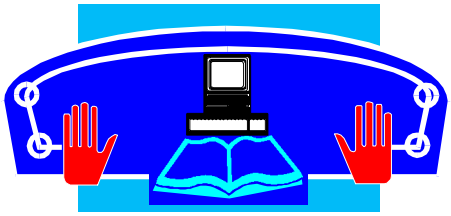

A Framework For Commercial Development Of Arctic And Glacial Ice Resources
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1. INTRODUCTION

1.1. NWT Water and Ice Resources

NWT arctic ice received wide acclaim at EXPO 86. The fact that British Columbia and Greenland are presently harvesting their glacial ice ***resources*** commercially warrants a closer examination of the NWT'S potential to do likewise. This report outlines the factors that will influence commercial ice harvesting in the **NWT and** the actions the Department of Economic Development and Tourism will pursue in the short-term to assist in exploring this potential business opportunity.

Canada accounts for 9% of the world's freshwater resources with 60% of Canada's freshwater resource occurring in the North. Most of the arctic rivers have their source in glaciers. The replenishment of rivers and lakes makes arctic glaciers invaluable to Canada and indeed to the NWT.

The perception of glaciers as tourist attractions and their uses as subject of scientific expeditions and investigations have multiplied through the years, generating revenue for some NWT communities. These glaciers have an even greater potential to contribute to the NWT'S economy through the commercial mining of ice.

1.2. Legislative Jurisdiction and Ownership

Water resource management in Canada is governed by both provincial and federal statutes. Unlike the provinces, in the NWT the federal government exercises proprietary rights over water and ice resources and therefore the commercial development and sale of arctic ice resources. Like wise, the federal government is responsible for the administration of the environmental legislation that governs the harvesting of ice from glaciers.

The principal legislation that will impinge on the commercial development of arctic glaciers is the Northern Inland Waters Act. To a lesser and varying extent other legislation will come into play, namely: The Canada Water Act, the Arctic Waters Pollution Prevention Act, and the Food and Drug Act.

The recently developed Federal Water Policy provides a new perspective to the management and use of water and ice resources. Most significant is the federal government's intention to review the Northern Inland Waters Act to reflect the needs and desires of northerners.

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Also, the proposed NWT water policy being developed by the Department of Renewable Resources will influence ice harvesting activities in the NWT following the devolution of management jurisdiction respecting water and ice resources. Ice harvesting activities will have to conform to the resource management goal articulated in the water policy discussion paper, which states:

"The waters of the NWT **shall be** conserved, used and protected to maintain ecosystem integrity while providing economic and social benefits on an equitable, sustainable and enjoyable basis for present and future generations."

2. POTENTIAL SOURCES OF COMMERCIAL GLACIAL ICE

2.1. Distribution and Size of NWT Glaciers

Glaciers are found in three areas:

a) Baffin and Bylot Islands

Glaciers	Area (Sq. km.)
Terra Nova	165
Grinnell	130
Hall	490
Penny	5,960
Barnes	5,935
Bylot	4,895
Others	24,150

b) Queen Elizabeth Islands

Glaciers	Area (Sq. Km.)
Ellesmere	77,180
Devon	16,575
Axel Heiberg	12,560
Melville	335
Coburg	230
North Kent	140
Meighan	76

c) Western Mountains

Glaciers	Area (Sq. Km.)
Mackenzie Mountains	
- Backbone Ranges	60
- Canyon Ranges	60
Selwyn Mountains	
- South Nahanni	350

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Other sources of arctic ice include sea ice and icebergs. New techniques in iceberg detection, towing and fraction have not only provided effective tools for iceberg management but also enchanced the possibility for their commercial exploitation.

2.2. Factors That Will Influence Arctic Ice Harvesting . ,

i) Accessibility of glaciers;
ii) Engineering feasibility of harvesting methods;
iii) Legislative requirements - ownership and sales;
iv) Health requirements;
v) Cost of harvest;
vi) Environmental considerations; and
vii) Markets - local, national, export

3. PLANNING AND DEVELOPMENT

3.1. Planning for Water and Ice Development

There is tremendous potential in the 149,291 square kilometers of arctic glaciers as a source of ice. A myriad of factors will affect commercial exploitation of Arctic ice. This necessitates a strong water and ice planning group within the GNWT organization to ensure orderly exploitation of the ice resource and equitable distribution of the economic and social benefits that will be derived. Besides the usual complement of engineers? economists and lawyers, such a group will include biological scientists.

Any major commercial exploitation of arctic ice will impact northern Canadians in two ways:

i) quantity of ice available; and
ii) increased revenue to producer communities.

There is a possibility that glacial ecosystems may also be affected. Consequently, not only does the economic aspect of this business opportunities need to be ascertained but also the environmental impacts.

3.2. Licensing

Commercial development of arctic glaciers will require a permit or licence from the NWT Water Board.

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3.3. Pricing

The new federal water policy endorses the concept of realistic pricing of water resources as a means of generating revenue to cover development costs and at the same time conserve the resource. Water pricing policy in the NWT should be used in two ways:

i) to achieve the optimum allocation of the resources to Northerners; and
ii) to recoup production costs.

3.4. Commercial Development

As there is no active commercial arctic ice harvesting going on in the **NWT at this time, the constraints and opportunities are not fully understood. Information on the market, product line, technical feasibility, public health requirements and the environmental and legislative ramifications are all lacking. The Department of Economic Development and Tourism will encourage and support NWT entrepreneurs to examine the potential of this business opportunity through a pilot project during FY 08/89, drawing from the experiences of related businesses in other provinces and countries. The pilot project will incorporate the following:**

1. **a** Market demand - ascertained through product development and test marketing,
b Technical feasibility of harvesting and packaging, and
c Environmental impact and public health requirements

2. Assessment of Economic and financial viability

3. If deemed feasible, the development and implementation of a business plan.