165.



Mason  
20 days @ \$250.

	<u>5,000.</u>	
Sub-Total	\$ 24,070.	\$ 24,070.

SUBCONTRACTS

Nepean Development

\$ 4,000. .

Waste heat specialist

1,500.

Diesel specialist

1,200.

Northern Housing specialist

	<u>1,000.</u>	
Sub-Total	\$ 7,700.	7,700.

EXPENSES

Long distance telephone

\$ 400.

Translation (Inuktitut and French)

4,000.

Courier

200.

Cargo and Freight

500.

Typing and report preparation (overload  
typist, estimated 30 hours @ \$15.)

450.

Photocopier

200.

Travel and Accomodation

6,000.

Information Liaison Person	3,500.	
Travel and Accomodation for Liaison Person	3,500.	
Resource persons within Makivik to coordinate and supervise work and to review findings	<u>2,480.</u>	
Sub-Total	\$ 21,230.	<u>21,230.</u>
GRAND TOTAL		<u>\$ 53,000.</u>

ANNEX A

"Reactor Could Heat Remote Settlements"

excerpt from Vol. 15, No. 1, 1983, Resource  
Development

## Nuclear energy

# Reactor could heat remote settlements

Small nuclear reactors to heat large buildings is a future energy option for regions which do not have abundant long term supplies of oil, gas or electricity. Atomic Energy of Canada Limited (AECL) is studying the feasibility of small units in the range of two to 20 megawatts for individual buildings such as schools, factories, apartments or office blocks.

Based on the inherently safe SLOWPOKE research reactor, the proposed heating reactor would produce hot water at temperatures less than 100°C. It would be unattended most of the time, responding automatically to daily variations in load demand. The reactor core would contain enough uranium fuel to last two heating seasons.

With the projected cost of heat produced by the 'mini-reactor' already competitive with heat from electricity, the reactor's designers, John Hilborn and Ian Glen at the Chalk River Nuclear Laboratories in Ontario, feel there is a good chance the concept may be accepted as a valuable energy source in the near future. If the current studies at Chalk River confirm technical feasibility, a two megawatt prototype reactor will be built in 1984/85.

The reactor is installed in a water-filled pool, located inside a concrete vault. The core, about the size of a waste basket, consists of 200 uranium oxide fuel elements of the type used in CANDU power reactors, but using five per cent enriched uranium instead of natural uranium. Each fuel element is 0.5 m long and contains 0.5 kg of uranium. The core would be replaced as a unit every two years, assuming an annual load factor of 50 per cent.

The reactor coolant temperature is normally maintained at 80°C. Core cooling is by natural convection and the pool water is separated from the hot water delivered to the consumer by heat exchangers. For an extended shutdown a soluble neutron absorber can be added to the pool water.

Other pool-type reactors have been operating safely and reliably in Canada and other countries for at least 20 years. In Canada, for example, the five megawatt McMaster reactor has been operating in the city of Hamilton for 21 years for teaching and research purposes.

The most notable small reactor used for heating is the 70 MW AGESTA

plant, which supplied heat and electricity to a Stockholm suburb of 40,000 people from 1963 to 1973. High operating costs forced it to close just before the 1973 oil crisis, and there was no possibility of reversing the decision because the entire heavy water inventory had been sold to Canada. As the surrounding community had become accustomed to smokeless nuclear heat, there were many protests from the public when

AGESTA was shut down.

In the Soviet Union, four 60 MW reactors are currently supplying heat and electricity to a remote mining town, and a five MW heating reactor was recently installed in the city of Dimitrovgrad. The city of Grenoble in France is considering a 100 MW reactor, known as THERMOS, for large-scale district heating. Sweden and

*Continued on page 28*

## Nuclear heat for outposts

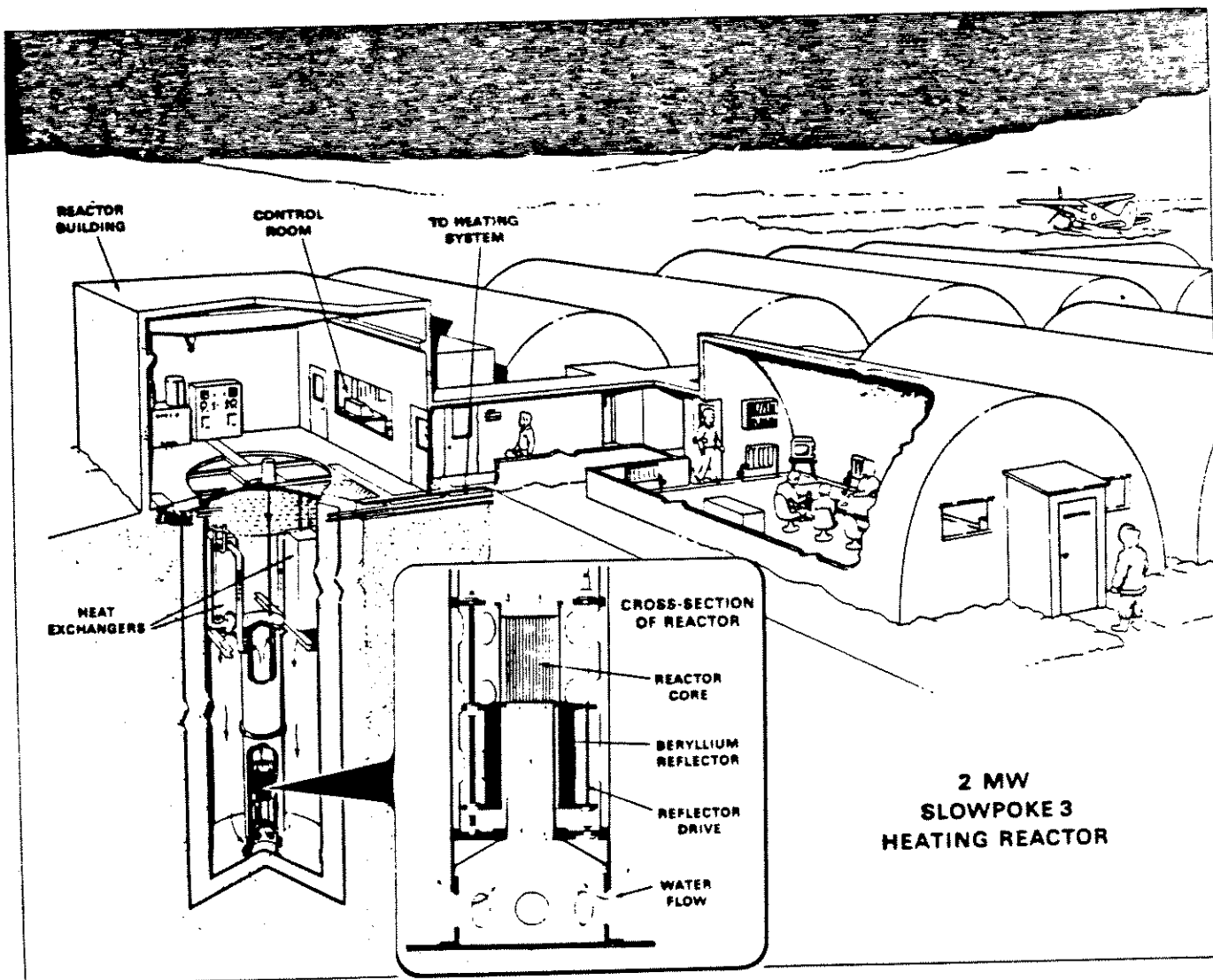
*Continued from page 27*

Finland have jointly developed a 200 MW heating reactor called SECURE. The largest reactor designed specifically for heating is a 500 MW unit proposed by the Soviet Union.

In Canada, Hilborn and Glen speculate that the first installation might be in remote Arctic communities, where heating costs are highest. Electric space heating, which now accounts for less than two per cent of secondary energy consumption, is already expanding rapidly in those provinces which have a large

supply of nuclear or hydro electricity. For regions which do not have abundant supplies of oil, gas or electricity, nuclear heating from small local reactors could be an important energy option for the future.

Although the greatest potential is for space heating, Hilborn says that with design modifications the reactor could be used to produce electricity as well as heat. Since the current version of the small reactor is operated at atmospheric pressure it cannot produce coolant temperatures high enough to generate electricity efficiently.



*An artist's conception of perhaps one of the most effective uses of the Slowpoke 3 Heating Reactor — providing heat to an isolated northern community.*

ANNEX B

C.V.'s

Brooks

Robillard

Peters

Mason

# Marbek

DAVID B. BROOKS

## EDUCATION

S.B. Geology	1955 Massachusetts Institute of Technology
M.S. Geology	1956 California Institute of Technology (National Science Fellow)
Ph.D. Economics	1963 University of Colorado

## EMPLOYMENT

Present	<p>Principal, MARBEK Resource Consultants Ltd.</p> <p>Dr. Brooks' principal areas of expertise are in natural resource economics and policy development. He has particular experience in energy and materials conservation, renewable energy, technology assessment, energy development and transportation projects, minerals and environmental issues. He enjoys an international reputation in these areas.</p>
May 1977- February 1983	<p>Co-ordinator, Ottawa Office of Energy Probe</p> <p>As chief representative for Energy Probe and for Friends of the Earth in Ottawa, Dr. Brooks was involved in economic and policy analysis on a wide range of national energy issues, policies and projects. In particular, he was conceiver and co-ordinator for the national study of soft energy paths for Canada (sponsored by EMR, Environment Canada and DSS) and Executive Director of the Beaufort Sea Alliance (sponsored by the Federal Environmental Assessment and Review Office).</p>
November 1973- May 1976	<p>Director, Office of Energy Conservation, Department of Energy, Mines &amp; Resources, Ottawa</p> <p>Dr. Brooks established the Canadian Government's energy conservation program. He set up the Office of Energy Conservation and developed the policies and programs of the office for 3 years. This included responsibilities for economic and technical analysis, public policy development, program delivery and communication.</p>
August 1970- November 1973	<p>Chief, Mineral Economics Research Division, Department of Energy, Mines &amp; Resources, Ottawa.</p>

# Marbek

## EMPLOYMENT (Cont'd)

July 1967- July 1970	Chief, Division of Mineral Economics, Bureau of Mines, U.S. Dept. of the Interior, Washington, D.C.
September 1966- June 1967	Assistant Professor of Economics, Berea College, Berea, Kentucky
September 1961- August 1966	Research Associate, Resources for the Future, Inc., Washington, D.C.

