OTH-1036

EXHIBIT #
WUSKWATIM GENERATION
& TRANSMISSION PROJECT

CLEAN ENVIRONMENT COMMISSION

OTH -

Pukatawagan Fishermen's Association
P.O. Box 172
Pukatawagan, Manitoba R0B 1G0
Telephone (204) 553-2232 or (204) 553-2213
Fax (204) 553-2070

February 6, 2004

The Hon. Stan Struthers
Minister of Conservation
Room 330, Legislative Building
Winnipeg, MB
R3C 0V8

The Hon. Steve Ashton
Minister of Water Stewardship
Room 314, Legislative Building
Winnipeg, MB
R3C 0V8

The Hon. Oscar Lathlin
Minister of Aboriginal and Northern Affairs
Room 344, Legislative Building
Winnipeg, MB
R3C 0V8

The Hon. Tim Sale
Minister of Energy, Science and Technology
Room 333, Legislative Building
Winnipeg, MB
R3C 0V8

Dear Ministers:

Re: Request for Meeting
Churchill River Water Management Issues

I am writing on behalf of the Pukatawagan Fishermen's Association (PFA) to request a meeting to discuss water management, fisheries management and outstanding issues related to the construction and operation of the Island Falls Generating Station. PFA represents 175 licenced commercial fishers and 125 additional persons associated with the Churchill River commercial fishery between the Manitoba-Saskatchewan boundary and Leaf Rapids, Manitoba. These fishers and allied workers are members of the Mathias Colomb Cree Nation and are resident at Pukatawagan, Manitoba.

The PFA has viewed with interest several recent provincial initiatives:

1. the establishment by Manitoba of a special Cabinet position for Water Stewardship;
2. the Throne Speech commitments regarding water stewardship and water management;
3. the proposal by Minister Ashton and Minister Struthers to adopt a national water strategy.

As you may be aware, the fishery relied upon by the members of the PFA has been adversely affected by the operation of the Island Falls Generating Station. It is important to note that the Saskatchewan Power Corporation does not possess authorizations under Manitoba statutes and regulations to use, store and regulate Manitoba waters. As well, no water regime has been imposed by Manitoba on SaskPower's operations to mitigate these effects and provide for fisheries, navigation, potable water supplies and other uses. Further, no settlement or compensation agreement has been arrived at between SaskPower and the PFA or with PFA's members through a settlement with any other party. The Island Falls Generating Station has been in operation since 1927 and the related Whitesand Dam Control Structure at the outlet of Reindeer Lake has been in place since 1938.

... /2

The PFA is aware that these issues have been presented to Manitoba by representatives of Chief and Council of the Mathias Colomb Cree Nation (MCCN) on several occasions. Recently, the MCCN has authorized, by Band Council Resolution (BCR), the PFA to independently pursue resolution of these issues as they affect the PFA. A copy of the BCR is attached to this letter.

The PFA endorses-in-principle Water Regime Management Option C. "Management of Water Regime to Multiple Objectives" of the *Proposal for Modified Water Regime Management of the Churchill River Between Island Falls and Granville Falls and Reindeer Lake* as presented to Minister Lathlin on February 22, 2001 (copy attached). In summary, the modified water regime proposes establishing terms and conditions - in both Manitoba and Saskatchewan - for the operation of SaskPower's Island Falls and Whitesand facilities in a manner that provides for near-natural flow conditions. As noted in the proposal, the loss of generation at SaskPower's 95 MW Island Falls facility would be an average of only 3% annually. It is important to note that the 1975 Saskatchewan-Manitoba-Canada Churchill River Study (the "Missinipe Probe") arrived at the same conclusion (Hofer 1975: 47).

In 2004, it is no longer acceptable to impose mitigable, adverse environmental effects on fisheries, wildlife and First Nation peoples for a minimal power benefit.

The PFA would like to secure the support of the Government of Manitoba toward implementing the *Proposal for Modified Water Regime Management* in cooperation with the Saskatchewan Water Corporation, SaskPower and Manitoba Hydro. It is important that the PFA confirm the support of Manitoba and Manitoba Hydro prior to initiating discussions with SaskPower in respect of the *Proposal for Modified Water Regime Management* and related matters.

Therefore, we request a meeting between our representatives and yourselves at your earliest convenience. In particular, the PFA wishes to determine whether the position expressed by the President of Manitoba Hydro in his letter of September 18, 2002 (copy attached) represents the position of the Government of Manitoba in respect of the *Proposal for Modified Water Regime Management*, and if so, whether it would be necessary for the PFA to engage Manitoba and Manitoba Hydro in settlement negotiations. Please contact me directly at (204) 999-1661 to arrange a date for this meeting.

Sincerely,

Peter Sinclair
Fisheries and Economic Development Advisor

encls.
cc. PFA President
MCCN
MKO-NRS

Manitoba Hydro

R.B. Brennan, FCA
President and
Chief Executive Officer

To: Councillor Matt Sinclair

2002 09 18

Chief Shirley Castel
Mathias Colomb First Nation
Pukatawagan, Manitoba
R0B 1G0

Chief Archie Halkett
Barren Lands First Nation
Brochet, Manitoba
R0B 0B0

Dear Chiefs:

Further to our meeting of September 4, 2002, I am now able to report on the possibility of accommodating different water flows from Saskatchewan. Manitoba Hydro has designed our system in a manner that is compatible with the current mode of regulation of Reindeer Lake. Returning Reindeer Lake to a "state of nature" will affect both the operations of Manitoba Hydro and the downstream Manitoba water regimes affecting all communities downstream of Reindeer Lake.

As a "state of nature" course of action is not appropriate for Manitoba we encourage you to explore other alternatives directly with SaskPower.

We would be pleased to introduce you to the appropriate SaskPower personnel but we caution, again, that we cannot support a "state of nature" option.

Yours truly,

RBB/smc

P.O. Box 815 • Winnipeg, Manitoba • CANADA R3C 2P4 • rbbrennan@hydro.mb.ca
Telephone/N° de téléphone: (204) 474-3600 • Fax/N° de télécopieur: (204) 474-4114

STATEMENT OF COMMON OBJECTIVE

The undersigned agree upon the following common objective after meeting in Regina, Saskatchewan on May 1, 1998 to discuss a water management regime for the Reindeer Lake-Reindeer River-Churchill River system, in accordance with Articles 5 and 6 of the Terms of Reference attached to the February 12, 1997 Negotiating Agreement:

"That Sask Power facilities and the water regime be properly licensed and Sask Power obtain the proper land–use authorizations in order to operate, based on a plan developed to serve the multiple water regime management objectives of all parties, and utilizing a water management process accepted by all parties."

For the Mathias Colomb Cree Nation

For the Barren Lands First Nation

For Saskatchewan Power Corporation

Gordie Pelly

For the Province of Manitoba

For Saskatchewan Water Corporation

Mathias Colomb Cree Nation and the Barren Lands First Nation
Presentation to
The Hon. Oscar Lathlin, Minister of Conservation

OVERVIEW OF A PROPOSAL FOR MODIFIED WATER REGIME MANAGEMENT of THE CHURCHILL RIVER BETWEEN ISLAND FALLS AND GRANVILLE FALLS and REINDEER LAKE

February 22, 2001
Legislative Buildings, Winnipeg, Manitoba

1.0 Summary

The Churchill River and Reindeer Lake region of what is now northwest Manitoba and northeast Saskatchewan have long been important to Manitoba First Nations for food, furs, a source of drinking water, transportation and are an integral part of aboriginal heritage, language, culture, and institutions. The Churchill River, Reindeer River and Reindeer Lake remain today as central features in the economic pursuits of the Mathias Colomb Cree Nation and the Barren Lands First Nation of Manitoba. The lands surrounding these lakes and rivers - and the islands within them - have since time immemorial, provided the sites for communities, camps and cabins, the materials for living and the location of burial sites.

Between 1927 and 1930, the Churchill River Power Company Limited constructed the Island Falls Generating Station on the Churchill River at a point 22 km west of the Saskatchewan-Manitoba boundary. Between 1937 and 1942, the Churchill River Power Company also built the Whitesand Dam in Saskatchewan on the Reindeer River, a tributary to the Churchill River, in order to provide a more dependable flow of water to the Island Falls hydroelectric project. These projects have resulted in a reversal of natural water flows and levels on the Churchill River and on Reindeer Lake.

In Manitoba, the Island Falls project has resulted in lower spring and summer water levels and higher winter water levels than what would have occurred under natural flow conditions. Significant impacts to fish, wildlife, navigation, water quality and human health have also occurred.

The Whitesand Dam flooded at least 10,227 acres of land and shorelines in Manitoba by raising the level of Reindeer Lake approximately six feet. Although the flooded lands are viewed as provincial Crown lands, they are lands to which the affected Manitoba First Nations enjoy a right of access for hunting, trapping and fishing. The exercise of such a right is guaranteed under the terms of Treaty 6 (Mathias Colomb Cree Nation), Treaty 10 (Barren Lands First Nation), the *Natural Resources Transfer Act, 1930* and by the *Constitution Act, 1982.*

In addition, the Whitesand Dam flooded 660 acres of Indian reserve land at Brochet Indian Reserve 197, contrary to the provisions of the *Indian Act.*

Since 1981, the Saskatchewan Power Corporation has operated the Island Falls and Whitesand Dams without any terms and conditions being imposed by a valid and subsisting licence issued by either Saskatchewan or Manitoba, nor does the Saskatchewan Power Corporation possess an authority under the federal *Indian Act* to flood portions of Brochet Indian Reserve 197.

No compensation arising from these impacts has ever been paid to Manitoba riparian users on either the Churchill River or the Reindeer River-Reindeer Lake systems by either of the Churchill River Power Company or the Saskatchewan Power Corporation, although the federal and provincial authorizations explicitly continue to require or required that such compensation be paid.

1.1 Status of Provincial Authorizations for the Island Falls and Whitesand Projects

As of April1,1981, the Saskatchewan Power Corporation purchased the Island Falls and Whitesand Dams from the Churchill River Power Company. Also on April 1, 1981, the original licences issued by Saskatchewan and Manitoba for the operation of these facilities expired.

In his March 17, 1981 memo to the Acting President of the Saskatchewan Power Corporation, the Saskatchewan Minister of Environment invoked s. 47(1) of the Saskatchewan *Water Power Regulations* by declaring:

> *". . . I hereby designate the Saskatchewan Power Corporation as the person who may enter upon, possess, occupy, operate and control the Island Falls power development. For such time as SPC acts pursuant to this designation no licence need be issued under the regulations. . . I expect that at some future time this designation will be terminated and a licence will then be issued."*

On March 5, 1981, prior to the designation by the Saskatchewan Minister of Environment and prior to the effective date of the sale agreement, the Saskatchewan Power Corporation applied under the Manitoba *Water Power Act* for a new licence for water storage at Reindeer Lake.

In 1985, a draft Final Licence for the Development of Water Power at Island Falls on the Churchill River was prepared by the Saskatchewan Water Corporation, which since April, 1981, had become responsible for the administration of the *Water Power Act*.

The 1985 draft Final Licence was reviewed by the Manitoba Department of Natural Resources and by the Saskatchewan and Manitoba offices of the Department of Indian and Northern Affairs Canada.

The Manitoba licencing process included, in December 1985, a referral by the Manitoba Minister of Natural Resources of a number of issues for public hearings by the Manitoba Water Commission. The Commission was asked to recommend to the Minister appropriate terms and conditions to be included in any renewal licence issued under the Manitoba *Water Power Act* which might be granted.

The Mathias Colomb Cree Nation and the Barren Lands First Nation of Manitoba were recognized as participants in Manitoba's licencing process and were heard at the Commission's hearings, including a hearing held at Brochet, Manitoba. These First Nations opposed the granting of a licence to the Saskatchewan Power Corporation in the absence of acceptable terms and conditions.

The application before the Manitoba Water Commission was unilaterally withdrawn by the Saskatchewan Power Corporation in February, 1987. On October 30, 1987, the Manitoba Water Commission issued its preliminary report. The Saskatchewan Power Corporation has yet to resubmit an application to the Manitoba Minister of Conservation.

In 1987 and continuing through 1988, the Saskatchewan Water Corporation corresponded with the Saskatchewan Power Corporation and the Assistant Deputy Minister of the Manitoba Department of Natural Resources in an effort to arrive at agreeable language for a Final Licence. However, the Saskatchewan Water Corporation advised that it will not issue any Final Licence for the Development of Water Power by the Island Falls developments until the regulatory issues are resolved with the province of Manitoba, Canada and the affected First Nations.

No licence has subsequently been issued under Manitoba law to the Saskatchewan Power Corporation following the April 1, 1981 expiry of the original May 1, 1942 *Licence for the Development of a Storage Reservoir*.

Thus, both the Island Falls and Whitesand developments continue to be operated only under the authority and terms of the March 17, 1981 memo setting out the Ministerial declaration.

Today, the Island Falls Generating Station has an installed generating capacity of 95 MW, provided by seven turbine generator units. Two additional units were installed in 1947 and 1959. In 1998, the annual production of the station was 747 million kW.h. Since 1973, the Island Falls Generating Station has been interconnected with the Manitoba Hydro system. In 1983, the Saskatchewan Power Corporation and Manitoba Hydro cost-shared a 230 kv transmission interconnection to Island Falls.

2.0 Overview of First Nation Initiatives to Resolve Outstanding Issues

Since 1989 in particular, the Mathias Colomb Cree Nation and the Barren Lands First Nation have approached both the Saskatchewan Power Corporation and the government of Saskatchewan in the hopes that a negotiated resolution of these issues would be given a high priority by Saskatchewan and the Saskatchewan Power Corporation. However, prior to 1994, both Saskatchewan and the Saskatchewan Power Corporation declined to negotiate these issues directly with the Mathias Colomb Cree Nation and the Barren Lands First Nation.

In an effort to resolve these matters, the Mathias Colomb Cree Nation and the Barren Lands First Nation initiated a legal action in December, 1991, through a Notice of Application. A Statement of Claim was subsequently filed on August 24, 1992. The Mathias Colomb Cree Nation and the Barren Lands First Nation were seeking declaratory and injunctive relief from the court.

In essence, the Statement of Claim requested a ruling from the Court of Queen's Bench with respect to the duty, if any, of the Saskatchewan Power Corporation to obtain Manitoba licences under the *Water Power Act* and the *Water Rights Act*. A related question concerned the requirements for a Governor-in-Council approval under section 35(1) of the *Indian Act* for the taking of reserve lands through the flooding of 660 acres at the reserve of the Barrens Land Band at Brochet. The Attorneys General of Manitoba and Canada supported the basic positions of the First Nations.

The Saskatchewan Power Corporation contended the legal action in two court proceedings based on procedural issues related to the legal standing of these First Nations. However, the Manitoba courts recognized the standing of Mathias Colomb Cree Nation and the Barren Lands First Nation as well as their independent capacity to press for the enforcement of federal and provincial laws which directly affect their "special interests". In the spring of 1994, the Supreme Court of Canada denied the Saskatchewan Power Corporation leave to appeal this aspect of the legal proceedings.

As a result of these multiple court decisions in favour of Mathias Colomb Cree Nation and the Barren Lands First Nation and in light of the support of the governments of Manitoba and Canada, the Saskatchewan Power Corporation approached the Mathias Colomb Cree Nation and the Barren Lands First Nation seeking a negotiated settlement.

In late 1996 and early 1997, negotiations were productive and resulted in the conclusion of a Memorandum of Understanding (MOU) between the Saskatchewan Power Corporation and the two First Nations. This MOU, dated February 12, 1997, sets out the terms of reference and process for negotiations in this matter and also provides for the necessary funding for community support costs and technical advisory and legal costs.

2.1 Proposal for Modified Water Regime Management

As part of the technical analysis related to the February 12, 1997 negotiations process between the Saskatchewan Power Corporation and the affected First Nations, a modelling tool was developed by Unies Engineering of Winnipeg to examine various water flow conditions in the water systems affected by the Island Falls and Whitesand Dams. This computer-based modelling tool incorporates actual water flow, level and hydroelectric production data between 1929 and 1997. The modelling tool is capable of simulating various water flow conditions, including the natural flows that would have occurred in each year between 1929 and 1997 without regulation by the Island Falls and Whitesand Dams.

Following analysis of actual and simulated natural flows through use of the modelling tool, the First Nations developed a detailed proposal for a Modified Water Regime. It is proposed in the Modified Water Regime that the Island Falls and Whitesand Dams be operated such that water flows and levels on the Reindeer River, Reindeer Lake and the Churchill River between Island Falls, Saskatchewan and Granville Falls, Manitoba be restored to near-natural seasonal flows and levels. The Saskatchewan Power Corporation has generally accepted the core analysis as presented by the First Nations in the Modified Water Regime proposal presented on May 1, 1998.

Under such a water regime, power generation at the Island Falls hydroelectric station would return to essentially "run-of-the-river" operations, with purchases from Manitoba Hydro intended to make up any reduced generation during low-flow years resulting from returning to near-natural flows in the Reindeer River - Reindeer Lake system. Implementation of the Modified Water Regime and establishing "managed near-natural flows" would restore fish and wildlife habitat and populations as well as provide enhanced flood and drought controls throughout the Reindeer River - Reindeer Lake - Churchill River system. The Modified Water Regime would also substantially improve water quality during the summer months on the Churchill River between Island Falls, Saskatchewan and Granville Falls, Manitoba.

Analysis indicates that regulation of the Reindeer River, Reindeer Lake and the Churchill River between Island Falls, Saskatchewan and Granville Falls, Manitoba to restore near-natural seasonal flows and levels would result in an average reduction in annual power production of three percent.

The supporting analysis for the proposed Modified Water Regime suggests a finding that the marginal power benefits associated with full regulation of Reindeer Lake do not justify the substantial environmental impacts at Reindeer Lake and on the Churchill River, especially in light of the availability of affordable "make up power" from Manitoba Hydro and provincial government support for the principles of sustainable development.

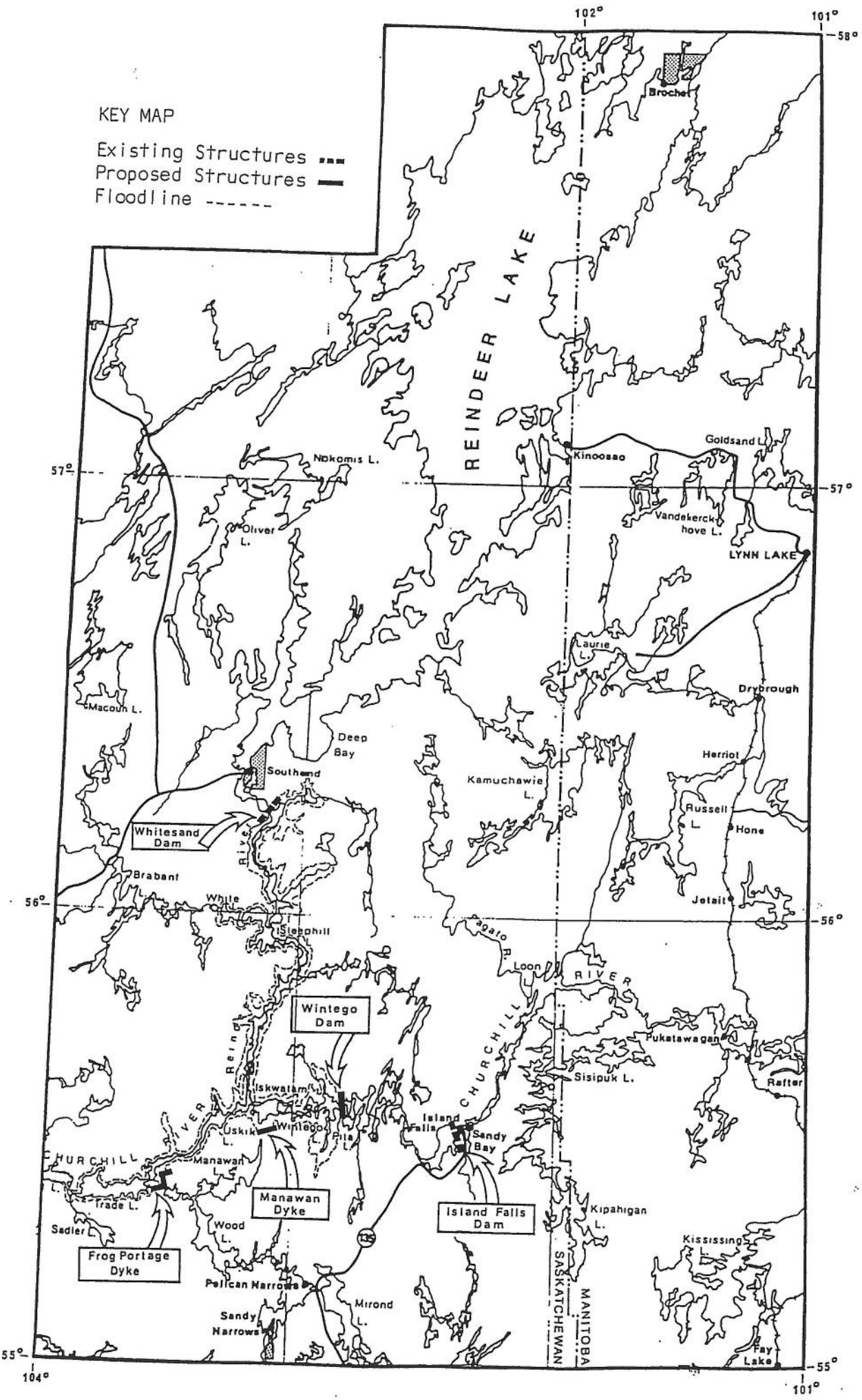
3.0 Conclusions and Recommendations

✓ Particularly in light of the marginal power benefits provided by the full regulation of Reindeer Lake by the Whitesand Dam, every effort should be made to mitigate the effects of the construction and operation of the combined Island Falls developments on fisheries, wildlife, lands, navigation, transportation, water quality, human health and other considerations, in or nearby the Churchill River downstream of Island Falls and in or nearby Reindeer Lake above the Whitesand Dam, including the adoption of a water regime intended to restore near-natural seasonal water flow conditions.

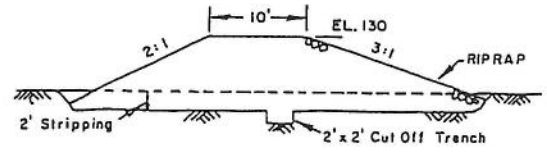
✓ The Saskatchewan Power Corporation should obtain Manitoba licences under the *Water Power Act* and the *Water Rights Act*, or enforceable instruments substantially similar to such authorizations, and that the terms and conditions of such licences should establish operating constraints reflecting the objectives of the May 1, 1998 Modified Water Regime proposal.

✓ Saskatchewan, Manitoba, the Saskatchewan Power Corporation and Manitoba Hydro should arrive at an agreement for the sale of power by Manitoba Hydro to "make up" any reduction in power production at Island Falls resulting from the Modified Water Regime.

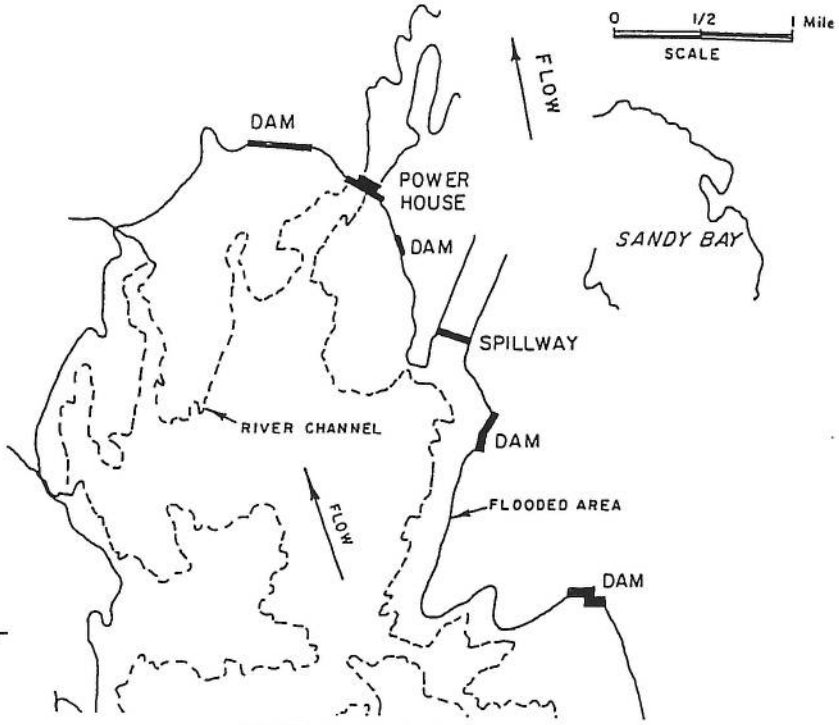
✓ The successful implementation of the proposed Modified Water Regime for Reindeer Lake and the Churchill River between Island Falls, Saskatchewan and Granville Falls, Manitoba will require the leadership and full commitment of both the province of Manitoba and Manitoba Hydro.


KEY MAP
Existing Structures
Proposed Structures
Floodline
102°
101°
58°
57°
56°
55°
104°
REINDEER LAKE
Brochet
Goldsand L.
Kinoosao
Nokomis L.
Oliver L.
Vandekerckhove L.
LYNN LAKE
Laurie L.
Drybrough
Macoun L.
Deep Bay
Southend
Herriot
Kamuchawie L.
Russell L.
Hone
Whitesand Dam
Brabant
White
Sleeghill
Jetait
Loon
RIVER
Wintego Dam
Pukatawagan
Sisipuk L.
Rafter
Iskwatam
Uskik L.
Wintego L.
Pila L.
Island Falls
Sandy Bay
Manawan L.
Manawan Dyke
Island Falls Dam
Kipahigan L.
Trade L.
Sadler L.
Wood L.
Frog Portage Dyke
Pelican Narrows
Mirond L.
Sandy Narrows
Kississing L.
SASKATCHEWAN
MANITOBA
Fay Lake

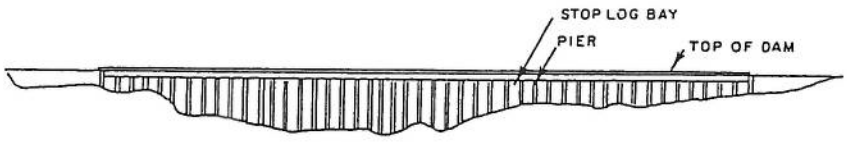
Details of Island Falls Hydro-Electric Development