## PUBLICATIONS

1983	<u>Life After Oil: A Renewable Energy Policy for Canada,</u> with R. Bott and J. Robinson (Edmonton: Hurtig Publishers, 1983 (in press).
1981	<u>Zero Energy Growth for Canada,</u> (Toronto: McClelland and Stewart, 1981).
1979	<u>A Guide to Soft Energy Studies, Alternatives,</u> Vol.8 (Summer/Fall 1979) with Sean Casey.
1978	<u>Economic Impact of Low Energy Growth in Canada: An Initial Analysis,</u> Discussion Paper No. 126, Economic Council of Canada (Ottawa: 1978).
1976	<u>Mineral Supply as a Stock, in Economics of the Mineral Industries,</u> W.A. Vogely, Editor (New York: AIME, 1976).
1974	Editor, <u>Resource Economics: Selected Works of Orris C. Herfindahl</u> (Baltimore: The Johns Hopkins Press for Resources for the Future, 1974).
1973	<u>Minerals: An Expanding or a Dwindling Resource?,</u> Mineral Bulletin MR 134, Department of Energy, Mines and Resources (Ottawa, Canada: 1973).
1969	<u>Peaceful Use of Nuclear Explosives: Some Economic Aspects,</u> with J.V. Krutilla (Baltimore: John Hopkins Press for Resources for the Future, 1969).
1965	<u>Supply and Competition in Minor Metals</u> (Baltimore: Johns Hopkins Press for Resources for the Future, 1965).
1964	<u>Economic Analysis of Strip Mine Reclamation,</u> <u>Natural Resources Journal,</u> (January 1964.)



# Marbek

## OTHER EXPERIENCE

Participant on behalf of CIDA at first African seminar on energy conservation, held in Lomé, Togo, 1983.

Executive Director, Beaufort Sea Alliance, 1981-83: participation in Environmental Assessment and Review of plans for Beaufort Sea Oil development.

Director, Friends of the Earth Canada since founding (President of the Board 1978 - 1981).

Director, National Survival Institute, Toronto.

National co-ordinator of a major province-by-province study of soft energy paths, sponsored by the Federal Department of Energy, Mines and Resources and Environment Canada, 1980 - 1983.

Australian Conservation Foundation, Melbourne, Australia, 1980: helped to develop alternative energy policies for the state of Victoria.

Dept. of Indian Affairs and Northern Development, Ottawa, 1980 - 1983: preparation of report on soft energy policies for the Yukon Territory.

Highlander Research and Education Center, Tennessee, 1979: identification of land-use problems related to renewed coal development in Appalachia.

International Energy Agency, Paris, 1976: development of a method to measure and compare benefits and costs of conservation measures.

United Nations Conference on the Human Environment, Geneva, 1971: preparation of action plan for minerals and for energy as part of report, Environmental Aspects of Natural Resources Management.

President's Council of Economic Advisors, Washington, D.C., 1964: preparation (with Lee E. Preston) of a report, The Federal Helium Program.

## PROFESSIONAL ASSOCIATIONS

International Association of Energy Economists

The Society for a Human Economy

International Project for Soft Energy Paths (Canadian Representative).

# Marbek

PAUL D. ROBILLARD

## EDUCATION

B.A.	Queen's University, Economics, 1972
M.S.W.	Carleton University, Social Policy Analysis, Community Development, 1976
Dipl. Applied Solar Technology	Algonquin College, 1977
Dipl. Intermediate Conversational French	Protestant School Board of Western Quebec, 1978
Dipl. French Immersion Program	University of Ottawa, 1981

## EMPLOYMENT

Present:	Principal, MARBEK Resource Consultants Ltd.  Mr. Robillard's principal areas of responsibility within the firm include: project management; program planning and development; energy conservation and renewable energy technologies; technology transfer and communication programs. Special areas of experience are urban energy management and remote communities.
1981-82	Senior Consultant, Middleton Associates  As a senior consultant with Middleton Associates, Mr. Robillard was primarily responsible for urban and remote community energy initiatives.

EMPLOYMENT (cont'd)  
1977-81

President, ROBILLARD Consulting

Working both independently and in association with other firms, Mr. Robillard was involved in the development and implementation of a number of E.M.R. community energy programs.

Major projects and/or appointments included:

- Community Liaison Task Force - Conservation and Renewable Energy Branch, E.M.R. Mr. Robillard served as lead consultant to the Task Force. Major responsibilities included: project co-ordination; research and analysis of relevant conceptual materials, strategies and community energy program approaches throughout Canada and the U.S. Prime responsibility for the development of a national demonstration program.
- Community Energy Program - Communications Branch, E.M.R. - Mr. Robillard held project management responsibility for the development of a series of publications and demonstration projects directed towards developing the participation of the Canadian Voluntary Sector in local energy conservation programs.
- Community Liaison Team - Office of Energy Conservation, E.M.R. - Mr. Robillard served under contractual arrangements, as Program Co-ordinator. Responsibilities included: goal setting; budget management; and supervision of field consultants in 4 regions of Canada. In addition, duties included inter-departmental and inter-governmental liaison; proposal preparation; conference and seminar organization; as well as provision of on-site consultations to specific local projects.

1977

St. Lawrence College. Teaching Master.

REPORTS/PUBLICATIONS

Municipal Energy Management: Opportunities/ Barriers/ Creative Initiatives; Energy, Mines and Resources, Canada, February 1983.

Community Energy Clearing House, Energy, Mines and Resources, Canada, April 1982, (co-author).

Community Energy Audit Guidelines, Canada Mortgage and Housing Corporation, May 1982, (co-author).

Ontario Remote Community Data Base, Ontario Ministry of Energy, May 1982, (co-author).

Northern Community Energy Assessments, Ontario Ministry of Energy, Energy, Mines and Resources, Canada and the Kiyahna Tribal Area Council, November 1982.

An Assessment of the Barriers to the Delivery of Alternatives to Diesel-Generated Electricity in Remote Communities, Ontario Ministry of Energy, December 1982.

Full Service Residential Retrofit Assistance Centers Energy, Mines and Resources, Canada, (in progress, co-author).

Community Liaison Task Force; An Investigation Into The Delivery Of Energy Conservation At The Local Level. Energy, Mines and Resources, Canada, May 1981.

Energy Conservation and Community Economic Development, a report of the Abenaki Conference, Energy, Mines and Resources, Canada, July 1979.

Greenhouse Agriculture: Appropriate Technologies as Opportunities for Local Economic Development, Energy, Mines and Resources, Canada, January 1979.

## ROGER PETERS

### EDUCATION

BSc (Eng)	Hons. Chemical Engineering Imperial College, University of London, U.K., 1963.
MEng.	Environmental Engineering University of Western Ontario, London, Ontario, 1969.
1975	Educational Television Production Carleton University, Ottawa, Ontario
Diploma Solar Technology	Algonquin College, Ottawa, Ontario, 1977.

### EMPLOYMENT

Present	Principal, MARBEK Resource Consultants Ltd.  Mr. Peters' special areas of expertise include: renewable energy, energy conservation, and technology development.
February 1980- April 1983	Solar Products Officer and Solar DHW System R & D Co-ordinator, National Research Council, Ottawa, Ontario  Project scientist for NRC solar contracts concerned with innovation and development. Responsible for the co-ordination of all NRC work on solar domestic hot water system development and evaluation.
September 1978- January 1980	Energy Consultant.  As a free lance consultant, Mr. Peters carried out a number of technical and energy management projects. These included: - Technical advisor on appropriate technology for use by indian bands. - Designed and installed hybrid passive/active solar heating system and other energy conserving features in new house.

EMPLOYMENT (cont'd)

- Prepared manual on the design and building of attached home solar greenhouses. Designed, built and monitored performance of a 2000 sq. ft. commercial solar greenhouse.
- Prepared manual for municipal governments on energy audits and use of energy conservation and renewable sources of energy. Worked with Ottawa City Councillors on the formation of an energy advisory committee. Reviewed energy aspects of a Zoning plan for Mountain Township, Ontario.
- Carried out an energy use survey of farms in Dundas County, Ontario.

September 1977-  
August 1978

National Co-ordinator, Community Conservation Center Programme, Department of Energy, Mines and Resources, Ottawa.

Developed Community Conservation Centre concept, managed the \$7.5 million programme, supervised 34 headquarters staff, and produced and edited resource material for use by the Centres.

August 1975-  
August 1977

Pollution and Energy Research and Projects Officer, Pollution Probe Ottawa.

Prepared information and education material on consumer lifestyles, energy and environment.

Prepared major reports on Environmentally Appropriate Technology, Techniques of Community Energy Conservation, and House Heat Loss Surveys.

Designed, constructed and operated a fast, soil-less community scale composting unit suitable for use by apartment buildings, small sub-divisions, condominiums, shopping centres or any multiple unit housing.

September 1974-  
August 1975

Advisor, Multilateral Programmes  
Department of the Environment, Ottawa

Co-ordinated Departmental participation in international environmental organizations and programs.

May 1969-  
August 1974

Head, Water Quality Surveys  
Department of the Environment, Ottawa

Planned and operated national and local water quality monitoring systems, and the National Water Quality Data

EMPLOYMENT (cont'd)

Temporary advisor to the United Nations Environment Program (UNEP) Geneva, Switzerland and to the World Health Organization (WHO), Geneva, Switzerland.

Visiting Worker, United Nations Monitoring and Assessment Research Centre, London, United Kingdom.