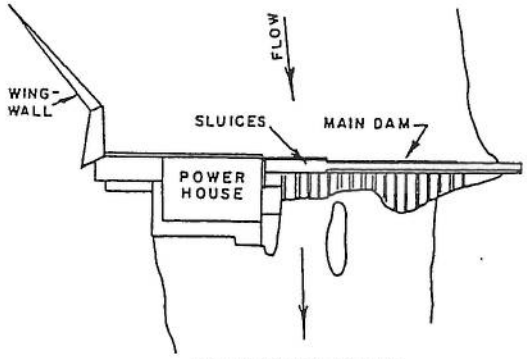
TYPICAL SECTION THROUGH EARTH FILL DAM



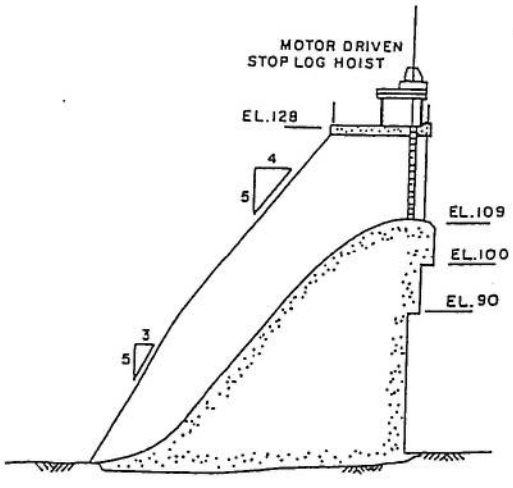
GENERAL LAYOUT



SPILLWAY ELEVATION

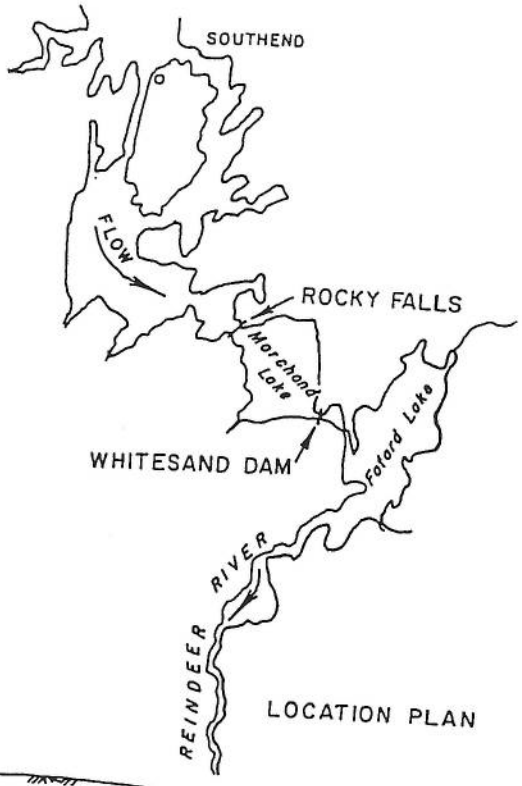


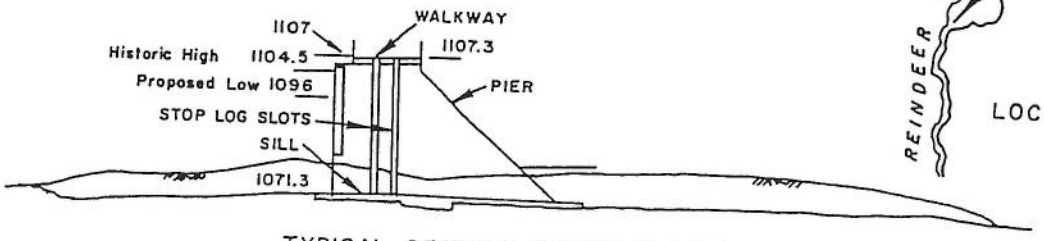
MAIN DAM LAYOUT



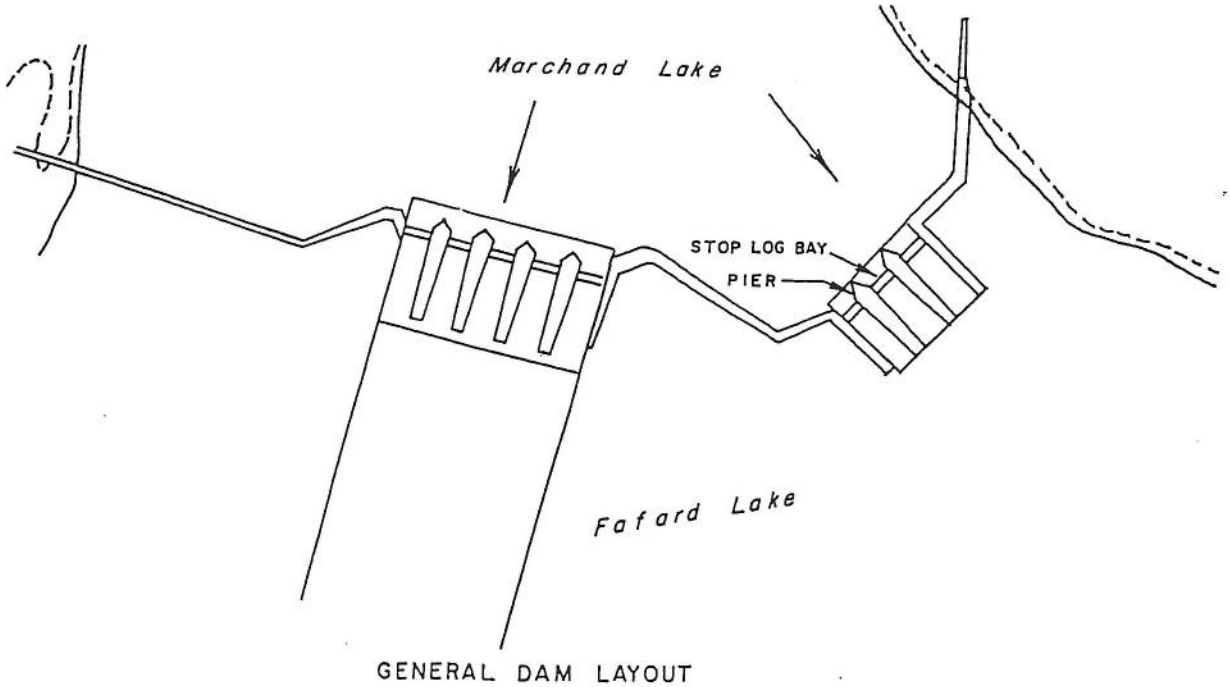
SECTION THROUGH POWER SPILLWAY

Location and Details of
Whitesand Dam





TYPICAL SECTION THROUGH DAM



GENERAL DAM LAYOUT

Mathias Colomb Cree Nation / Barren Lands First Nation

SaskPower Negotiations

A Proposal for Modified Water Regime Management of the Reindeer Lake, the Reindeer River, and the Churchill River

Prepared by:

UNIES Ltd.
Consulting Engineers
1666 Dublin Avenue
Winnipeg, MB R3H 0H1

Prepared for:

Mathias Colomb Cree Nation
Missinippi River
(Pukatawagan), MB R0B 1G0

- and -

Barren Lands First Nation
Brochet, MB R0B 0B0

April 29, 1998

I. HISTORICAL HYDROELECTRIC WATER REGIME MANAGEMENT

A. SETTING

Manipulation of the Natural Water Regime has been taking place on the Churchill River since the start of construction of the Island Falls Generating Station in 1928, and on Reindeer Lake and the Reindeer River since the start of lake outlet control in 1937.

The style of hydroelectric management of the Reindeer Lake, Reindeer River, and Churchill River water regimes has changed over the years as:

1. Power and energy requirements have gradually increased.

2. The original electricity generating and water control equipment has been replaced, upgraded, or added to.

3. The original isolated electrical network has been connected with the overall North American network.

4. Capability for forecasting electricity demands and the system's water supplies has gradually improved.

SaskPower has owned the hydroelectric system since 1981 and has operated it in a consistent way since then. Interpretation of water regime records indicates that the hydroelectric management acts from day to day according to its long- and short-term expectations of water availability in the Reindeer/Churchill basin, making use of its water control capabilities at the Whitesand Dam and the Island Falls Generating Station to adjust Churchill River flow rates to pursue its hydroelectric objectives. The water regime which is imaged in the hydrometric data record is consistent with Reindeer/Churchill system operation in which:

1. The underlying objective of present system operations is to maximize the total amount of energy produced over periods of years.

2. (a) Winter energy is worth a little more than summer energy.

   (b) When there is not enough water in the rivers and lakes of the basin (especially Reindeer Lake) to make maximum energy all year, there is a tendency for more energy to be produced in winter than in summer.

3. (a) Production of short term power at Island Falls is not very important to SaskPower. The combination of the Island Falls forebay reservoir and the installed generation equipment is not a highly favourable configuration for peaking power production. Other parts of SaskPower's generating system are used more for satisfying the minute-by-minute changes in demand for power in Saskatchewan.

(b) Island Falls power produced during the day is worth a little more than the power produced at night.

(c) When there is not quite enough water flowing in the Churchill River near Island Falls to make maximum power all day, there is a tendency for more power to be made during the day and less at night.

Because there is much in nature which is variable and not completely understood, and therefore cannot be predicted closely, the outcome of the hydroelectric system management by its operators varies from year to year. Some of the basic effects of the hydroelectric operation recur often and some only occasionally. The most recent few years of hydroelectric regulation of the Reindeer/Churchill system have included widely ranging and representative examples of natural outcomes in the basin and the resulting hydroelectric water regime management responses.

B. SUMMARY OF MAJOR HYDROELECTRIC WATER REGIME IMPACTS

1. Reindeer Lake

(a) The water level has been raised permanently.

(b) Normal range of water levels has been increased - greater difference between high water and low water.

(c) Maximum rate of change of water level has been increased - can rise faster and drop faster during the year.

(d) Seasonal timing has been shifted - annual high water up to one or two months later in the year.

(e) Other unusual occurrences with non-natural operational responses, from time to time.

2. Churchill River

(a) Seasonal timing has been radically shifted:
- ► frequently: up to a seasonal reversal: lower flows and water levels in summer, higher flows and water levels in winter.
- ► commonly: relatively similar flows and water levels all year.

(b) Long-term average water levels and flow rates are almost the same (possibly a little different due to increases and decreases in summer evaporation losses in different parts of the system).

(c) Normal range of water levels and flow rates has been decreased:
- ► smaller difference between high and low water.

(d) Normal or moderate floods and droughts have been decreased in severity.

(e) Extreme floods and droughts have been increased in severity.

(f) Maximum rate of change of water level has been increased:
- ► can rise faster and drop faster over periods of hours, days and months, at any time during the year.

(g) Other unusual occurrences with non-natural operational responses, from time to time.

Water regime impacts of Reindeer/Churchill system operation on hydroelectric generation are readily estimable.

Water regime impacts of system operation on a wide spectrum of resource and environmental phenomena along the Reindeer Lake, Reindeer River, and Churchill River basin corridor are not as easily quantified.

II. WATER REGIME MANAGEMENT OPTIONS

A. REGULATION TO PRESENT HYDROELECTRIC REGIME
(regulation of Reindeer Lake to smooth seasonal energy generation)

- High degree of benefit toward SaskPower: Reindeer Lake reservoir supports objective of maximizing annual kWh output.

- Raised Reindeer Lake level and volume results in shoreline and biota impact.

- Larger-than-natural water-level range means more logistical problems for lake users.

- Downstream rivers experience high winter flows/levels, low summer flows/levels, removal/reversal of natural seasonal pattern, and more frequent and rapid fluctuations, with attendant problems, including significant impacts to shoreline and biota, as well as logistical problems for river users.

- No flood control benefit with reservoir at full supply level condition (attempt to maintain reservoir within operating range could create or worsen downstream flood).

- No drought control benefit with reservoir at minimum supply level condition (attempt to maintain reservoir within operating range could create or worsen downstream drought).

B. REGULATION TO NATURAL WATER REGIME

(equivalent to no regulation of Reindeer Lake outflow rates)

- High degree of benefit toward First Nations could be assumed: i.e., state of nature, higher summer levels and lower winter levels on rivers, usually lower rates of change in all seasons.

- Mitigation of logistical problems for lake and river users attributed to water flow regulation [scheme A] could be assumed.

- Mitigation of shoreline and biota impacts attributed to water flow regulation [scheme A] could be assumed.

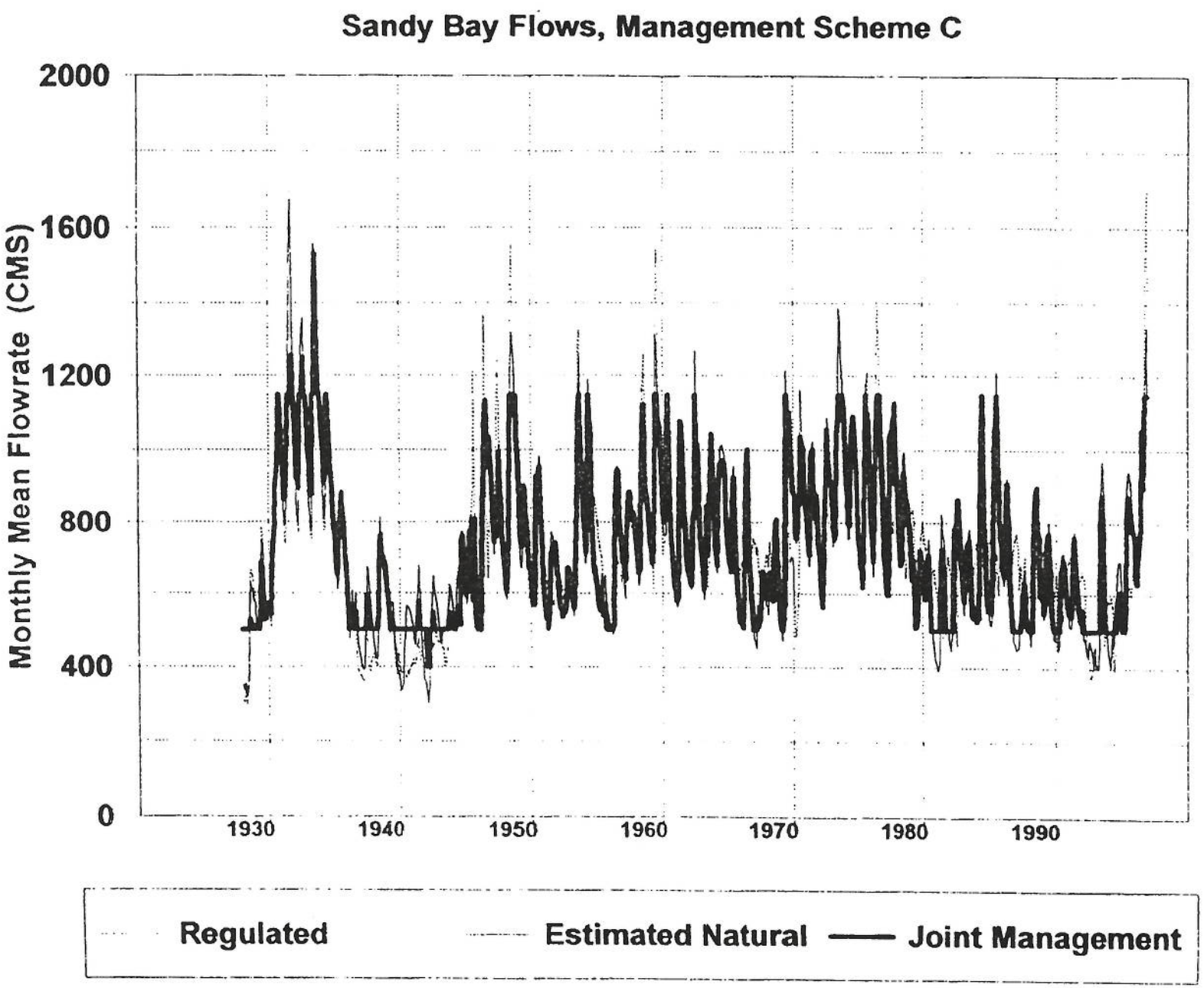
- Smaller range of levels on Reindeer Lake, probably lower average levels.

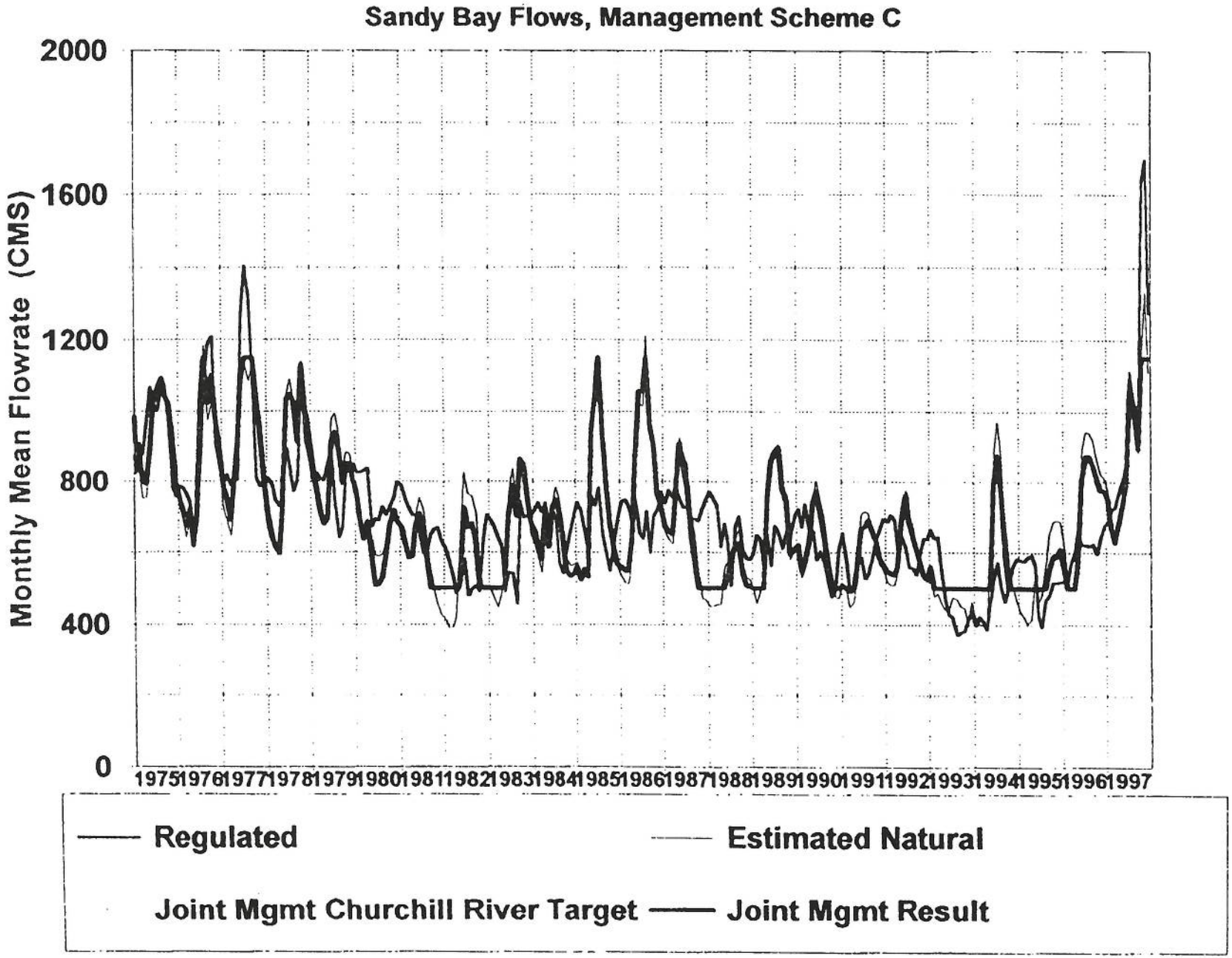
- Low winter level may cause water supply system problems on Churchill River.

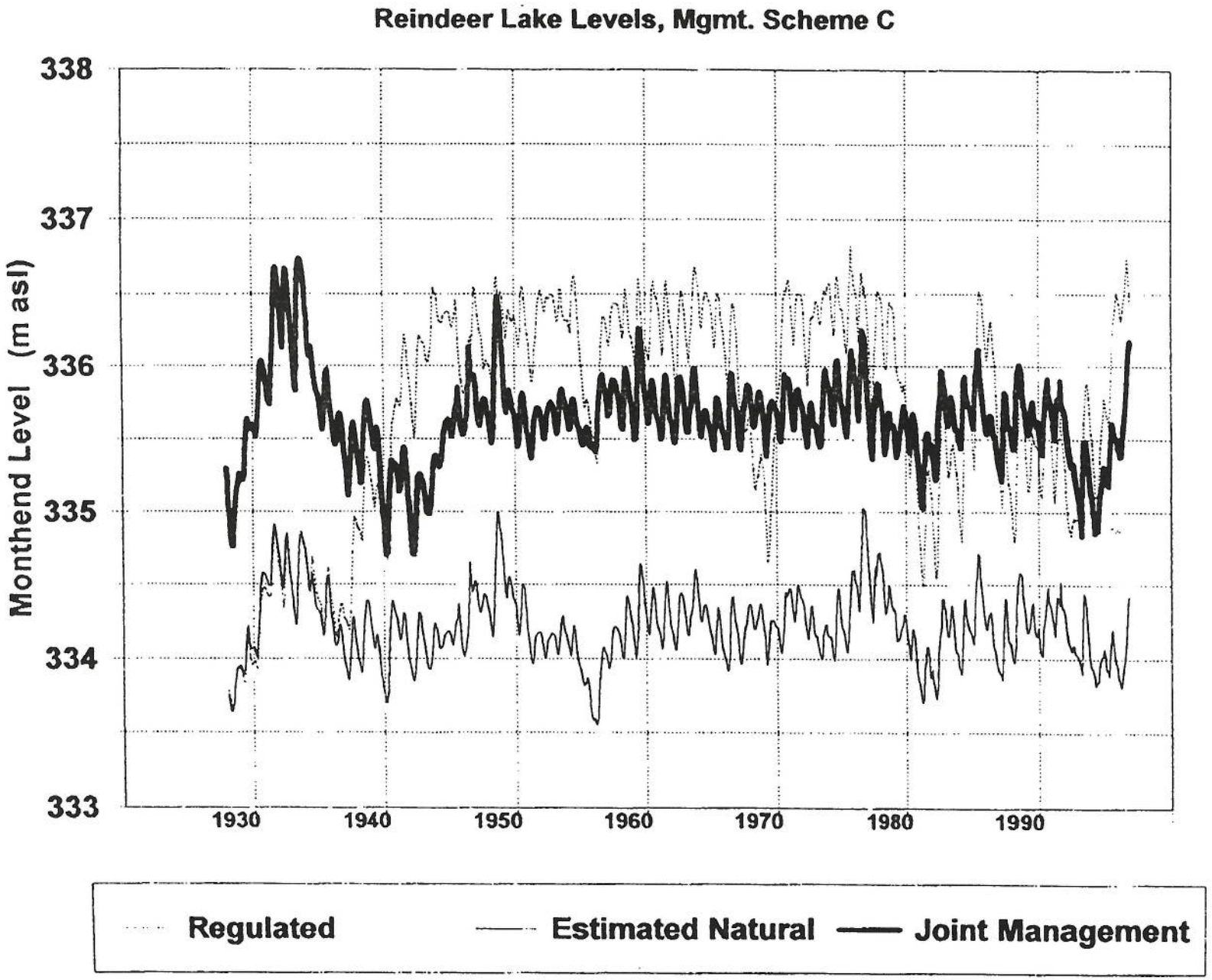
- No hydro-electric benefits beyond natural flow pattern attributable to Reindeer Lake reservoir.

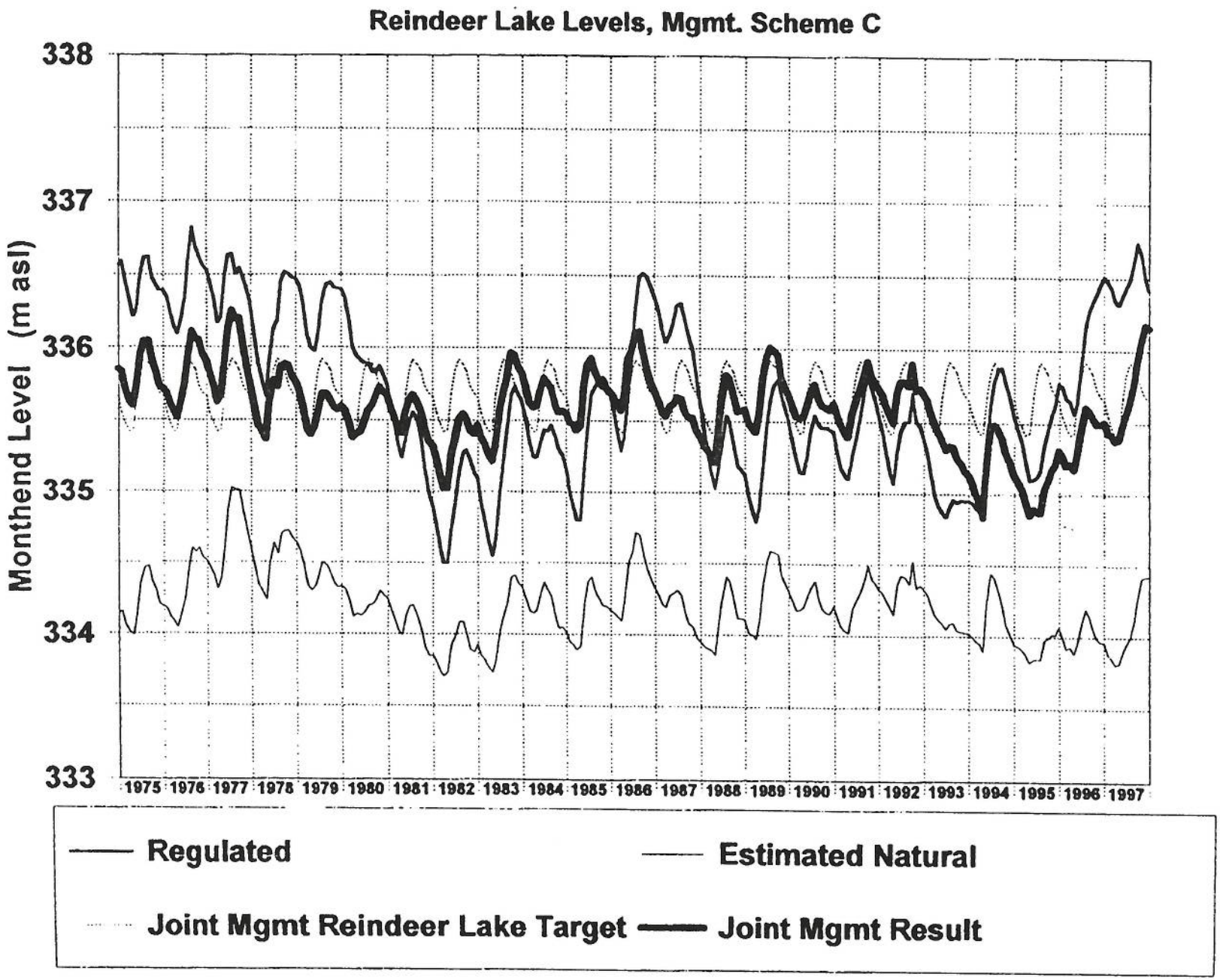
- Some water passes generating site during higher flow periods without yielding energy that may otherwise have been generated through rescheduling of flows.

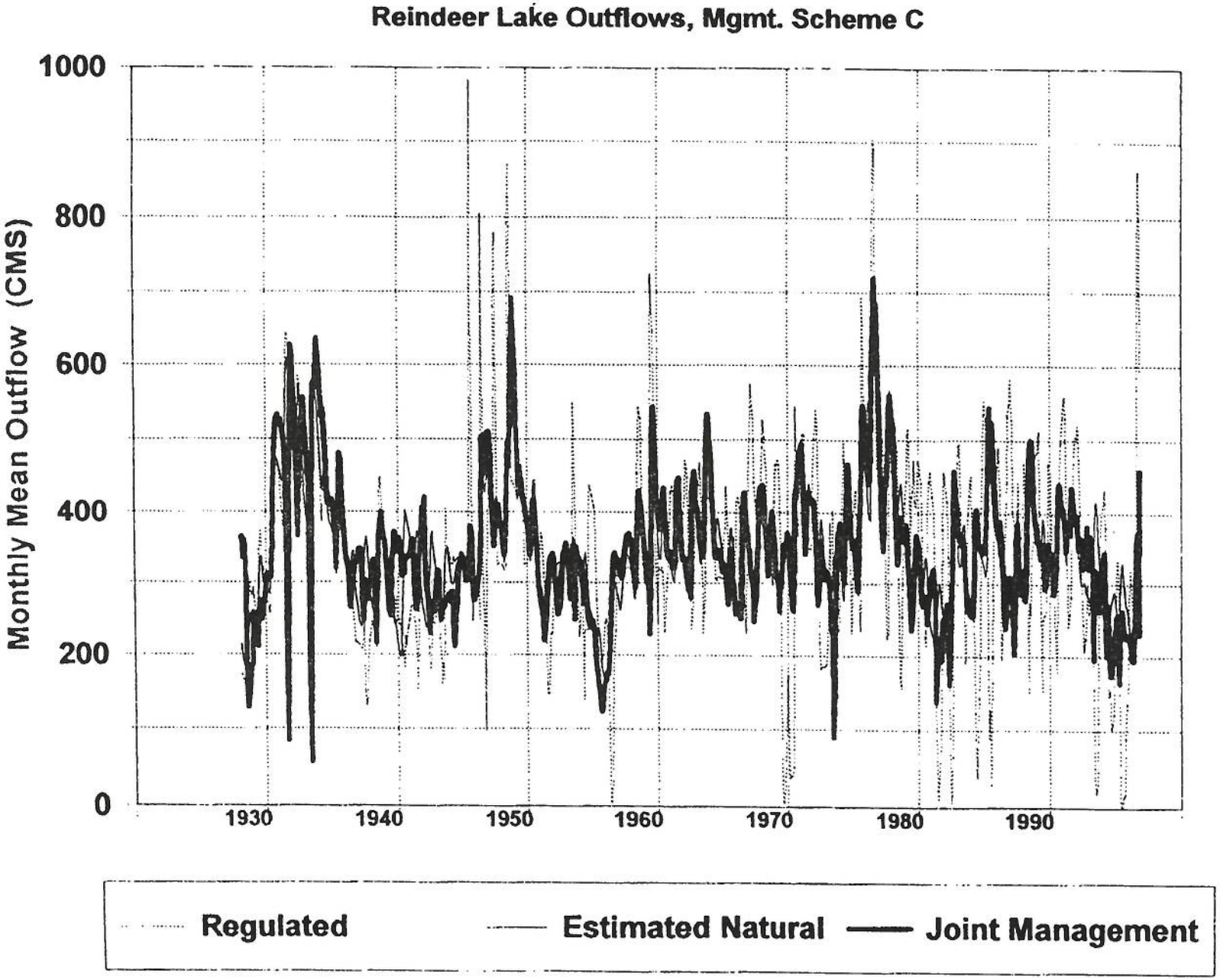
- No flood-control benefit other than natural attenuation.