January 1967-  
August 1968

Process Design and Development Engineer  
Dow Chemical of Canada Ltd., Sarnia, Ontario

Planned and designed petrochemical plant expansions, carried out cash flow analysis, and prepared process and mechanical flow-sheets,

September 1963-  
December 1966

Process Research and Development Engineer  
Fisons Fertilizers Limited, Felixstowe, United Kingdom

Carried out bench and pilot plant scale investigation of new fertilizer processes and developed basic plant designs.

PUBLICATIONS

1982

"The Development of Standard Test Procedures for Solar Domestic Water Heaters", Proceedings of Solar Energy Society of Canada Conference, ENERGEX 82, Regina, Aug. 23-29, 1982, Vol II/II, p.943.

1981

"Load Profiles, Control Strategies, and Auxiliary Heaters that Improve the Performance of Solar Domestic Water Heaters", Proceedings of Solar World Forum, Brighton, England, 23-28 August, 1981, vol. 1, p.32.

"How Co-operative Users and Interactive Solar/Auxiliary Systems Can Improve the Performance of Solar Domestic Water Heaters", Proceedings of Solar Energy Society of Canada Conference, Montreal, 4-7 August 1981, p.142.

1979

"Strategies for a Consumer Regulated Economy and Energy System", Conserver Society Notes, Vol. I No. 4, Winter 1979.

PUBLICATIONS (cont'd)

- 1976 "The Sun Book" with Mark Riley and Ian Hornby, Pollution Probe Ottawa, September 1976, Info Earth, 1977 and 1978.
- "Good Health Good Food", Canadian Consumer, Vol. 6, No. 5, October 1976.
- "With a Little Help From Our Friends", Canadian Consumer, Vol. 6, No. 3, June 1976.
- "Energy -- Our Decision, His Legacy", Canadian Consumer, Vol. 6, No. 1, February 1976.
- 1974 "A Water Quality Economic Index", Proceedings on Water Pollution Research No. 9, 1974.
- 1973 "Nutrient Balances for Evaluation of Nutrient Sources in Water Quality Management", American Water Resources Association Bulletin, February 1973.
- 1972 "Storage and Processing of Water Quality Data", Inland Water Directorate Reprint Series No. 165, Department of Environment, Ottawa K1A 0E7.

MEMBERSHIPS

Former Member Board of Directors  
Ottawa Community Credit Union

Former Member Board of Directors  
Oxfam Canada and Oxfam Trading Ltd.

Member CSA Technical Committees on  
Solar Domestic Hot Water Heaters.

Member (application pending)  
Association of Professional Engineers of Ontario



# Marbek

## GILLIAN MASON

### EDUCATION

B.E.S. University of Waterloo, 1981.. Bachelor of Environmental Studies, Honours Urban and Regional Planning

### EMPLOYMENT

Present: Associate, MARBEK Resource Consultants  
Ms. Mason's primary areas of responsibility within the firm include: policy and program development; research; energy conservation and land use planning and community energy management.

September 1981-  
September 1983

Associate, Peter Barnard Associates  
As an employee of Peter Barnard Associates, Ms. Mason was responsible for land use planning and energy conservation studies; program and policy development; core area revitalization, and market research.

#### Projects included:

- examination of opportunities for energy conservation through land use planning in the Town of Richmond Hill which required extensive review of Official Plan and Zoning By-laws and development of detailed amendments
- similar study for a rural municipality, the Township of Georgina, resulting in policy and by-law amendment recommendations
- review of procedures for siting propane fuelling facilities in Ontario and preparation of a handbook to guide approval process for installation applications, for Ontario Ministry of Energy
- assessment of marketability of energy conserving low-cost/no-cost modifications to conventional tract housing, for Ontario Ministry of Municipal Affairs and Housing
- design of \$4.5 million heritage program of revolving funds, for Ontario Ministry of Citizenship and Culture

# Marbek

## EMPLOYMENT (continued)

- preparation of a planning appraisal for the County of Peterborough to determine need for a county role in planning
- organization and implementation of a major educational seminar on industrial development.

April 1981-  
August 1981.

Community Planner, Community Planning Review Branch, Ministry of Municipal Affairs and Housing.

- full responsibility to review and make recommendations on the disposition of all municipal planning matters requiring provincial approval within Wellington County.

## MEMBERSHIPS

Canadian Institute of Planners.

## REPORTS

Richmond Hill Energy Conservation Through Land Use Planning; Town of Richmond Hill; August 1983.

Township of Georgina Energy Conservation Through Land Use Planning; Township of Georgina; September 1982.

Guide to Siting Propane Fuelling Facilities in Ontario; Ontario Ministry of Energy; May 1983.

Arnprior Core Area Study; Town of Arnprior; August 1983.

A Municipal Heritage Fund for Ontario; Ontario Ministry of Citizenship and Culture; March 1982.

Medical Device Alert Bulletins: An Evaluation of the Program; Health and Welfare Canada; August 1983.

Peterborough County Planning Appraisal; Peterborough County; August 1982.

Industrial Development: Sharpening the Competitive Edge; Proceedings from seminar March 11, 1982; April 1982; edited.

Climate Sensitive Residential Design; Ontario Ministry of Municipal Affairs and Housing; April 1982.

ANNEX B

C.V.'s

Brooks

Robillard

Peters

Mason

DAVID B. BROOKS

EDUCATION

S.B. Geology	1955 Massachusetts Institute of Technology
M.S. Geology	1956 California Institute of Technology (National Science Fellow)
Ph.D. Economics	1963 University of Colorado

EMPLOYMENT

Present	Principal, MARBEK Resource Consultants Ltd. Dr. Brooks' principal areas of expertise are in natural resource economics and policy development. He has particular experience in energy and materials conservation, renewable energy, technology assessment, energy development and transportation projects, minerals and environmental issues. He enjoys an international reputation in these areas.
May 1977- February 1983	Co-ordinator, Ottawa Office of Energy Probe As chief representative for Energy Probe and for Friends of the Earth in Ottawa, Dr. Brooks was involved in economic and policy analysis on a wide range of national energy issues, policies and projects. In particular, he was conceiver and co-ordinator for the national study of soft energy paths for Canada (sponsored by EMR, Environment Canada and DSS) and Executive Director of the Beaufort Sea Alliance (sponsored by the Federal Environmental Assessment and Review Office).
November 1973- May 1976	Director, Office of Energy Conservation, Department of Energy, Mines & Resources, Ottawa Dr. Brooks established the Canadian Government's energy conservation program. He set up the Office of Energy Conservation and developed the policies and programs of the office for 3 years. This included responsibilities for economic and technical analysis, public policy development, program delivery and communication.
August 1970- November 1973	Chief, Mineral Economics Research Division, Department of Energy, Mines & Resources, Ottawa.

# Marbek

## EMPLOYMENT (Cont'd)

July 1967- July 1970	Chief, Division of Mineral Economics, Bureau of Mines, U.S. Dept. of the Interior, Washington, D.C.
September 1966- June 1967	Assistant Professor of Economics, Berea College, Berea, Kentucky
September 1961- August 1966	Research Associate, Resources for the Future, Inc., Washington, D.C.

## PUBLICATIONS

1983	<u>Life After Oil: A Renewable Energy Policy for Canada,</u> with R. Bott and J. Robinson (Edmonton: Hurtig Publishers, 1983 (in press).
1981	<u>Zero Energy Growth for Canada,</u> (Toronto: McClelland and Stewart, 1981).
1979	<u>A Guide to Soft Energy Studies, Alternatives,</u> Vol.8 (Summer/Fall 1979) with Sean Casey.
1978	<u>Economic Impact of Low Energy Growth in Canada: An Initial Analysis,</u> Discussion Paper No. 126, Economic Council of Canada (Ottawa: 1978).
1976	<u>Mineral Supply as a Stock, in Economics of the Mineral Industries,</u> W.A. Vogely, Editor (New York: AIME, 1976).
1974	Editor, <u>Resource Economics: Selected Works of Orris C. Herfindahl</u> (Baltimore: The Johns Hopkins Press for Resources for the Future, 1974).
1973	<u>Minerals: An Expanding or a Dwindling Resource?,</u> Mineral Bulletin MR 134, Department of Energy, Mines and Resources (Ottawa, Canada: 1973).
1969	<u>Peaceful Use of Nuclear Explosives: Some Economic Aspects,</u> with J.V. Krutilla (Baltimore: John Hopkins Press for Resources for the Future, 1969).
1965	<u>Supply and Competition in Minor Metals</u> (Baltimore: Johns Hopkins Press for Resources for the Future, 1965).
1964	<u>Economic Analysis of Strip Mine Reclamation, Natural Resources Journal,</u> (January 1964.)

# Marbek

## OTHER EXPERIENCE

Participant on behalf of CIDA at first African seminar on energy conservation, held in Lomé, Togo, 1983.

Executive Director, Beaufort Sea Alliance, 1981-83: participation in Environmental Assessment and Review of plans for Beaufort Sea Oil development.

Director, Friends of the Earth Canada since founding (President of the Board 1978 - 1981).

Director, National Survival Institute, Toronto.

National co-ordinator of a major province-by-province study of soft energy paths, sponsored by the Federal Department of Energy, Mines and Resources and Environment Canada, 1980 - 1983.

Australian Conservation Foundation, Melbourne, Australia, 1980: helped to develop alternative energy policies for the state of Victoria.

Dept. of Indian Affairs and Northern Development, Ottawa, 1980 - 1983: preparation of report on soft energy policies for the Yukon Territory.

Highlander Research and Education Center, Tennessee, 1979: identification of land-use problems related to renewed coal development in Appalachia.

International Energy Agency, Paris, 1976: development of a method to measure and compare benefits and costs of conservation measures.

United Nations Conference on the Human Environment, Geneva, 1971: preparation of action plan for minerals and for energy as part of report, Environmental Aspects of Natural Resources Management.

President's Council of Economic Advisors, Washington, D.C., 1964: preparation (with Lee E. Preston) of a report, The Federal Helium Program.

## PROFESSIONAL ASSOCIATIONS

International Association of Energy Economists

The Society for a Human Economy

International Project for Soft Energy Paths (Canadian Representative).