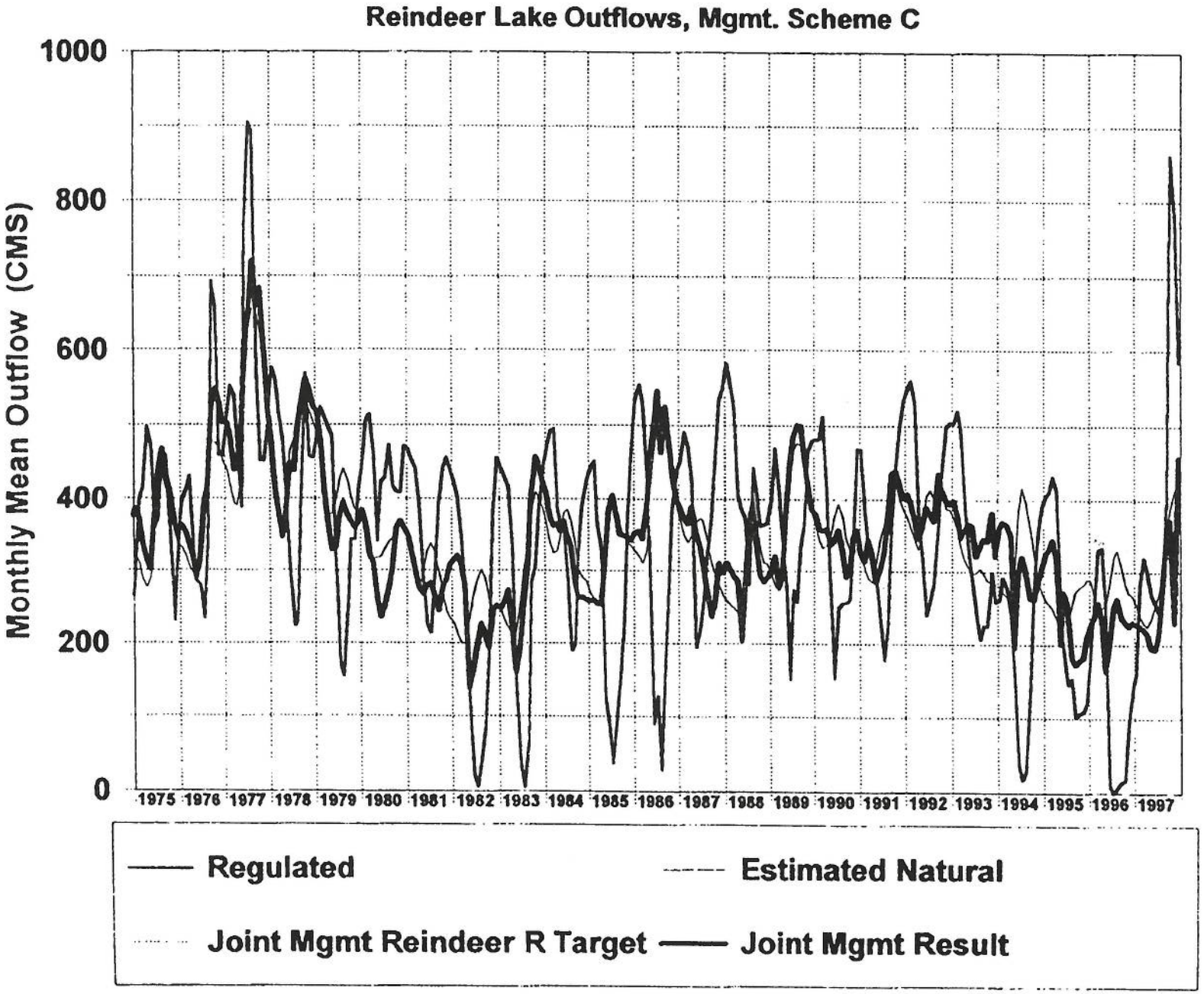

Sandy Bay Flows, Management Scheme C
Monthly Mean Flowrate (CMS)
2000
1600
1200
800
400
0
1930
1940
1950
1960
1970
1980
1990
Regulated
Estimated Natural
Joint Management


Sandy Bay Flows, Management Scheme C
Monthly Mean Flowrate (CMS)
2000
1600
1200
800
400
0
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997
Regulated
Estimated Natural
Joint Mgmt Churchill River Target
Joint Mgmt Result


Reindeer Lake Levels, Mgmt. Scheme C
Monthend Level (m asl)
338
337
336
335
334
333
1930
1940
1950
1960
1970
1980
1990
Regulated
Estimated Natural
Joint Management


Reindeer Lake Levels, Mgmt. Scheme C
Monthend Level (m asl)
338
337
336
335
334
333
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997
Regulated
Estimated Natural
Joint Mgmt Reindeer Lake Target
Joint Mgmt Result


Reindeer Lake Outflows, Mgmt. Scheme C
Monthly Mean Outflow (CMS)
1000
800
600
400
200
0
1930
1940
1950
1960
1970
1980
1990
Regulated
Estimated Natural
Joint Management


Reindeer Lake Outflows, Mgmt. Scheme C
Monthly Mean Outflow (CMS)
1000
800
600
400
200
0
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997
Regulated
Estimated Natural
Joint Mgmt Reindeer R Target
Joint Mgmt Result

C. MANAGEMENT OF WATER REGIME TO MULTIPLE OBJECTIVES

(Examples C1, C2 and C3: regulation of Reindeer Lake to approximate natural flow and level patterns in the Reindeer/Churchill system where possible, with mitigation of extreme natural Churchill River water supply conditions, namely low water and high water.

- Benefit to the Barren Lands First Nation: near-natural pattern of seasonal lake level fluctuations within historical reservoir operating range. Mitigation of logistical problems for lake users attributed to water flow regulation [scheme A] could be assumed. Mitigation of shoreline and biota impacts attributed to water flow regulation [scheme A] could be assumed.

- Benefit to the Mathias Colomb Cree Nation: near-natural seasonal pattern with moderated dry- and wet-period flows, no worsening of floods and droughts due to regulation. Mitigation of logistical problems for river users attributed to water flow regulation [scheme A] could be assumed. Mitigation of shoreline and biota impacts attributed to water flow regulation [scheme A] could be assumed.

- Benefit to SaskPower: regulation to increase low flows toward full Island Falls generating capacity.

1. <u>Components of Multiple-Objective Regulation Scheme</u>:

(a) Release estimated near-natural flows from Reindeer Lake, and operate the Lake toward a selected, near-natural, seasonal pattern about 1.5 m above the natural average level (e.g. target mean at 335.68 m asl, with annual range 0.5 m). The result is near-natural variations on the Lake and flows and levels on the Reindeer and Churchill Rivers, subject to multiple-objective adjustments as follows:

(b) River mitigation target: minimum and maximum Churchill River flows (e.g., 500 & 1150 cubic metres per second at Sandy Bay). Reindeer Lake is used to store excess or provide make-up water; the Lake's WL range increases sometimes). This operating range is maintained unless doing so would require exceedance of lake-mitigation target.

(c) Lake mitigation target: minimum and maximum Reindeer Lake levels (334.68 & 336.68/336.38/336.08 [C1, C2 and C3] metres above sea level [schemes C2 and C3 include implementation of Reindeer Lake high water mitigation objectives]). This operating range is maintained unless doing so would require exceedance of extreme-release target.

(d) Extreme-release target: Churchill River high flows always no higher than corresponding estimated natural highs, low flows no lower than corresponding estimated natural lows.

D. COMPARISON OF WATER MANAGEMENT REGIMES - SYNOPTIC VALUATION OF HYDROELECTRIC BENEFIT

	Actual SPC data	Water Management Regime A.	B.	C1.	C2.	C3.
Estimated generation potential: (average 1982-96)						
Net GWh/y	688.6	690.4	668.7	674.3	674.3	674.2
%	---	100.0	96.9	97.7	97.7	97.7
Generation Benefit Comparison: (average 1982-96) @ 0.055/0.05 /kWh winter/summer						
$M/year	---	36.31	34.95	35.28	35.28	35.27
%	---	100.0	96.2	97.2	97.2	97.1

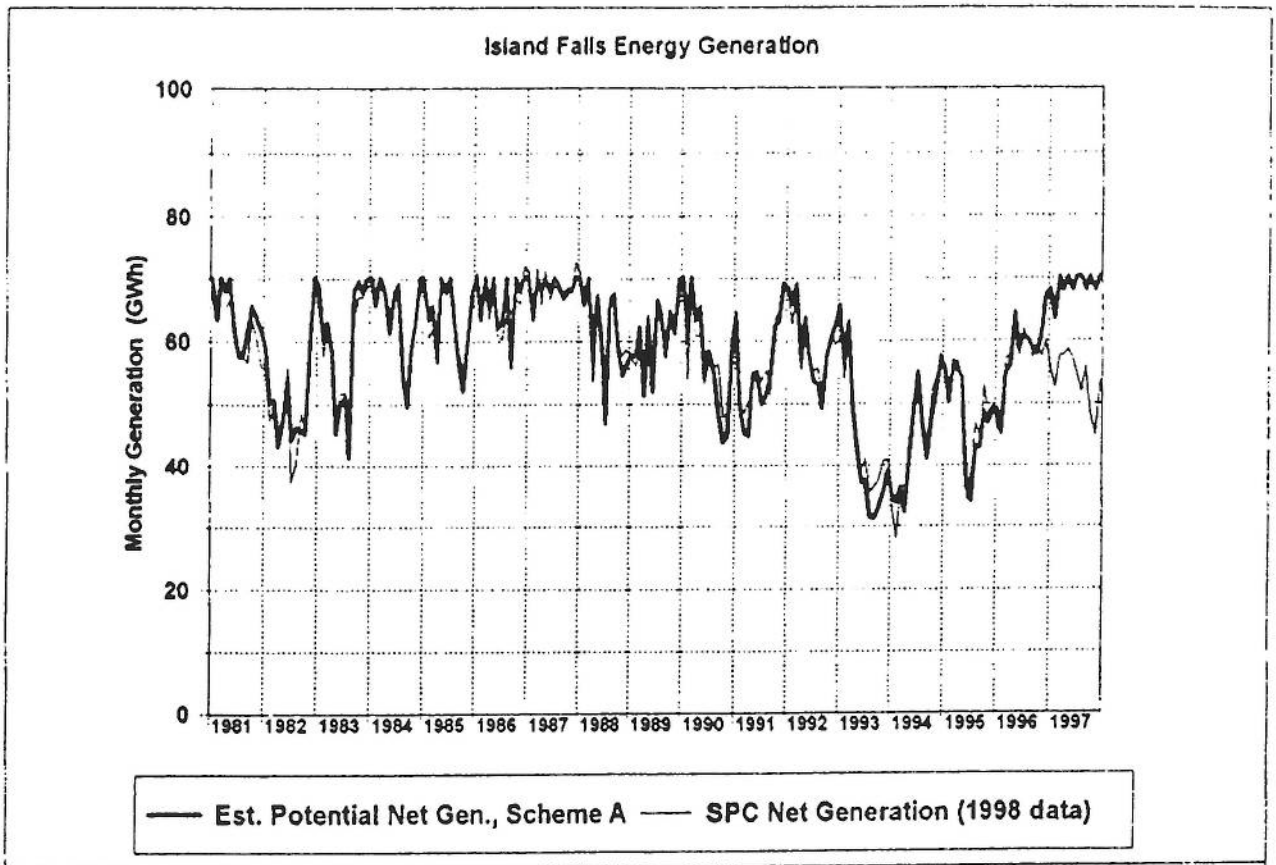
For average total energy production potential at the Island Falls Generating Station with 1982-1996 hydrologic conditions, there is estimated to be approximately a three percent difference between the total production potential with present hydroelectric operation and the total production potential with uncontrolled Reindeer Lake releases (B vs A). With winter energy worth more than summer energy (e.g., 10% assumed in example), loss of energy production revenue with summer-high, winter-low flows is greater (near four percent for uncontrolled Reindeer Lake outflows).

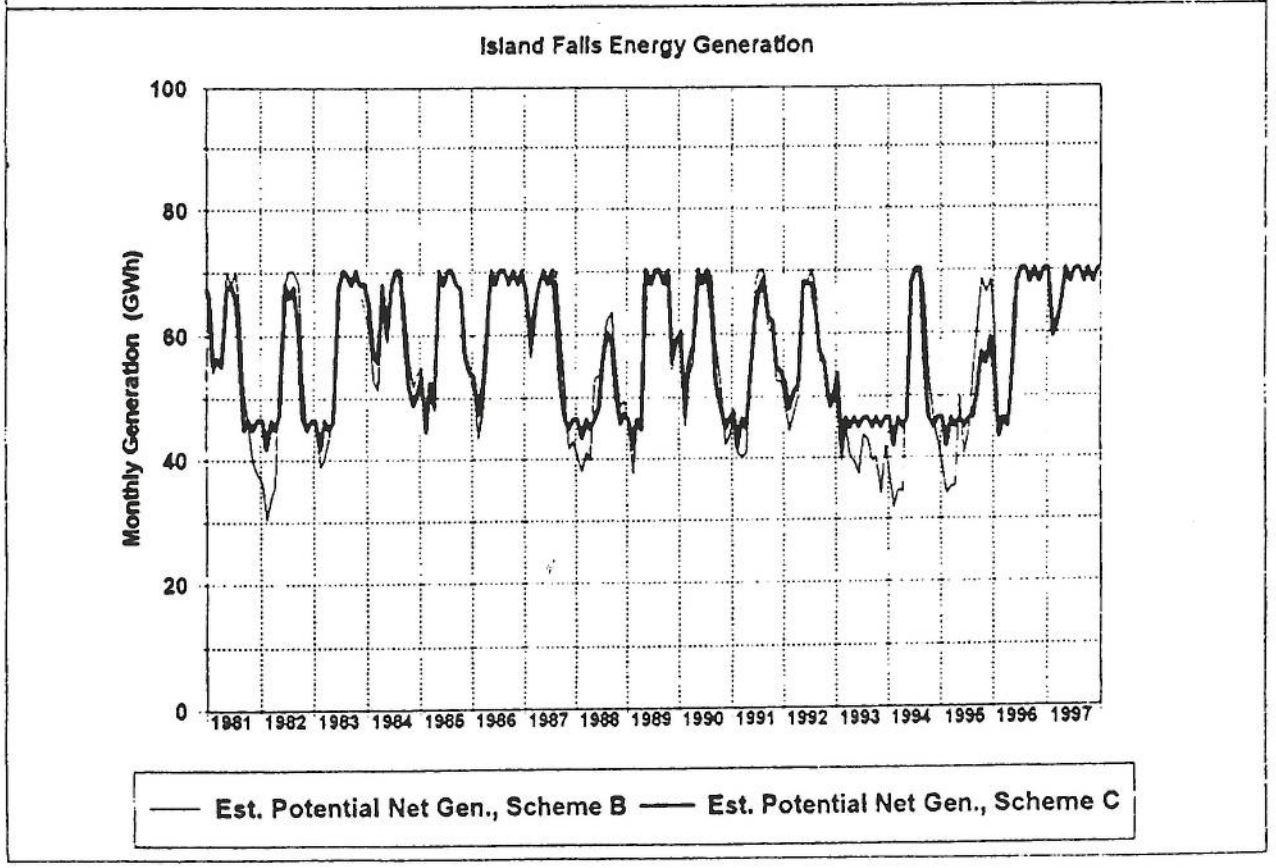
Regulation to multiple objectives including mitigation of low flows as in the scheme C variations results in an intermediate level of hydroelectric benefit because of the mitigation of low flows associated with the unregulated situation (B). Other workable schemes with similar benefit could also be defined. Actual results of regulation to multiple objectives would depend on the multiple-objective constraints applied during system operation. Constraints and operating philosophy would be established by agreement among the regulating parties.

Arrangements to enhance coordinated operations with Manitoba Hydro may be considered in order to ensure that the generation benefits noted above [B and C1, C2 and C3] can be obtained, particularly in light of the potential for relative increases in summer generation under Schemes B and C1, C2 and C3. Examples of these arrangements are for seasonal interchange between SaskPower and Manitoba Hydro and/or "storage" of SaskPower summer generation in the Manitoba Hydro system reservoirs for return to SaskPower in the winter.

In addition, given the degree of interconnection between the SaskPower and Manitoba Hydro systems, the modest reduction in average annual generation under Schemes B and C1, C2 and C3 could be accomodated through energy purchases by SaskPower from Manitoba Hydro, should similar low-cost energy production be unavailable from the SaskPower system.

The attached figures illustrate the general outcome of modified water regime management scheme C and its seasonal behaviour on the Churchill River, Reindeer River, and Reindeer Lake. The three variations of scheme C noted above, C1, C2 and C3 produce similar Reindeer and Churchill River seasonal patterns of flow and level, as well as similar energy production potential at Island Falls. The variations C2 and C3 reduce the frequency of occurance of moderately high Reindeer Lake levels. Further discussion of Reindeer Lake high water considerations is the subject of the attached commentary.


Island Falls Energy Generation
Monthly Generation (GWh)
100
80
60
40
20
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997
Est. Potential Net Gen., Scheme A
SPC Net Generation (1998 data)


Island Falls Energy Generation
Monthly Generation (GWh)
100
80
60
40
20
0
1981 1982 1983 1984 1985 1986 1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997
Est. Potential Net Gen., Scheme B
Est. Potential Net Gen., Scheme C

Comment on High Water Considerations at Reindeer Lake

SaskPower is looking for a "take line" or easement at elevation 338.0 m asl. This elevation results from the assumed simultaneous occurrences of a once-in-100-year "flood" (i.e., high lake level) and a once-in-5-year wind. Because it is understood that a high water condition in the watershed and a high wind would be almost independent occurrences, their joint occurrence could be considered to have a probability of exceedance of 1/100 * 1/5, or 1/500, the so-called once-in-500-year event. The 100-year high water level has been estimated by SaskWater to be approximately 337.0 m and the additional effect of the 5-year wind and waves is estimated to be approximately 1.0 metre, for a total of 338.0 m.

The attached Figure 1(a) illustrates the past history of annual high water levels on the lake. With full reservoir supply level (FSL) at 336.68 m asl, it can be seen from the frequency analysis that, prior to the mid-1970's interconnection of the Island Falls system with the Manitoba Hydro and North American electrical grids, system operators kept the reservoir nearly full most of the time. Since that time, multi-year use of Reindeer Lake's storage capacity has been more common with close to half the years having seen a nearly full reservoir at some time during the year, while in just over half the years the highest water level achieved was lower than 336.0 m asl, or more than 60 cm or 2 feet below the full supply level.

Under the assumption that the latter period of operation is relatively similar to the expected future SaskPower operation of Reindeer Lake for hydroelectric purposes, the figure indicates that the 1% annual exceedance level (the 1:100 year event) should be almost 337.0 m asl, the level suggested by SaskWater. This makes sense in association with the presently applied upper reservoir limit of 336.68 m for this large lake; when conditions cause levels to exceed this maximum, operational effort is focussed upon returning the level to within its normal operating range below 336.68 m. A reservoir surcharge of 0.32 metres would be expected to be highly infrequent in the case of Reindeer Lake.

The additional one metre above 337.0 m, estimated by SaskWater, would be due to wind setup and wave runup. Wind setup depends upon wind speed, depth of the water, and the fetch or length of the water surface over which the wind is blowing. In Reindeer Lake, the possible fetch is broken up by many islands, peninsulas, and the wandering path of the shoreline. An estimate of theoretical wind setup for a maximum once-in-five-year occurrence at Brochet would be somewhere between 0.05 and 0.26 metres. During the years 1991 through 1997 most of the noticeable wind setup events at Brochet were actually setdown events because the tendency for a sustained northerly wind is much greater than for a southerly wind at this location. The largest observed event during the period was a two-day/two-day setdown/recovery incident in August of 1995 with the average water level on the second day of setdown reaching 0.13 metres below the prevailing level at the time.

The conclusion to be drawn from the above calculation and observation is that wind setup is not a significant factor for water level behaviour on Reindeer Lake in comparison to other factors such as either outflow regulation over a two-metre, multi-year range, or wave runup. The latter, in the Reindeer Lake context, is assessed below.

Wave heights near Brochet would depend mainly on wind speed and fetch. For a five-year wind at the north end of the lake estimated from historical records to be near 56 km/h, maximum open-water wave heights of 1.0 and 2.0 metres would be estimated for fetches of about 8 and 40 km, respectively. The shorter distance of open water would be more representative for the Brochet Bay area, a much longer clear path for the full development of waves being absent in this part of the lake. If it is assumed the one-metre wave contacts portions of shoreline sloping at 1:10 and 1:4, the additional runup beyond the top of the open-water wave would be estimated to be 0.5 and 1.3 metres, respectively.

The conclusion to be drawn from the above approximate analysis is that the 1.0 metre allowance by SaskWater for wave runup in Reindeer Lake would not be considered to be overly conservative, and therefore the promotion of 338.0 m for a "take" or severance line on Reindeer Lake by SaskPower could be considered to be about right from a theoretical perspective, under the assumption of a continuation of the present style and range of reservoir operation for hydroelectric purposes [scheme A].

A different requirement for emergency water storage on lands lying adjacent to Reindeer Lake would be expected as a consequence of an alteration to the Reindeer Lake regulated water regime. In other words, and for example, if the expected one-in-100-year high water level was raised or lowered due to the way in which the reservoir was operated, then the calculated severance line elevation would be correspondingly raised or lowered. The expected additional effects of wind and waves superimposed upon the static regulated water surface would not be materially changed by any reasonable change in water level and seasonal pattern.

As an example, for proposed modified management scheme C1, discussed in the Modified Water Management Regime proposal, the expected one-in-100-year high water exceedance level, as illustrated in Figure 1(a), would be near 336.75 m asl, a reduction from that expected with the present operating regime. The scheme as shown effects a general reduction of high water conditions on Reindeer Lake, except under sustained, unusually high, basin water supply conditions such as were actually experienced over a several-year period in the early 1930's. Although rare and only encountered once within the 70-year historical record, such conditions should be expected to recur, perhaps more often than once every 100 years, perhaps less often.

Scheme C1, set-up to run in the context of the present hydroelectric operating range of the lake (334.68 to 336.68 m), would be a successful plan under most conditions, but would be less well-behaved under extreme hydrologic conditions - in an extreme drought or flood, the water could stay low or high, respectively, from one year to the next.

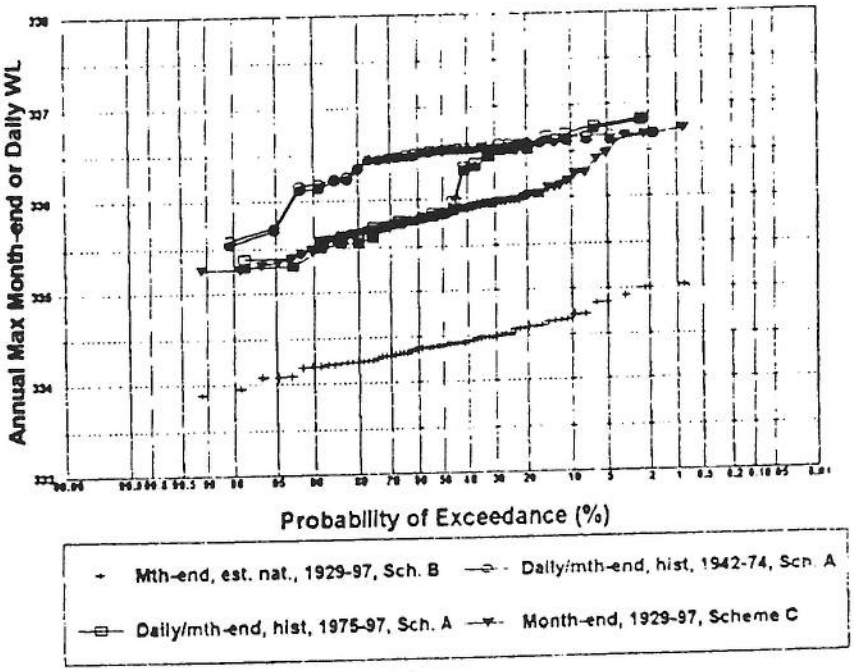
Other regulation schemes could be designed with specific features to mitigate occurrence of high Reindeer Lake levels or other undesired conditions. There are many possibilities for multiple-objective operation of the lake. Figure 1(b) exemplifies a few variations of Scheme C, each intended to reduce the amount of present lake-margin land needed for emergency water storage. In the figure are shown scheme C1, with reservoir full supply level (FSL) at 336.68 m asl, the current value, and two variations of the same operating plan with reservoir FSL set at 336.38 [scheme C2] and 336.08 [scheme C3] m asl, respectively.

Results indicate that only the highest peak water levels would be affected by the adopted high-water avoidance measures. Electrical energy generation under schemes C2 and C3 would be insignificantly affected in comparison to the outcome with scheme C1, according to the simulation results. The reason for this is the general correspondence between high Reindeer Lake levels and ample Churchill River flows for full energy production at Island Falls. In terms of total generation, this Scheme falls between that which would result from a natural pattern of lake outflows and that which would result from continued operation according to the present practice of SaskPower.

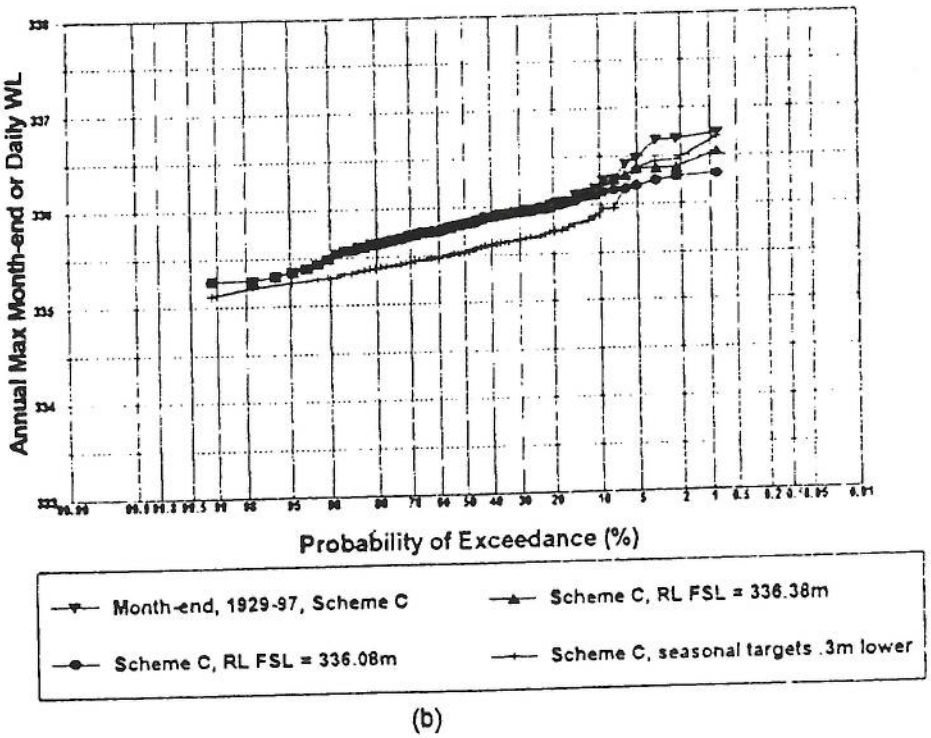
The fourth curve of Figure 1(b) represents the outcome of operation according to the target ranges and strategies of Scheme C1, but with the target average water level on Reindeer Lake set 0.3 metres lower than the 335.68 metre level adopted for scheme C1. In this case, most annual maximum water levels end up about 0.3 metres below those of Scheme C1. While the wet period of 1932-34 remains dominant, the approach slightly improves upon Scheme C1 for Reindeer Lake high-water mitigation.

The above examples indicate that regulation of Reindeer Lake could be managed in various ways to reduce high water levels on the lake, reduce the amount of present lake-margin land needed for emergency water storage and simultaneously produce hydroelectric energy. There are trade-offs between these three objectives, and there are also other interests and concerns which could reasonably be taken into consideration.

UNIES Ltd.
April 29, 1998



(a)



(b)

Figure 1 Reindeer Lake High Water Incidence with Modified Reservoir Operation:
(a) Historical and estimated natural regimes, and Joint Management Scheme C.
(b) Application of high water avoidance strategies.