# Marbek

## PAUL D. ROBILLARD

### EDUCATION

B.A.	Queen's University, Economics, 1972
M.S.W.	Carleton University, Social Policy Analysis, Community Development, 1976
Dipl. Applied Solar Technology	Algonquin College, 1977
Dipl. Intermediate Conversational French	Protestant School Board of Western Quebec, 1978
Dipl. French Immersion Program	University of Ottawa, 1981

### EMPLOYMENT

Present:	Principal, MARBEK Resource Consultants Ltd.
	Mr. Robillard's principal areas of responsibility within the firm include: project management; program planning and development; energy conservation and renewable energy technologies; technology transfer and communication programs. Special areas of experience are urban energy management and remote communities.
1981-82	Senior Consultant, Middleton Associates
	As a senior consultant with Middleton Associates, Mr. Robillard was primarily responsible for urban and remote community energy initiatives.

EMPLOYMENT (cont'd)  
1977-81

President, ROBILLARD Consulting

Working both independently and in association with other firms, Mr. Robillard was involved in the development and implementation of a number of E.M.R. community energy programs.

Major projects and/or appointments included:

- Community Liaison Task Force - Conservation and Renewable Energy Branch, E.M.R. Mr. Robillard served as lead consultant to the Task Force. Major responsibilities included: project co-ordination; research and analysis of relevant conceptual materials, strategies and community energy program approaches throughout Canada and the U.S. Prime responsibility for the development of a national demonstration program.
- Community Energy Program - Communications Branch, E.M.R. - Mr. Robillard held project management responsibility for the development of a series of publications and demonstration projects directed towards developing the participation of the Canadian Voluntary Sector in local energy conservation programs.
- Community Liaison Team - Office of Energy Conservation, E.M.R. - Mr. Robillard served under contractual arrangements, as Program Co-ordinator. Responsibilities included: goal setting; budget management; and supervision of field consultants in 4 regions of Canada. In addition, duties included inter-departmental and inter-governmental liaison; proposal preparation; conference and seminar organization; as well as provision of on-site consultations to specific local projects.

1977

St. Lawrence College. Teaching Master.



REPORTS/PUBLICATIONS

Municipal Energy Management: Opportunities/ Barriers/ Creative Initiatives; Energy, Mines and Resources, Canada, February 1983.

Community Energy Clearing House, Energy, Mines and Resources, Canada, April 1982, (co-author).

Community Energy Audit Guidelines, Canada Mortgage and Housing Corporation, May 1982, (co-author).

Ontario Remote Community Data Base, Ontario Ministry of Energy, May 1982, (co-author).

Northern Community Energy Assessments, Ontario Ministry of Energy, Energy, Mines and Resources, Canada and the Kayahna Tribal Area Council, November 1982.

An Assessment of the Barriers to the Delivery of Alternatives to Diesel-Generated Electricity in Remote Communities, Ontario Ministry of Energy, December 1982.

Full Service Residential Retrofit Assistance Centers Energy, Mines and Resources, Canada, (in progress, co-author).

Community Liaison Task Force; An Investigation Into The Delivery Of Energy Conservation At The Local Level. Energy, Mines and Resources, Canada, May 1981.

Energy Conservation and Community Economic Development, a report of the Abenaki Conference, Energy, Mines and Resources, Canada, July 1979.

Greenhouse Agriculture: Appropriate Technologies as Opportunities for Local Economic Development, Energy, Mines and Resources, Canada, January 1979.

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April 1983

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Co-ordinator, National Research Council, Ottawa, Ontario

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number of technical and energy management projects.  
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by indian bands.
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- "Energy -- Our Decision, His Legacy", Canadian Consumer, Vol. 6, No. 1, February 1976.
- 1974 "A Water Quality Economic Index", Proceedings on Water Pollution Research No. 9, 1974.
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- 1972 "Storage and Processing of Water Quality Data", Inland Water Directorate Reprint Series No. 165, Department of Environment, Ottawa K1A 0E7.

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## GILLIAN MASON

### EDUCATION

B.E.S. University of Waterloo, 1981.. Bachelor of Environmental Studies, Honours Urban and Regional Planning

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Ms. Mason's primary areas of responsibility within the firm include: policy and program development; research; energy conservation and land use planning and community energy management.

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Associate, Peter Barnard Associates  
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Projects included:

- examination of opportunities for energy conservation through land use planning in the Town of Richmond Hill which required extensive review of Official Plan and Zoning By-laws and development of detailed amendments
- similar study for a rural municipality, the Township of Georgina, resulting in policy and by-law amendment recommendations
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- design of \$4.5 million heritage program of revolving funds, for Ontario Ministry of Citizenship and Culture

# Marbek

## EMPLOYMENT (continued)

- preparation of a planning appraisal for the County of Peterborough to determine need for a county role in planning
- organization and implementation of a major educational seminar on industrial development.

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August 1981.

Community Planner, Community Planning Review Branch, Ministry of Municipal Affairs and Housing.

- full responsibility to review and make recommendations on the disposition of all municipal planning matters requiring provincial approval within Wellington County.

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Medical Device Alert Bulletins: An Evaluation of the Program; Health and Welfare Canada; August 1983.

Peterborough County Planning Appraisal; Peterborough County; August 1982.

Industrial Development: Sharpening the Competitive Edge; Proceedings from seminar March 11, 1982; April 1982; edited.

Climate Sensitive Residential Design; Ontario Ministry of Municipal Affairs and Housing; April 1982.

ANNEX C

BRIEF DESCRIPTION

OF MARBEK



## CORPORATE FOCUS

Marbek Resource Consultants is a recently formed company that can offer a wide variety of consulting services on energy, water, minerals, environment and urban issues. The firm offers extensive experience in the following areas:

- . Energy Conservation
- . New and Renewable Sources of Energy
- . Community Energy Management
- . Environmental Assessment
- . Information and Technology Transfer
- . Resource Assessment and Pre-feasibility Studies

For example, the firm has developed valuable expertise on energy and resource management in urban, rural and remote communities, solar system design, energy conservation techniques, the economics of energy and resource development, and soft energy path analysis.

In any of these areas, the firm can provide services at the policy and program development stage, offer technical assistance, undertake research and pre-feasibility studies, and prepare reports, publications, conferences or seminars for either specialized or general audiences. Clients have included municipal, provincial, national and international organizations in both the private and the public sectors. The interests of these organizations have ranged from local housing problems in Canada and to Third World development, but they have shared a common link through the development or use of natural resources and associated impacts on the natural or built environment. Marbek's role has generally included one or more of the following stages: research and analysis of problems and opportunities; policy or program conception and development; development of information or implementation schemes for program and policy delivery; and evaluation of policies and programs.

## ORIGIN OF MARBEK

Several threads were woven together to create Marbek Resource Consultants. The firm itself emerged from the former Ottawa Office of Middleton Associates which had been in existence since April, 1981 and within a year and a half, had grown to a permanent staff of 6 (4 professionals, two administrative) plus associates and gross annual sales at full capacity of about \$450,000. When Middleton Associates, based in Toronto, went out of business in late December, 1982, the three senior staff members in the Ottawa Office (Brian Kelly, George Matheson and Paul Robillard) determined to establish Marbek.

A second strand came from the Federal Office of Energy Conservation in the Department of Energy, Mines and Resources: David Brooks had been the original director of this office, Brian Kelly was in charge of information and implementation Programs and George Matheson participated in one of the early bus programs to deliver conservation information to the public. The third strand is the voluntary sector: at one time or another, all of the principals in Marbek have worked full time with environmental non-government organizations in Canada and, in the case of George Matheson, with a major international ENGO based in Nairobi. This combination of public and private experience, and within the latter of profit and non-profit activities, has proven invaluable in building the capabilities represented in Marbek Resource Consultants. The Company was federally incorporated in January 1983 under corporation number 143363.

ANNEX D

MARBEK STUDIES

## ANNEX D

### SUMMARIES OF RELATED PROJECTS BY MARBEK PERSONNEL

Marbek Resource Consultants, its principals, and its staff members have an extensive range of experience in energy policy and resource programs. The following list highlights some of the projects the firm and the proposed project staff have undertaken. The list is by no means complete, but it does provide an indication of the breadth and depth of the firm's capabilities.

The project summaries that follow are organized into 5 categories:

- . R & D & D Planning
- . Communications and Technology Transfer Planning
- . Publications
- . Surveys and Reports
- . Audio-Visual Materials, Training, Meetings, Seminars

#### R & D & D Planning

- C1 Buildings Energy Research and Development Strategy. Public Works Canada (1982). This project provided assistance to the Building Energy Conservation Sector (BECS) Committee in the development of a R & D plan for energy conservation in buildings. The work involved a review of all federal government activities in the field and an analysis of R & D needs. The result was a plan focussing on the key technologies and operating departments over a 5 year period.

- C2 Development of a Research and Development Plan for Industrial Process and Commercial/Institutional Solar Technology. National Research Council (ongoing). This project consists of two phases. In Phase 1, the major types of energy requirement in the commercial/institutional and industrial sectors were determined, after maximum use of heat recovery and conservation techniques. In Phase 2 solar technologies which might contribute to these major energy requirements are to be characterized, and a research and development plan drawn up that might bring the most promising technologies to commercial readiness.

#### Communications and Technology Transfer Planning

- C3 The CREDA National Information Transfer Plan. Energy Mines and Resources (1983). This project involved the development of a technology transfer plan. All existing demonstration projects funded under the Federal/Provincial Conservation and Renewable Energy Demonstration Agreements (CREDA) were screened for applicability to national audiences and classified according to technology and markets. Each of the market groupings (by sector and subsector) were then researched and a strategic plan developed for transfer of demonstration experience to key target groups. These individual plans were amalgamated into a proposed national information transfer plan complete with budget, schedule, key transfer agents, media and cost allocation recommendations.
- C4 CHIP Communications Plan. Energy, Mines and Resources, (1981). This project involved the preparation of a communications plan for the Canadian Home Insulation Program (CHIP). In addition, the CHIP Applicants' Brochure was rewritten and advertisements were drafted. These measures were designed to achieve several objectives including making the program easier to understand and reducing the seasonal nature of the program.