HYDROLOGY (SASKATCHEWAN)

by

R. D. Hofer

Water Planning and Management Branch

Environment Canada

Regina, Saskatchewan

1975

FINAL REPORT 2

Edited by Judith Mitchell

Produced by J. S. Wilson

The Churchill River Study was undertaken jointly by Canada, Saskatchewan, and Manitoba to determine the social, economic, and environmental impact of a possible hydro-electric development on the Churchill River. An intergovernmental Board was established to provide overall management of the Study. The Board established a Study Office to supervise the project.

The Study was designed to permit various ecological components of the study area to be examined simultaneously by agencies, persons, or consultants selected by the Board. The Study Office has used the Final Reports of all Study Sectors in the preparation of the Board's Technical Report.

The present Final Report was prepared for the Churchill River Study Board. It is based on work that was financed (but not directed) by the Board. Therefore, any conclusions, recommendations, or opinions expressed herein must be attributed to the authors rather than the Board.

CHURCHILL RIVER STUDY

FINAL REPORT 2, 1975

HYDROLOGY (SASKATCHEWAN)

By R. D. Hofer

Abstract

The Island Falls hydro-electric plant on the Churchill River became operational in 1930. Records from that time to the present are available for the elevation of the water level in the reservoir behind the dam and the amount of water discharged below the dam. In order to regulate the flow of water discharged from Reindeer Lake through the Reindeer River into the Churchill River, dams were constructed at Rocky Falls in 1937 and 1938 and at Whitesand Rapids at the outlet of Reindeer Lake in 1942. Measurements of Reindeer Lake and the flow of the Reindeer River at Whitesand Dam are available from 1929 to the present. These measurements are referred to as the *recorded* or *historic* levels and flows. A computer simulation model was devised to reconstruct the *natural* levels and flows, which are those measurements that would have been observable at Whitesand Dam and Island Falls had no structures been built at the outlet of Reindeer Lake.

The average recorded level of Reindeer Lake is 1101.3 feet; the average natural level is 1096.4 feet. The structures built in 1937, 1938, and 1942 raised the level of Reindeer Lake 4.9 feet. The average of the recorded *maximum* elevations of Reindeer Lake during the period of observation is 1103.88 feet. The extreme maximum elevation was 1104.6 feet.

The average recorded streamflow of the Reindeer River at the outlet of Reindeer Lake for the period 1929-1972 is 11,416 cubic feet per second; the natural flow for the same period has been calculated at 11,767 cfs.

The 1929-1972 average recorded streamflow of the Churchill River at Island Falls is 23,749 cfs; the natural flow has been calculated at 24,100 cfs.

At present, the average elevation of Wintego Lake is 1005 feet. The proposal by the Saskatchewan Power Corporation for a hydro-electric development at Wintego would raise this level 102 feet, creating a reservoir with a full supply level of 1107 feet above sea level. At this full supply level, 172 square miles of land (along the Churchill River up to Drinking Falls, along the Reindeer River, and along Reindeer Lake) would be flooded. If the full supply level were set at 1104.5 feet, a total of 112 square miles would be flooded; as this is the average maximum recorded level of Reindeer Lake, no additional flooding would occur on the shores of Reindeer Lake.*

Computer calculations for the period 1930-1972 show that the construction of a power station having a capacity of 300 megawatts at the Wintego site and the refurbishing of the existing Island Falls station to a capacity of 150 megawatts would produce 2400 million kilowatt hours annually. Without the Wintego development, refurbishing the Island Falls station from the present 100 megawatts to 150 megawatts would produce 850 million kilowatt hours annually.

The eight operational alternatives that were considered for each of the two proposals (refurbished Island Falls and Wintego) showed that the power produced by each was essentially the same. Because a reservoir elevation of 1107 feet (as opposed to one of 1104.5 feet) would produce only 0.5 per cent more power from a refurbished Island Falls plant and only 1.3 per cent more power from Wintego, it is recommended that future studies should adopt a maximum reservoir elevation of 1104.5 feet. This would prevent any additional flooding of Reindeer Lake and reduce the flooding along the Reindeer and Churchill Rivers.

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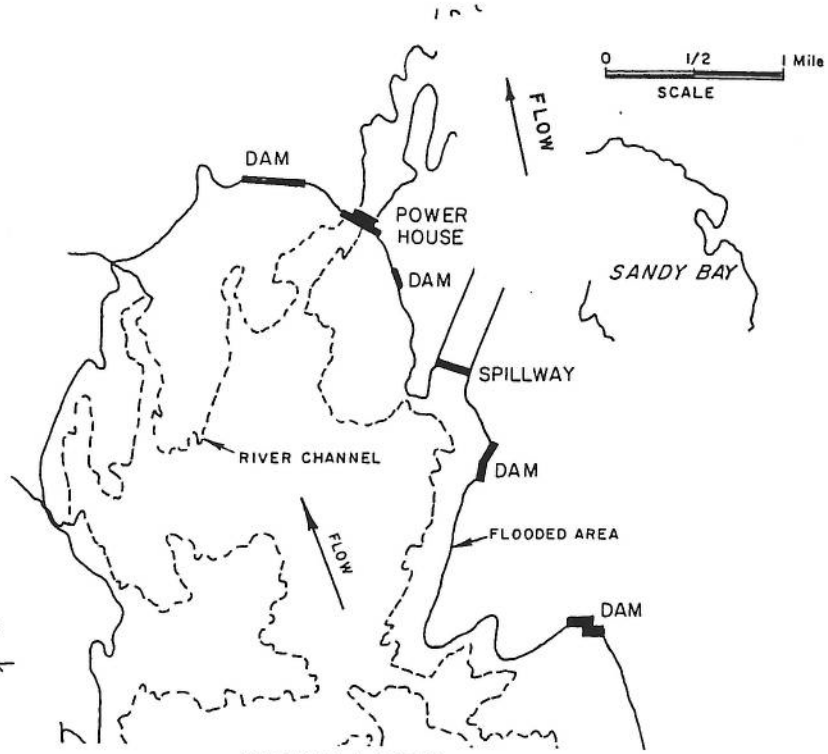
* As of April 1975 Saskatchewan Power Corporation has proposed that the full service level be stabilized at 1104.5 feet.

Streamflow patterns would be modified significantly from the natural and recorded regimes if either the refurbished Island Falls alternatives or the Wintego Proposal alternatives were operated strictly for power production. Under the natural and recorded regimes, streamflow peaks usually occur in July; under regulations for maximum power production, maximum discharges would be released during the winter.

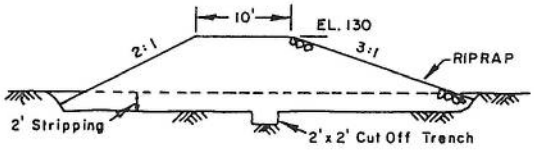
The Hydrology Study Sector used monthly time units. Other study sectors of the Churchill River Study, particularly the Fisheries and Wildlife Study Sectors, expressed their concern about daily streamflow fluctuations below the control structure.

Although the regulation proposals submitted by the Saskatchewan Power Corporation, Manitoba Hydro, and the Fisheries and Wildlife Study Sectors vary considerably, they produce approximately the same amount of power. Therefore, it should be possible to reach compromises in the regulation procedures that would be acceptable to all affected interests in the Churchill River Basin.

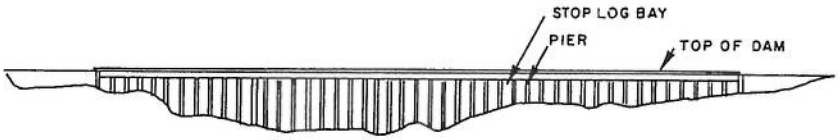
Details of Island Falls Hydro-Electric Development



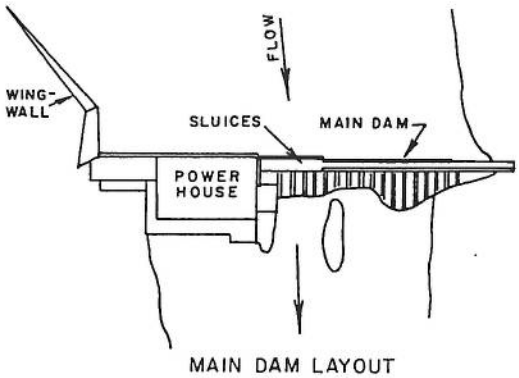
GENERAL LAYOUT



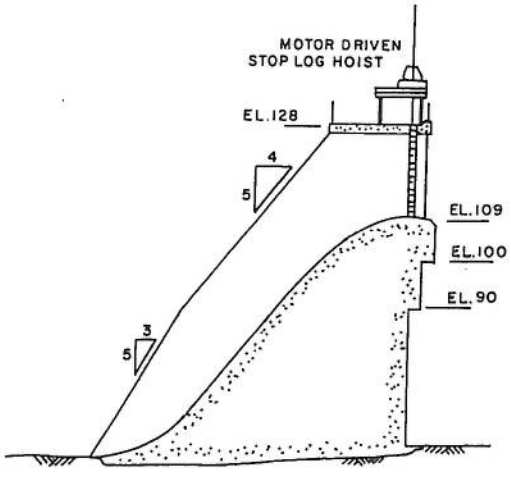
TYPICAL SECTION THROUGH EARTH FILL DAM



SPILLWAY ELEVATION

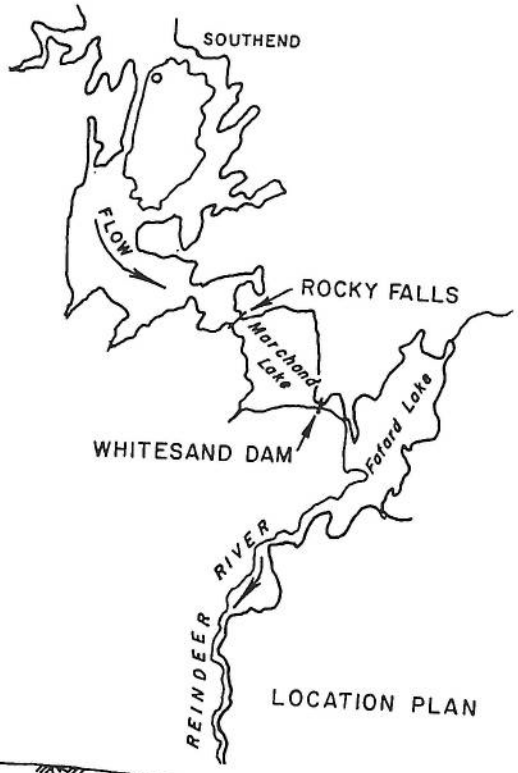


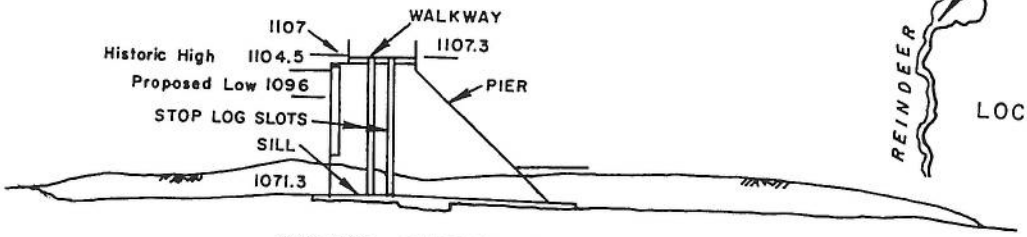
MAIN DAM LAYOUT



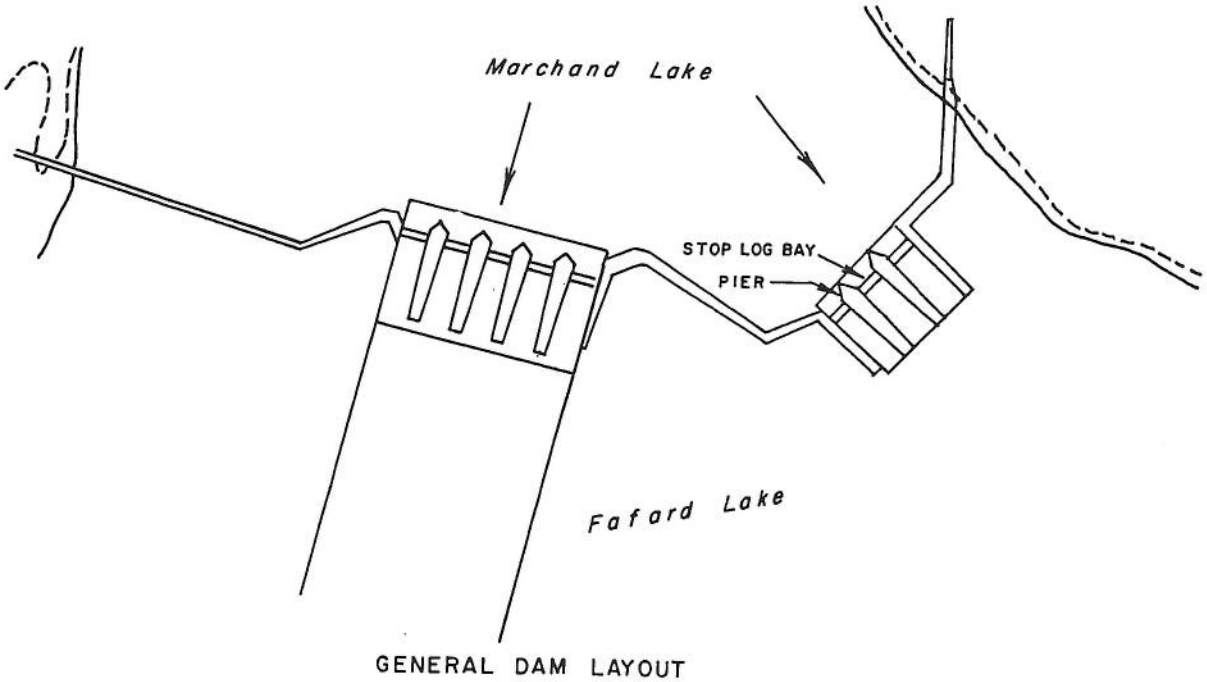
SECTION THROUGH POWER SPILLWAY

Location and Details of
Whitesand Dam





TYPICAL SECTION THROUGH DAM



GENERAL DAM LAYOUT

three 140,000 hp units and an installed capacity of 300 MW. The combination of the Wintego dam and a refurbished Island Falls generating station would provide 450 MW.

The main dam and dykes would be constructed of rock fill with an impervious core. The spillway structure would be 1073 feet long; at the full supply level of 1107, it would have a discharge capacity of 105,000 cfs through its four 40-foot gates.

3.5 LICENSING CONSIDERATIONS

Under existing water rights acts, all projects that control or use water must be licensed by the province in which the project is located.

3.5.1 Island Falls

The Island Falls generating station is the only hydro-electric plant on the Saskatchewan portion of the Churchill River. The station was licensed on April 1, 1931 in accordance with the Provisions of the *Saskatchewan Water Power Act 1931*. The license provides that after April 1, 1961, the province may expropriate the works on payment of compensation. After 1981 the works become the property of the province, again on due payment of compensation, although the CRPC may have the license extended if the extension is requested between April 1, 1975 and April 1, 1978. If the license is not going to be extended the CRPC must be notified before April 1, 1978.

The CRPC has applied for licenses for all improvements made to the Island Falls generating station and associated works since 1931. A record of the company's investments has been maintained, so that the province can determine the amount of compensation to be paid in the event that the development is expropriated.

3.5.2 Whitesand Dam

Whitesand Dam was licensed for the period December 1, 1941 to April 1, 1981. Because approximately 16 per cent of Reindeer Lake is in Manitoba, the dam was licensed in both Saskatchewan and Manitoba. The licenses have the same expiry date and expropriation provisions as the Island Falls generating station license.

3.5.3 Future Licensing

The Province of Saskatchewan must make a decision on the Island Falls generating station and Whitesand Dam before April 1, 1978, assuming that the CRPC will apply for an extension of the license. The Province of Manitoba will be very interested in this decision because of its commitment to divert a portion of the Churchill River streamflow to the Nelson River at Southern Indian Lake. This streamflow is closely related to storage regulation in Saskatchewan.

The recreational attractiveness and socio-economic stability of the Churchill River Basin partly depends on the maintenance of streamflow and lake level regimes that are conducive to fish and wildlife production. Any licensing of future developments or operational procedures will require a consideration of environmental concerns.

5.5.4 Power Production

Table 12 sets out the monthly mean power production of the 16 alternatives for the period 1930 to 1972. Alternatives 1 to 9 summarize the power production at Island Falls for the refurbished Island Falls arrangement. Alternatives 9 to 16 show the total power production of Island Falls and the Wintego dam. A summary table of the Island Falls power production within the Wintego arrangement is provided for comparison with the Island Falls power production within the refurbished Island Falls arrangement. Monthly percentages of annual power production are shown immediately below the monthly power values.

Maximum power production under the environmental alternatives would occur in July and August; under SPC simulations, maximum production would occur during November, December, and January. All Manitoba Hydro alternatives resulted in maximum power productions in December; monthly values, however, were fairly uniform from November to April.

In general, the amount of power produced at the Island Falls generating station is the same for all 16 alternatives. Alternative 3 produced the largest amount of power annually (870.4 MW), and Alternative 13 produced the smallest amount of power (845.8 MW). The difference between the power production of the two alternatives is only three per cent.

The Wintego dam arrangement produced approximately twice as much power as the Island Falls arrangement. Alternative 11 produced the largest amount of power annually (2481.8 MW) for the combined capacities of the Wintego dam and the Island Falls generating station. Alternative 15 produced the smallest amount of power (2419.6 MW). The difference between the power production of the two alternatives is 2.5 per cent.

5.5.5 Duration Curves

The elevations and discharges that result from the 16 simulated

Table 12: Monthly Mean Power Production

Refurbished Island Falls Arrangement
Power at Island Falls
150 Megawatt capacity
Units Are Millions of Kilowatt Hours

Alt	Group	Range	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
1	Environmental 7,000 cfs	1104.5 to 1098	64.6	54.9	56.2	54.9	74.3	82.2	88.5	86.6	80.0	80.2	73.2	70.0	865.5
		%	7.5	6.3	6.5	6.3	8.6	9.5	10.2	10.0	9.2	9.3	8.5	8.1	
2	SPC 11,000 cfs	1104.5 to 1096	95.5	83.7	86.6	86.4	46.9	52.4	56.0	53.9	52.5	55.8	99.5	101.2	870.4
		%	11.0	9.6	9.9	9.9	5.4	6.0	6.4	6.2	6.0	6.4	11.4	11.6	
3	SPC 11,000 cfs	1107 to 1096	96.3	84.8	88.0	88.5	46.9	52.4	56.0	53.4	50.3	52.2	99.6	102.0	870.4
		%	11.1	9.7	10.1	10.2	5.4	6.0	6.4	6.1	5.8	6.0	11.4	11.7	
4	SPC 11,000 cfs	1104.5 to 1099.5	95.1	83.4	82.4	82.2	46.9	52.4	56.8	54.2	54.5	58.9	99.7	102.3	868.8
		%	10.9	9.6	9.5	9.5	5.4	6.0	6.5	6.2	6.3	6.8	11.5	11.8	
5	Man. Hydro 13,000 cfs	1104.5 to 1096	78.3	70.1	74.8	72.2	57.9	64.8	71.9	71.9	66.2	64.8	80.4	80.6	853.9
		%	9.2	8.2	8.8	8.5	6.8	7.6	8.4	8.4	7.8	7.6	9.4	9.4	
6	Man. Hydro 13,000 cfs	1107 to 1096	79.1	70.9	75.9	73.4	57.9	64.6	70.6	70.6	64.4	64.1	80.9	81.2	853.6
		%	9.3	8.3	8.9	8.6	6.8	7.6	8.3	8.3	7.5	7.5	9.5	9.5	
7	Man. Hydro 7,000 cfs	1104.5 to 1096	81.2	72.3	77.1	74.3	47.3	57.6	62.5	74.3	71.5	72.6	82.8	83.5	857.0
		%	9.5	8.4	9.0	8.7	5.5	6.7	7.3	8.7	8.3	8.5	9.7	9.7	
8	Man. Hydro 7,000 cfs	1107 to 1096	82.3	73.3	78.6	75.9	47.3	57.3	60.8	73.8	71.0	72.3	83.3	84.2	860.1
		%	9.6	8.5	9.1	8.8	5.5	6.7	7.1	8.6	8.3	8.4	9.7	9.8	

WINTEGO ARRANGEMENT
Power at Island Falls
150 Megawatt capacity
Units Are Millions of Kilowatt Hours

Alt	Group	Range	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
9	Environmental 7,000 cfs	1104.5 to 1098.0	63.5	54.0	55.3	53.9	73.2	81.2	87.2	85.5	79.1	79.2	72.2	69.1	853.4
		%	7.4	6.3	6.5	6.3	8.6	9.5	10.2	10.0	9.3	9.3	8.5	8.1	
10	SPC 11,000 cfs	1104.5 to 1096	100.2	88.7	90.2	90.6	34.0	37.5	47.4	54.9	53.4	57.8	101.9	104.3	860.9
		%	11.6	10.3	10.5	10.5	3.9	4.4	5.5	6.4	6.2	6.7	11.8	12.1	
11	SPC 11,000 cfs	1107 to 1096	101.4	89.9	90.5	90.7	34.0	37.5	45.8	52.9	53.0	57.6	102.2	105.5	861.0
		%	11.8	10.4	10.5	10.5	3.9	4.4	5.3	6.1	6.2	6.7	11.9	12.2	
12	SPC 11,000 cfs	1104.5 to 1099.5	100.1	86.6	85.8	85.4	34.0	37.6	48.9	55.8	56.3	62.9	101.8	104.3	859.5
		%	11.6	10.1	10.0	9.9	4.0	4.4	5.7	6.5	6.6	7.3	11.8	12.1	
13	Man. Hydro 13,000 cfs	1104.5 to 1096	79.3	70.6	75.3	72.1	54.1	63.7	70.5	69.3	63.2	64.3	81.6	81.8	845.8
		%	9.4	8.4	8.9	8.5	6.4	7.5	8.3	8.2	7.5	7.6	9.7	9.7	
14	Man. Hydro 13,000 cfs	1107 to 1096	80.6	72.0	75.7	73.4	54.1	63.0	70.5	68.4	61.8	63.5	81.6	81.8	846.4
		%	9.5	8.5	8.9	8.7	6.4	7.4	8.3	8.1	7.3	7.5	9.6	9.7	
15	Man. Hydro 7,000 cfs	1104.5 to 1096	83.5	74.0	77.9	75.3	33.6	51.6	60.0	75.8	72.6	72.5	84.0	84.7	845.5
		%	9.9	8.8	9.2	8.9	4.0	6.1	7.1	9.0	8.6	8.6	9.9	10.0	
16	Man. Hydro 7,000 cfs	1107 to 1096	84.5	75.4	78.7	76.6	33.5	50.2	59.7	75.6	71.5	72.1	84.0	84.7	846.5
		%	10.0	8.9	9.3	9.1	4.0	5.9	7.0	8.9	8.4	8.5	9.9	10.0	

Power at Wintego and Island Falls
450 Megawatt capacity
Units Are Millions of Kilowatt Hours

Alt	Group	Range	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
9	Environmental 7,000 cfs	1104.5 to 1098.0	183.3	156.0	159.8	155.9	209.8	232.2	249.4	244.4	226.4	226.8	207.2	198.8	2450.0
		%	7.5	6.4	6.5	6.4	8.6	9.5	10.2	10.0	9.2	9.3	8.5	8.1	
10	SPC 11,000 cfs	1104.5 to 1096	282.9	249.8	253.8	253.6	98.1	108.6	137.5	159.0	154.7	167.7	289.3	295.2	2450.2
		%	11.5	10.2	10.4	10.3	4.0	4.4	5.6	6.5	6.3	6.8	11.8	12.0	
11	SPC 11,000 cfs	1107 to 1096	289.8	256.3	258.0	257.3	99.3	109.9	134.6	155.5	155.8	169.4	293.8	302.1	2481.8
		%	11.7	10.3	10.4	10.4	4.0	4.4	5.4	6.3	6.3	6.8	11.8	12.2	
12	SPC 11,000 cfs	1104.5 to 1099.5	283.9	245.0	242.7	240.4	98.7	109.4	142.2	162.0	163.8	182.7	290.3	296.4	2457.5
		%	11.6	10.0	9.9	9.8	4.0	4.5	5.8	6.6	6.7	7.4	11.8	12.1	
13	Man. Hydro 13,000 cfs	1104.5 to 1096	226.6	201.5	214.6	205.1	156.3	183.5	203.1	200.1	182.9	186.3	233.6	234.0	2427.6
		%	9.3	8.3	8.8	8.4	6.4	7.6	8.4	8.2	7.5	7.7	9.6	9.6	
14	Man. Hydro 13,000 cfs	1107 to 1096	232.8	207.8	218.4	211.2	158.2	183.8	205.6	200.1	181.1	186.3	236.4	236.9	2458.6
		%	9.5	8.4	8.9	8.6	6.4	7.5	8.4	8.1	7.4	7.6	9.6	9.6	
15	Man. Hydro 7,000 cfs	1104.5 to 1096	237.8	210.4	221.1	213.4	97.6	148.8	173.1	218.1	208.9	209.0	239.9	241.5	2419.6
		%	9.8	8.7	9.1	8.8	4.0	6.1	7.2	9.0	8.6	8.6	9.9	10.0	
16	Man. Hydro 7,000 cfs	1107 to 1096	243.1	216.6	226.2	219.6	98.5	146.6	174.5	220.2	208.4	210.4	242.7	244.4	2451.2
		%	9.9	8.8	9.2	9.0	4.0	6.0	7.1	9.0	8.5	8.6	9.9	10.0	

Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada

Mathias Colomb Band Government

MISSINIPPI RIVER
PUKATAWAGAN, MANITOBA R0B 1G0
TELEPHONE 1-204-553-2089-2090
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BAND COUNCIL RESOLUTION
RÉSOLUTION DE CONSEIL DE BANDE

Chronological no – N° consécutif	0798
File reference no. – N° de référence du dossier	

NOTE: The words "from our Band Funds" "capital" or "revenue", whichever is the case, must appear in all resolutions requesting expenditures from Band Funds.
NOTA: Les mots "des fonds de notre bande" "capital" ou "revenu" selon le cas doivent paraitre dans toutes les résolutions portant sur des dépenses à même les fonds des bandes.

	Cash free balance – Solde disponible
The council of the / Le conseil de: MATHIAS COLOMB	Capital account / Compte capital $
Date of duly convened meeting / Date de l'assemblée dument convoquée: D-J 02 M 09 Y-A 13 — Province: MB.	Revenue account / Compte revenu $

DO HEREBY RESOLVE:
DÉCIDE, PAR LES PRÉSENTES:

Whereas: Pukatawagan Fishermen's Association Inc. is comprised of 120 commercially licensed fishers whose traditional fishing area is geographically located between the Sask – Manitoba boundary west and Twin Falls, Highrock Lake east on the Churchill River,

Whereas: Said area includes Nelson Lake, Flatrock Lake, Sisipuk Lake, Loon Lake, Britton Lake, and

Whereas: The combined total of allowable caught species is approximately 350 thousand pounds listed as walleye (pickerel), white fish, jacks (northern pike), tulibee, goldeye, and

Whereas: Historically, Pukatawagan Fishermen's Associate Inc., always has been a separate entity operated by an executive board, elected by a majority of all commercial fishers, and

Whereas: Pukatawagan Fishermen's Association Inc., contributes much to the prosperity and economic stimulus of the community, with unlimited potential, and

Whereas: Commercial fishers of the area have, nevertheless, been stymied by the reality of geographic isolation, resulting in exceptionally high cost of operating thus impacting their net returns from the fishery; and

Whereas: Certain infrastructure requirements and equipment and operational needs are required by the members of and the organization known as Pukatawagan Fishermen's Association Inc., and

Whereas: Said requirements are detailed in the accompanying proposal.

Therefore be it Resolved That: Pukatawagan Fishermen's Association Inc., request from the Chief and Council sanction by means of this resolution to proceed with a detailed plan outlining infrastructure needs and other requirements to provide for a organized and efficient fishery in the identified area, and

Further, be it Resolved That: Pukatawagan Fishermen's Association Inc., endeavor to seek an understanding from Saskatchewan Power Corporation, on a stand alone basis in their request, for assistance outside of, and without prejudice, to existing and on going negotiations between Mathias Colomb Indian Band, in general, and Sask Power.

Quorum 06

(Chief – Chef)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)

(Councillor – Conseiller)