- C5 Energy Conservation Communications Program. Government of the Northwest Territories (1982). This project involved the development of an energy conservation communications program for the Government of the Northwest Territories. The plan recognized the different energy consumption patterns in the north, including the fact that many residents are provided with accommodation and so have less incentive to conserve energy.
- C6 Advisory Committee for the Restaurant Energy Technology Transfer Program. University of Manitoba (ongoing). Brian Kelly, President of Marbek Resource Consultants, has served as a consultant on this Advisory Committee for the past year and a half. The Committee advises the University of Manitoba Office of Industrial Research regarding its function as a lead agency in the Buildings Energy Technology Transfer Program. Specifically, the committee advises on R & D and technology transfer actions in the field of restaurant energy conservation.
- C7 Background Document for Toxic Chemical Communication Projects. Environment Canada (1983). This project produced a clear and concise paper that identifies key issues and themes in the field of toxic chemicals. The purpose of the paper was to provide overall guidance to free lancers and other contractors who produce information materials for Environment Canada concerning toxic chemicals.
- C8 Community Energy Clearinghouse: An Implementation Plan. Energy, Mines and Resources (1982). This project involved the development and elaboration of a program plan for a federally-supported information service designed to assist those involved in community energy management. The Clearinghouse was designed to be a part of the federal Municipal Energy Management Program, providing a specific type of information transfer for municipalities entering a new and unfamiliar field.

- C9 Communications Activities for the Ontario Waste Management Corporation. OWMC (1982). This project involved the preparation of a communications plan for the OWMC, dealing with the technically and politically complex field of hazardous waste management. The process required a particular focus on the needs of target audiences; perhaps the most important of these audiences were the specific communities threatened (in their view) by proposals to establish a nearby treatment facility.
- C10 Northern Community Energy Assessments. Kayahna Tribal Area Council, EMR and Ministry of Energy (1982). This project, initiated at the request of the Kayahna Tribal Area Council with the support of EMR and the Ontario Ministry of Energy, identified and assessed the most promising energy conservation and alternative power generation technologies for 10 remote Ontario communities. The study provided energy planners, both in the study remote communities and in government, with an understanding of the available energy options as well as with a framework for delivery of the more viable technologies to the communities.
- C11 Barriers to Alternative Power Systems in Remote Communities. Ministry of Energy (1983). This project identified and assessed technical, market and institutional barriers inhibiting the use of alternate power systems in Ontario's remote communities. A preliminary strategy for addressing the identified barriers was presented.
- C12 Energy Alternatives for Ontario Remote Communities: A Strategy and Implementation Plan. Ontario CREO. (in progress). This project will provide the Federal Government with a broad 10 year strategy and implementation plan for reducing the dependence of Ontario's remote communities on fossil fuels through the utilization of alternative energy resources and technologies and energy conservation measures.

## Publications

- C13 Handbook on Air Sealing Homes for Energy Conservation. Saskatchewan Research Council and Energy Mines and Resources (1983). This 450 page technical handbook is a thorough yet easily understood manual on the principles and practice of air sealing in low-rise residential buildings. It is a technology transfer tool aimed at the air sealing industry. The handbook provides detailed step-by-step instructions and a large number of clear illustrations.
- C14 Energy Efficient Housing Construction. Canada Mortgage and Housing Corporation, (1983). This book provides thorough, information (including graphics) on all aspects of super energy efficient housing construction. A recent reviewer commented: "This sturdy publication is exactly what the Canadian housing construction field needs, and it should find a place on every designer's bookshelf and in every tool-box on the job-site. It provides the straight-forward, no-nonsense information needed by consumers and builders and job-crew alike..." (Sol, No. 41 September 1983).
- C15 Keeping the Heat In. Energy Mines and Resources (1976). This popular 100 page handbook provides detailed instructions to the householder on the techniques of home retrofit. With about four million copies in print, the first edition became the basic manual for Canadians interested in the "how-to" of home insulation.
- C16 Solar Water Heater Buyers Guide. Energy Mines and Resources (in progress). This guide is designed to provide homeowners with information on how solar water heaters work, how to choose the right size and type, how to calculate expected savings, and how to look after the water heater. The text clearly and concisely covers technical issues for a non-technical audience.



- C17 Municipal Energy Management: Opportunities/Barriers/Creative Initiatives. Energy, Mines and Resources Canada (1983). This forthcoming publication provides a review and assessment of energy management opportunities implemented by local communities throughout North America. The publication identifies major barriers experienced and presents a strategy for addressing them. This report is intended to help stimulate wider adoption of creative, effective energy conservation options.
- C18 Community Energy Audit Guidelines Canada Mortgage and Housing Corporation (December 1981). This project produced a document designed to help municipalities to carry out a community energy audit. The audit function was elaborated within the context of an overall community energy management process. This approach clearly identified the audit as a means to an end -- not an end in itself.
- C19 Glossary of Energy Terms for Planners. Ontario Ministry of Energy (December, 1982). This 90-page publication defines and clearly explains a wide range of energy terms. The text concisely interprets technical concepts for the municipal planner - an audience whose responsibilities have only recently begun to include significant energy concerns.
- C20 Take the Plunge: Support Publications. Energy Mines and Resources (1983). This project involved the production of a series of conservation checklists for each of the various types of job responsibility in the hospitality industry, plus a companion motivational booklet. These printed materials are distributed with a slide tape show Take the Plunge (Project C33 below) so as to complement its message and maximize its impact.

- C21 Guide to Siting Propane Fuelling Facilities in Ontario. Ministry of Energy (1983). This project involved an extensive review of current provincial legislation and municipal powers governing the safe and appropriate siting of propane pumps for motor vehicle fuelling. The end product was a handbook designed for distribution to all approval agencies, outlining the recommended procedure for obtaining approval for an installation.
- C22 Zero Energy Growth for Canada. McClelland & Stewart (1981). This major book, which has been adopted for use in a number of universities and which has been re-issued in paperback, explores the full range of policy issues related to energy conservation in Canada. It describes economic, social and environmental aspects of conservation policies and goes on to develop a far reaching conservation program with full recognition of technical, institutional and political problems.
- C23 A Survey of Institutional Innovations Fostering Energy and Resource Conservation. Science Council of Canada (1981). This project surveyed and evaluated the wide range of institutional innovations contributing to the growth of energy conservation in North America. The best of these innovations were documented in a tightly written report, as a means of stimulating adoption (or adaptation) of the innovations by other institutions. The report was published by the Science Council.

#### Surveys and Reports

- C24 Compendium of Federal and Provincial Energy Conservation and Off-Oil Programs. Energy, Mines and Resources, (1982). This Compendium includes brief descriptions of all federal and provincial energy conservation and off-oil programs, both existing and impending. It is designed to be a useful reference document for those involved in planning, implementing and promoting such programs. Programs are categorized and analyzed to identify program overlaps and program gaps.

- C25 Survey of U.S. Solar Programs. Energy Mines and Resources (1983). This project involved a survey and documentation of U.S. programs in the solar energy field. The work included a determination of how well the various tax incentive, rebate, demonstration, and loan programs have worked, and made recommendations for future Canadian solar programs on the basis of these findings.
- C26 The Implication of Energy Retrofit on Municipal By-Laws. Canada Mortgage and Housing Corporation (1981). This project surveyed municipalities across Canada to determine the extent to which retrofitting activities have conflicted with municipal by-laws. The report concludes that there is potential for significant conflicts but the problem has not matured due to the limited extent of second generation retrofitting. Immediate action is recommended to avoid large numbers of conflicts.
- C27 Options for Intervention in Energy. Environment Canada (1983). This project involved an evaluation of the intervention options open to Environment Canada in the energy field. The project involved a wide-ranging survey of intervention activities by institutions in North America; preparation of case studies; an analysis of options; and development of recommendations on preferred approaches.
- C28 Development of Second Generation Energy Conservation Programs. Energy Mines and Resources (ongoing). This project involves a review of existing federal energy conservation programs and, primarily, the development of a full spectrum of realistic "second generation" programs intended to ensure optimal levels of energy conservation over the next several years. The project will produce program details relating to all major energy consuming sectors.

- C29 Program Development: Community Energy Management. Ontario Ministry of Energy, (1983). Based on a review of community energy management (CEM) experience in Canada, the United States and Sweden, this project identified opportunities open to the Ontario Ministry of Energy to encourage CEM in Ontario municipalities. These opportunities were evaluated and elaborated, leading to a recommended provincial support program.
- C30 Energy Conservation Through Land Use Planning. Town of Richmond Hill (1983) and Township of Georgina (1982). Preparation of guidelines for two municipalities, one urban and one rural, for their use in conserving energy through land use planning. Required extensive review of existing policies and standards governing land use. Guidelines were produced for the use of both the development industry in preparing development proposals and for municipal planners in reviewing proposals in terms of energy sensitivity.
- C31 Soft Energy Paths. Energy Mines and Resources, Environment Canada, and Department of Supply and Services (1981-3). This major national project analyzed energy end uses in Canada, examining on a province-by-province basis the potential for these end use needs be met through the application of conservation techniques and the use of renewable energy. The study found that the technical and economic opportunities are dramatic. The study is to be published in popular form as Life After Oil (Hurtig Publishers).
- C32 Draft Code of Practice for the Installation of Solar Domestic Hot Water Systems. Canadian Standards Association (ongoing). This project includes the writing of sections of a draft CSA Code of Practice covering the reliability, health, and safety aspects of installing solar domestic hot water systems. The work includes consideration of the impacts of solar water heating on the building and plumbing codes.

Audio-Visual Materials, Training, Meetings, Seminars

- C33 Take the Plunge. Hospitality Industry Energy Management Task Force (1982). This project involved the full production of a polished slide-tape show on energy conservation opportunities in restaurants, hotels, and similar establishments. Designed to motivate and inform employees and managers, the show has been distributed across the country. In a related 1983 project (project C20), Marbek produced printed materials to be distributed with the slide tape show, so as to complement its message and maximize its impact.
- C34 Ottawa Energy Action Plan Process Slide-Tape Show. Energy Mines and Resources (1983). This project involved the conceptual development, script writing and production of a slide-tape show on Ottawa's Energy Action Plan Process, in co-operation with Marbek's associate Maruska Studios. The show is intended to encourage other municipalities to consider and undertake initiatives like Ottawa's pioneering Municipal Energy Management program.
- C35 Energy Conservation Retrospect and Prospect. Energy, Mines and Resources (February, 1982). This major national conference brought together key actors in Canada's conservation sector. The speakers discussed the present state-of-the-art in energy conservation technologies and programs, and assessed future options and needs. The conference proceedings were published.
- C36 Federal/Provincial Meetings on Energy Conservation and Alternate Transportation Fuels. Interprovincial Advisory Committee on Energy (IPACE) (March, 1982). Meetings were organized under the auspices of IPACE for federal and provincial officials in both energy conservation and alternative transportation fuels. Responsibilities included: development of agenda; provision of background materials; arranging all logistics of the meetings (rooms, food, travel etc.); production of meeting summaries for distribution and in the conservation meeting, making a presentation on marketing of energy conservation.

- C37 African Seminar on Energy Conservation Policy. Canadian International Development Agency (1982). David Brooks was contracted by CIDA to be the Canadian representative to an international seminar held in Lomé, Togo in April 1982. The purpose of the seminar was to transfer to senior government officials from West African nations the experience of developed nations in developing and implementing energy conservation programs. Dr. Brooks presented part of the 10 day seminar and filed a report on the whole project with CIDA on his return.
- C38 Industrial Development: Sharpening the Competitive Edge (1982). Organization and implementation of a major educational seminar on industrial development. The seminar was held to foster discussion between the public and private sector actors in industrial development. All aspects of the conference organization, including developing themes, engaging speakers, advertising and promotion, logistics and production of conference proceedings were carried out by the consultant.
- C39 Climate Sensitive Residential Design. Ministry of Municipal Affairs and Housing (1982). This project undertook an assessment of the marketability of traditional tract-housing designs, modified for energy conservation through low-cost/no-cost measures. The work included a review of the design proposals through a workshop session with builders, developers, marketing agents, architects and municipal planners. The evaluation formed part of a report on acceptable future energy conserving housing designs.
- C40 Waste Management Issues Seminar. Ontario Waste Management Corporation, (January 15-17, 1982). This well organized and carefully conceived seminar brought together the major Ontario actors in the field of hazardous waste management. The focus was the overall process of site selection for waste management facilities, with emphasis being placed on activities being undertaken during Level 1 selection of candidate regions.

- C41 Residential Retrofit Training Activities in Canada. Ontario Research Foundation and EMR (September 1982). The purpose of this project was to survey and assess the state of training on residential retrofit in Canada and develop recommendations for improvement. The survey covered governments, professional and trade associations, the building industry and schools. The information was analysed, difficiencies noted and recommendations developed. The report served as a Canadian submission to the International Energy Agency and input to program planning for BETT.
- C42 Increased Profits Through Energy Management in Your Restaurant and Increasing Profits by Monitoring Energy Costs and Consumption. Office of Industrial Research, University of Manitoba (1983). These manuscripts were prepared as two modules in a 4 part Restaurant Energy Technology Training Program. The first training module provides the restaurant owner/manager with an overview of energy management opportunities and benefits. It also outlines the steps involved in establishing a restaurant energy management program. The second module provides the restaurant owner/manager with step-by-step instructions for establishing, maintaining, and profiting from energy records. Both modules include extensive use of A/V materials.
- C43 Energy Conservation/Oil Substitution Options for the Windigo Council. Windigo Tribal Council (in progress). This project will identify and assess energy conservation/oil substitution options for the seven remote communities of the Windigo Council. Options to be addressed include energy efficient housing, building retrofit, diesel waste heat recovery and more efficient heating systems. The project will be undertaken with the close co-operation of the Windigo Council. Specific tasks will include:

- . the technical training of selected community residents in energy conservation applications/techniques and
- . the development of specific community energy plans (including step-by-step implementation and training tasks).



ANNEX E

An Act to establish the Makivik Corporation

ANNEX E



CHAPTER 91

An Act to establish the Makivik Corporation

[Assented to 23 June 1978]

HER MAJESTY, with the advice and consent of the Assemblée nationale du Québec, enacts as follows:

DIVISION 1

INTERPRETATION

1. In this Act, unless the context indicates otherwise.

Definitions  
"Inuit community"

(a) "Inuit community" means each of the following Inuit communities existing on 15 November 1974: Fort George, Poste-de-la-Baleine, Inukdjouac (Port Harrison), Povungnituk, Akulivik, Ivujivik, Sagluc, Maricourt (Wakeham), Koartac, Bellin (Payne), Aupaluk, Tasiujaq, Fort-Chimo, Port-Nouveau-Québec and Killiniq (Port Burwell), as well as any Inuit community formed thereafter and recognized by the Government in an order published in the *Gazette officielle du Québec*:

"board of directors or 'board'"

(b) "board of directors" or "board" means the board of directors created by section 15;

"Agreement"

(c) "Agreement" means the Agreement contemplated in section 1 of the Act approving the Agreement concerning James Bay and Northern Québec (1976, chapter 46);

"Inuit"

(d) "Inuit" means the Inuit beneficiaries under the Act respecting Cree and Inuit Native persons (1978, chapter 97);

"Corporation"

(e) "Corporation" means the Corporation established by section 2.

## DIVISION II

## INCORPORATION AND OBJECTS OF THE CORPORATION

Incorporation.  
Name.  
Alternate  
name.

2. A corporation is incorporated under the name of "Société Makivik".

It may also be designated in Inuttituit and in English as "Makivik Corporation".

Members.

3. Only the Inuit beneficiaries under the Act respecting Cree and Inuit Native persons (1978, chapter 97) are or may be members of the Corporation.

Non-profit  
association,  
etc.

4. The Corporation is a non-profit association without share capital and without pecuniary gain for its members; it is governed, subject to the provisions of this act, by Part III of the Companies Act (Revised Statutes, 1964, chapter 271) as it exists at the coming into force of this act, save that the enumeration in section 220 of the said act of sections which do not apply to the Corporation reads as follows: sections 1 to 17 and 23 to 27, paragraph *q* of section 29, sections 34 to 40, 42 to 73, 76 to 79, 81, the first three paragraphs of section 83, sections 84 and 85, subsection 3 of section 86, paragraphs *a* and *b* of subsection 2 of section 88, sections 89 to 91, paragraphs *j* and *k* of subsection 3 of section 95, section 99, subsection 2 of section 100, paragraphs *d* and *e* of subsection 1 and subsection 2 of section 101, and sections 117 and 119.

Objects

5. The objects of the Corporation are:

(a) to receive, administer, use and invest the part, intended for the Inuit, of the compensation provided for in Subsections 25.1 and 25.2 of the Agreement and the revenues therefrom, as well as all its other funds, in accordance with this act;

(b) to relieve poverty and to promote the welfare and the advancement of education of the Inuit;

(c) to develop and improve the Inuit communities and to improve their means of action;

(d) to exercise the functions vested in it by other acts or the Agreement;

(e) to foster, promote, protect and assist in preserving the Inuit way of life, values and traditions.

Head  
office.

6. The Corporation shall have its head office in the Territory, within the meaning of this expression in the Act respecting Cree and Inuit Native persons (1978, chapter 97), at such place as it determines by by-law.

Coming  
into force.

Such by-law shall come into force upon its publication in the *Gazette officielle du Québec*.

## DIVISION III

## POWERS AND DUTIES OF THE CORPORATION

## Duties.

## 7. The Corporation must,

(a) until 31 October 1997, invest directly or through one or more of its wholly owned corporations incorporated, either by special act of the Assemblée nationale or under Québec laws of general application, at least fifty per cent of that part intended for the Inuit of the compensation provided for in Subsection 25.1 of the Agreement, from time to time as it is received, in the investments described in the schedule;

(b) until 31 October 1987, invest directly or through one or more of its wholly owned corporations incorporated, either by special act of the Assemblée nationale or under Québec laws of general application, at least twenty-five per cent, in addition to the minimum of fifty per cent contemplated in paragraph a, of that part intended for the Inuit of the compensation referred to in Subsection 25.1 of the Agreement, from time to time as it is received, in the investments described in the schedule.

## Powers

## 8. The Corporation may

(a) set aside or transfer to one or more of its wholly owned holding or venture capital corporations incorporated, either by special act of the Assemblée nationale or under Québec laws of general application, not more than twenty-five per cent of that part of the compensation intended for the Inuit referred to in subsection 25.1 of the Agreement, from time to time as it is received, for the following purposes:

(i) to assist in the creation, financing or development of businesses, resources, properties and industries belonging to the Inuit;

(ii) to initiate, expand and develop opportunities for the Inuit to participate in the economic development of their society through the application of their skills and capital; and

(iii) to invest in the securities of any corporation owning property or carrying on business intended to directly relate to the economic or other interests of the Inuit;

(b) set aside or transfer to one or more of its wholly owned or wholly controlled corporations incorporated, either by special act of the Assemblée nationale or under Québec laws of general application, or, with the approval of the Government, to some form of wholly owned or wholly controlled non-corporate entity, any amount which, when added to the amount set aside or transferred pursuant to paragraph a, does not amount to more than twenty-five per cent of that part intended for the Inuit of the compensa-

tion referred to in Subsection 25.1 of the Agreement, from time to time as it is received, that must be used exclusively for educational, community and other charitable activities of the Inuit;

(c) subject to sections 10 and 11, administer, conserve, invest, reinvest, distribute and use as it deems appropriate:

(i) all the revenues from the investment of the compensation mentioned hereunder;

(ii) any portion of the compensation mentioned hereunder that has not been set aside or transferred under paragraphs a and b;

(iii) any portion, intended for the Inuit beneficiaries, of the compensation contemplated in Subsection 25.2 of the Agreement;

(iv) all its other funds;

(v) after the expiry of the periods referred to in paragraphs a and b of section 7, any portion of the compensation concerned;

(d) at its discretion, use its assets to reimburse the Northern Québec Inuit Association for debts contracted or expenses incurred by the latter for the general benefit of the Inuit before the date of the coming into force of this act.

Invest-  
ment, etc.,  
of com-  
pensation.

9. When, in accordance with section 7 or 8, the Corporation invests part of the compensation through corporations or transfers part of it to partnerships, corporations or other entities, these must invest these amounts or use them in accordance with the said sections.

Use of  
assets.

10. The Corporation and the legal entities referred to in sections 7 and 8 must use their assets exclusively for community purposes and other activities of general benefit to the Inuit; such assets shall not be distributed to an Inuit community except for its general benefit, and not for the individual benefit of any member of the Corporation.

Distribu-  
tion, etc.,  
of assets.

11. The Corporation and the legal entities contemplated in sections 7 and 8 shall not distribute their assets, in any manner whatsoever, to any individual as an entity distinct from the community, nor pay any dividend, make gifts or give any other benefit to such individual out of their assets.

Exempt  
from  
seizure.

12. The investments made pursuant to section 7 by the Corporation or the legal entities contemplated in the said section, and the securities of the said legal entities which are owned by the Corporation are exempt from seizure, save in respect of debts and obligations relating directly to such investments, and shall not be used as real security or alienated.

List of  
members.

**13.** The Corporation shall prepare each year a list of members and of major members arranged in alphabetical order and indicating the Inuit communities to which they are affiliated, on the basis of the Inuit Register established and maintained, in accordance with the Act respecting Cree and Inuit Native persons (1978, chapter 97), by the Secretary General contemplated in the said act.

Right to  
consult.

Each member is entitled to consult this list as provided in the by-laws of the Corporation.

Financial  
state-  
ments.

**14.** Within the six months following the end of each of its first twenty fiscal years, the Corporation shall file copies of its audited financial statements with the minister responsible for the application of this act and with the Minister of Indian Affairs and Northern Development.

## DIVISION IV

## THE BOARD OF DIRECTORS OF THE CORPORATION

Board of  
directors

**15.** The affairs of the Corporation shall be managed by a board of directors consisting of not under seventeen nor over twenty-five persons.

Number of  
members

Should the number of Inuit communities increase or decrease from the present level of fifteen, these minimum and maximum numbers will automatically be adjusted upwards or downwards, as the case may be, by the amount of that increase or decrease.

Represent-  
atives of  
Inuit com-  
munities.

**16.** The board of directors shall consist of at least one representative elected by each Inuit community. Each representative must, at the time of his election, be affiliated with the community that he represents, in accordance with the Act respecting Cree and Inuit Native persons (1978, chapter 97), and be ordinarily resident therein.

Provisional  
represent-  
atives.

**17.** Until 31 October 1985, the board of directors shall include three representatives appointed, after consultation with the other members of the board, by the governmental authorities, namely, two representatives by the Government of Québec and one by the Minister of Indian Affairs and Northern Development. These members have the status of members of the board but receive no remuneration or reimbursement of expenses from the Corporation.

End of  
term.

Such representatives may remain in office until 31 October 1987 upon the affirmative vote of four other members of the board, at a meeting of the board of directors duly convened to consider the question.

Election.

18. The election of the other members of the board who are not elected or appointed in accordance with section 16 takes place at the annual general meeting of the members of the Corporation.

Qualifications of members.

19. All members of the board must be major and, save for the representatives of the Government appointed in accordance with section 17, must be members of the Corporation.

Term of office.

20. The term of each member of the board of directors commences at the termination of the annual general meeting immediately following his election or appointment or at which he is elected, as the case may be.

Idem.

Such term shall not exceed three years in the case of elected members and two years in the case of representatives of the Government appointed in accordance with section 17.

Vacancy.

21. Should any of the Inuit communities fail to elect a representative to the board of directors, or should the annual general meeting elect an insufficient number of representatives to the board, or should the representatives mentioned in section 17 not be appointed, a vacancy on the board of directors exists until an election or appointment is made as provided for in sections 16 to 20.

Filling vacancies.

22. Save as provided in section 21, vacancies on the board of directors shall be filled as follows:

(a) should the unexpired portion of the term of any member elected by an Inuit community exceed one year, elections must be held in this community in the manner provided for in section 27; otherwise, the remaining directors may fill such vacancy by appointing to the council a person who must, at the moment of his appointment, be affiliated with the Inuit community that he represents and be ordinarily resident therein;

(b) should the unexpired portion of the term of any such member elected at an annual general meeting exceed one year, reckoned from the date of the next annual general meeting of members, an election for his replacement shall be held at such meeting; in the meantime, the remaining directors fill the vacancy until the termination of the next annual general meeting of members;

(c) should the unexpired term of any such member contemplated in paragraph b be less than one year, reckoned from the date of the next annual general meeting of members, the remaining directors fill the vacancy;

(d) vacancies created by representatives appointed in accordance with section 17 shall be filled by those who made the appointment.

The members of the board of directors so elected or appointed, save in the case of an appointment made by the members of the board pursuant to paragraph b, remain in office for the unexpired portion of the term of the members they replace.

Term of office.

**23.** Where a vacancy is filled, the term commences either on the date a member representing an Inuit community is elected, in the case of a representative of a community, or at the termination of the annual general meeting in the case of a member elected at such a meeting or on the date of appointment in the case of a member appointed in accordance with section 17 or appointed by the other members of the board of directors to fill the vacancy.

Quorum.

**24.** The quorum for meetings of the board of directors is a majority of the elected or appointed members, representing at least two-thirds of the Inuit communities who have elected representatives to the board of directors.

Notice.

**25.** Seven days prior notice must be given to each member of the board of directors in respect of any meeting of the board requiring notice. Such notice may be given in writing, by telephone, by telex or by any other means of telecommunication.

By-laws.

**26.** Subject to this act, the by-laws of the Corporation may provide for:

- (a) the number of members of the board of directors;
- (b) the term of office of each member of the board of directors, not including Government representatives appointed in accordance with section 17, so as to provide for the election by turns of a given number of members each year following the first election of directors;
- (c) the period during which elections for the representatives of each Inuit community to the board of directors must be held;
- (d) the quorum at meetings of the board of directors;
- (e) the quorum at meetings of members and the method of reimbursement of the expenses incurred by the representatives of each Inuit community because of their participation in these meetings;
- (f) the percentage of votes required to validly elect a representative of each Inuit community to the board of directors;



(g) the terms and conditions governing the use of the assets of the Corporation.

Amend-  
ments.

Any amendment to the foregoing by-laws comes into force only upon ratification by special resolution adopted by a majority of at least two-thirds of the votes from the major members of the Corporation having voted in person or by proxy at a meeting of the members duly summoned to examine that resolution.

## DIVISION V

## ELECTIONS

Elections.

27. When required, elections for representatives of each Inuit community to the board of directors are held in each community during the ninety-day period preceding the date fixed for the annual general meeting of the members or during the ninety-day period following the creation of any vacancy on the board of directors which must be filled by election in accordance with paragraph a of section 22.

Supervi-  
sion.

28. The elections provided for in section 27 shall be held under the supervision of a returning-officer appointed by the board. A member of the board cannot be returning-officer.

Persons  
entitled  
to vote.

29. Only major Inuit members affiliated with each Inuit community, in accordance with the Act respecting Cree and Inuit Native persons (1978, chapter 97), may vote in the election of a representative of such community to the board. Each major member has only one vote and may vote in person or by proxy. Only a member entitled to vote may act as proxy.

Number of  
procu-  
rations.

For the purpose of the application of this act, no one may hold more than ten procurations.

Voting  
continues.

30. Voting at an election held in an Inuit community continues until a candidate receives the majority of the votes cast.

Validity.

31. The election for the representative of an Inuit Community is not valid unless at least fifteen per cent of the members entitled to vote have voted in person or by proxy.

## DIVISION VI

## GENERAL MEETINGS OF MEMBERS

Date.

32. The annual general meeting of members of the Corporation shall be held within six months after the fiscal year-end of the Corporation.

Persons  
entitled  
to vote.

**33.** Only a major member may vote at general meetings of the Corporation and each member has only one vote; such vote may be made in person or by proxy; only a major member may act as proxy.

Quorum.

**34.** A quorum at general meetings of members is formed of the major members present in person who are affiliated with an Inuit community in accordance with the Act respecting Cree and Inuit Native persons (1978, chapter 97); that quorum is thirty-five members representing at least two-thirds of the Inuit communities that have elected representatives to the board.

Expenses.

**35.** The Corporation shall provide the funds necessary to cover the justifiable expenses incurred in attending any general meeting of at least two representatives from each Inuit community.

## DIVISION VII

### TRANSITIONAL PERIOD PROVISIONS

Provisional  
board of  
directors.

**36.** From the coming into force of this act until the termination of the first annual general meeting of members, a provisional board of directors, consisting of twenty-four persons, is constituted as follows: one representative of each Inuit community is appointed at a meeting of the community council or local authority of each of the fifteen existing Inuit communities, two representatives may be appointed by the Northern Québec Inuit Association, four members may be appointed by the Fédération des coopératives du Nouveau-Québec, and three other representatives are appointed in accordance with section 17.

Vacancy.

Should any member of the provisional board of directors not be appointed in accordance with the preceding paragraph, a vacancy remains on the board until an appointment is made.

Filling  
vacancies.

The remaining members of the board fill vacancies other than those provided for in the preceding paragraph, in the case of representatives already appointed by the community councils and the Northern Québec Inuit Association. Vacancies created by representatives appointed in accordance with section 17 shall be filled by the person who made the appointment.

Term of  
office.

The term of members of the provisional board of directors so appointed or appointed as substitutes commences on the date of their appointment.

Deposit of  
compensation, etc.

**37.** Until the termination of the first annual general meeting of members, the Corporation shall deposit the compensation contemplated in Subsection 25.1 of the Agreement and intended for the Inuit with a Canadian chartered bank or a savings and credit union carrying on business in Québec, and the revenues therefrom shall be received by the Corporation and managed and used by it in accordance with this act. Until such meeting of members, the Corporation, in addition to the other restrictions contained in this act, shall not:

(a) borrow any money in excess of the total of the accrued but unpaid interest which might at any time and from time to time be owing to the Corporation under the province of Québec debentures issued to the Corporation pursuant to Subsection 25.2 of the Agreement;

(b) anyway encumber any of its assets;

(c) make any agreement having a term in excess of one year or containing any commitment, financial or otherwise, that will not be fully discharged within such period.

Provisions  
applicable.

**38.** Subject to this division, the other divisions of this act apply, *mutatis mutandis*, to the provisional board of directors. For that purpose, the reference,

(a) in section 16, to a representative elected by each of the Inuit communities is a reference to a representative appointed by each of the Inuit communities; and,

(b) in sections 24 and 34, to the majority of the Inuit communities who have elected representatives to the board of directors, is a reference to the majority of the Inuit communities who have appointed representatives to the board of directors.

#### DIVISION VIII

#### FINAL PROVISIONS

Winding-  
up, etc., of  
Corporation.

**39.** No voluntary winding-up or dissolution of the Corporation may take place without prior government approval of the plan for distribution, after it has discharged its debts, of its assets to the Inuit communities for community purposes, other undertakings of general benefit to the Inuit or one or more prescribed charitable organizations contemplated in the Taxation Act (1972, chapter 23).

Right to  
accrued  
interest.

**40.** The Corporation is not entitled to the interest accrued, until the coming into force of this act, on the part of the compensation referred to in Subsection 25.1 of the Agreement and paid to the Northern Québec Inuit Association for the general

benefit of the Inuit. The Northern Québec Inuit Association must, however, give an account to the Corporation of its use of such interest and remit to the latter the portion of such interest remaining at the time of the coming into force of this act.

Makivik  
Corporation.

**41.** The Makivik Corporation is the legal entity contemplated in Subsections 1.11 and 27.01 of the Agreement. Every mention of the legal Inuit entity in the Agreement or in any other act or document to which the Government is a party designates the Makivik Corporation.

Inapplicable  
provision.

**42.** Section 21 of the Intergovernmental Affairs Department Act (1974, chapter 15) does not apply to the Corporation, nor to the legal entities contemplated in sections 7 and 8.

Minister  
responsible.

**43.** The Government shall designate the minister responsible for the application of this act.

Coming  
into force  
(26 June  
1978, G.O.  
p. 3855).

**44.** This act comes into force on a date to be fixed by proclamation of the Government.

## SCHEDULE

### AUTHORIZED INVESTMENTS

(1) Bonds or other evidences of indebtedness issued or guaranteed by the government of the province of Québec, of Canada or a province of Canada, of the United States of America or of any state thereof, by the International Bank for Reconstruction and Development, by a municipal or school corporation in Canada, or by a "fabrique" in the province of Québec;

(2) bonds or other evidences of indebtedness issued by a public authority having as its object the operation of a public service in Canada or any province thereof and entitled to impose a tariff for such service;

(3) bonds or other evidences of indebtedness secured by the transfer to a trustee of an undertaking by Canada or any province of Canada to pay sufficient subsidies to meet the interest and principal at their respective maturities;

(4) bonds, debentures or other evidences of indebtedness of a corporation that are fully secured by a first mortgage, charge or hypothec to a trustee or to the Corporation upon any, or any combination, of the following assets:

(i) real estate or leaseholds;

(ii) the plant or equipment of a corporation that is used in the transaction of business; and

(iii) bonds, debentures or other evidences of indebtedness, shares of a class authorized hereunder as investments, or cash balances, if such bonds, debentures, other evidences of indebtedness, shares or cash balances are held by a trustee;

and the inclusion, as additional security under the mortgage, charge or hypothec, of any other assets not of a class authorized hereunder as investments shall not render such bonds, debentures or other evidences of indebtedness ineligible as an investment;

(5) bonds or certificates issued by a trustee to finance the purchase of transportation equipment, for a corporation incorporated in Canada or the United States, to be used on airlines, railways or public highways, if the bonds or certificates are fully secured by

(i) an assignment of the transportation equipment to, or the ownership thereof by, the trustee, and

(ii) a lease or conditional sale thereof by the trustee to the corporation;

(6) bonds, debentures or other evidences of indebtedness

(i) of a corporation if, at the date of investment, the preferred shares or the common shares of the corporation are authorized as investments by paragraph 8 or 9; or

(ii) of, or guaranteed by, a corporation whose total earnings for a period of five (5) years ended less than one year before the date of investment were at least ten (10) times, and in each of any four (4) of the five (5) years, were at least one and one-half times the annual interest requirements at the date of investment on all indebtedness of or guaranteed by that corporation other than indebtedness classified as a current liability, under generally accepted accounting principles, in the balance sheet of the corporation; and if the corporation at the date of investment owns directly or indirectly more than fifty per cent (50%) of the common shares of another corporation, the earnings of the corporations during the said period of five (5) years may be consolidated with due allowance for minority interests, if any, and in that event the interest requirements of the corporations shall be consolidated and such consolidated earnings and consolidated interest requirements shall be taken as the earnings and interest requirements of the corporation; and, for the purposes of this subparagraph, "earnings" means earnings available to meet interest charges on indebtedness other than indebtedness classified as a current liability under generally accepted accounting principles;

(7) guaranteed investment certificates issued by a trust company incorporated in Canada if, at the date of investment, the

common shares or the preferred shares of the trust company are authorized as investments by paragraph 8 or 9, certificates of deposit and bearer discount notes of any Canadian chartered bank or any savings and credit union;

(8) the preferred shares of a corporation if

(i) the corporation has paid a dividend, in each of the five years immediately preceding the date of investment, at least equal to the specified annual rate on all its preferred shares, or

(ii) the common shares of the Corporation are, at the date of investment, authorized as investments by paragraph 9;

(9) the fully paid common shares of a corporation that, during a period of five (5) years that ended less than one year before the date of investment has either

(i) paid a dividend in each such year upon its common shares, or

(ii) had earnings in each such year available for the payment of a dividend upon its common shares, of at least four per cent (4%) of the average value at which the shares were carried in the capital account of the corporation during the year in which the dividend was paid or in which the corporation had earnings available for the payment of dividends, as the case may be;

(10) real estate or leaseholds for the production of income in Canada, if

(i) a lease of the real estate or leasehold is made to, or guaranteed by,

(A) the government of Canada or of any of the provinces, or an agency of the said governments, or

(B) a corporation, the preferred shares or common shares of which are, at the date of investment, authorized as investments by paragraph 8 or 9,

(ii) the lease provides for a net revenue sufficient to yield a reasonable interest return during the period of the lease and to repay at least eighty-five per cent (85%) of the amount invested in the real estate or leasehold within the period of the lease but not exceeding thirty years from the date of investment, and

(iii) the total investment of the Corporation hereunder in any one parcel of real estate or in any one leasehold does not exceed two per cent (2%) of the book value of the portion of the total assets of the Corporation relating to the compensation;

and the Corporation may hold, maintain, improve, lease, sell or otherwise alienate or dispose of the real estate or leasehold;

(11) real estate or leaseholds for the production of income in Canada, if

(i) the real estate or leasehold has produced, in each of the three (3) years immediately preceding the date of investment, net revenue in an amount that, if continued in future years, would be sufficient to yield a reasonable interest return on the amount invested in the real estate or leasehold and to repay at least eighty-five per cent (85%) of that amount within the remaining economic lifetime of the improvements to the real estate or leasehold but not exceeding forty years from the date of investment, and

(ii) the total investment of the Corporation hereunder in any one parcel of real estate or in any one leasehold does not exceed two per cent (2%) of the book value of the portion of the assets of the Corporation relating to the compensation; and the Corporation may hold, maintain, improve, lease, sell or otherwise alienate or dispose of the real estate or leasehold;

(12) debts secured by mortgages, charges and hypothecs, upon improved real estate or leaseholds in Canada, notwithstanding that the amount paid for such debts so secured by mortgage, charge or hypothec exceeds three-quarters of the value of the real estate or leasehold, if the loan for which the hypothec, mortgage or charge is security, is an approved loan or an insured loan under the National Housing Act (Revised Statutes of Canada, 1970, chapter N-10) or any equivalent provincial legislation;

(13) debts secured by hypothec or mortgage on real estate in Canada:

(i) if payment of principal and interest is guaranteed or assured by the government of Canada or of any province of Canada, or by any public authority therein; or

(ii) if the hypothec or mortgage ranks first and the amount of the debt is not more than seventy-five per cent (75%) of the value of the real estate securing payment thereof;

(14) where the Corporation owns securities of a corporation and as a result of investments made hereunder and as a result of a bona fide arrangement for the reorganization or winding up of the corporation or for the amalgamation of the corporation with another corporation, such securities are to be exchanged for bonds, debentures or other evidences of indebtedness or shares not authorized as investments by the foregoing provisions of this schedule, the Corporation may accept such bonds, debentures or other evidences of indebtedness or shares;

(15) the total book value of the investments of the Corporation in common shares authorized in this schedule shall not exceed

fifty per cent (50%) of the book value of the portion of the assets of the Corporation relating to the compensation;

(16) the total book value of the investments of the Corporation in real estate or leaseholds for the production of income authorized in this schedule shall not exceed ten per cent (10%) of the book value of the portion of the assets of the Corporation relating to the compensation;

(17) the Corporation shall not invest any of its funds in bonds, debentures or other evidences of indebtedness on which payment of principal or interest is in default;

(18) in order to secure total or partial payment of any amount owed to it, the Corporation may acquire and alienate the real estate which secures such payment, and such real estate is not subject to the restrictions prescribed in paragraph 10, 11 or 16;

(19) the Corporation may invest the funds described in section 8 of this act otherwise than as authorized in this schedule, provided that the total amount of such investment does not exceed seven per cent (7%) of the book value of the portion of the assets of the Corporation relating to the compensation and that, in the case of investment in real estate, the total real estate investment in a single undertaking does not exceed one per cent (1%) of the book value of the portion of the total assets of the Corporation relating to the compensation.