REFERENCE 9

NEWFOUNDLAND AND LABRADOR HYDRO

REPORT ON

1984/85 CLIMATOLOGICAL MONITORING

PROGRAM

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1.0 SUMMARY

The climatological study concluded on 1985-05-31 was the eigth in an annual series conducted by Newfoundland and Labrador Hydro.

The study included the accumulation of data related to wind speed and direction, ice accumulation on passive collectors.

This report summarized the data collected during the period of 1984-06-01 to 1985-05-31 and recommends the following:

(1) The continuation of the Passive Ice Meter Program.
(2) Wind Data continued to be collected at Hawkes Bay only.

(3) Relocate test towers to actual line routing prior to the start-up of the 1986 program.
(4) The test towers be monitored from November 1985 to May 1986 on the Long Range Mountains only.

2.0 OBJECTIVES

The "Report on 84/85 Climatological Monitoring Program" will review the individual components of the study funded under Hydro Work Order 5040 and backcharged to the L.C.D.C. Feasibility Program.

All the data collected during the 84/85 observation period will be presented.

Conclusions will be drawn based on the accumulated data and recommendations will be made as to the future direction of the program.

3.0 INTRODUCTION

The 1984/85 Climatological Monitoring Program incorporated two (2) programs designed to collect raw data with a goal to optimize transmission line design and route selection parameters for the HVDC Line.

The Passive Ice Meter and Test Tower Sites provide data related to icing conditions, that affect the HVDC transmission line, from Labrador to Soldier's Pond and in particular at selected locations along the proposed HVDC Line routes.

The anemometer Sites provide data related to another design parameter of transmission lines: wind speed, direction and peak gust conditions.

This report presents the summarized data collected from June 1984 to May 1985.

4.0 DISCUSSION OF PROGRAM

4.1 PASSIVE ICE METER

May 15, 1985 marked the completion of the eighth successful Passive Ice Meter (PIM) observation period. Observer co-operation was good at most sites and the data reported on the daily and monthly observation sheets have been comprehensive.

Data collected from the twenty-two (22) sites is tabulated in Appendix I Summary of Ice Meter Data.

In general, the information documented during the 1984/85 season showed similar ice accretion to previous years. The eight years data will now provide a good base for an icing profile for the province.

4.2 ANEMOMETER

The wind data programs for 1984/85 consisted of two (2) units, Hawkes Bay and Holyrood. Both Sunnyside and Yankee Point were terminated in 1982. The unit at Hawkes Bay operated year round. However, the unit at Holyrood, similar to previous years, only operated sporadically. Mechanical problems were encountered throughout the year. It is felt that unless continuous supervision is provided at the Holyrood site to correct problems as they occur; continuous data cannot be collected effectively. Since this cannot be done, it is recommended that the site be terminated.

4.3 TEST TOWER SITES

The Test Tower Program for the 1984/85 season began in mid December 1984; with visits to Long Range Mountain Crossing area. The winter was fairly mild with no substantial accumulations observed. No trips were made to Labrador this year.

All sites were visited as regularly as weather would permit and the collected data is tabulated in Appendix 6.3 - Summary of Test Tower Data.

It has been observed over the last few years that there is a vast difference in ice accumulation between exposed and sheltered sites. For example, exposed site 2B may have 30" of pendant rime while the test span on Inner Pond at a sheltered site has relatively little ice. It is felt that in order to get the true picture of what accumulation would be along the proposed routes (Inner Pond and Parsons Pond) the test towers should be on the routes. It is recommended, therefore, that some existing test towers be relocated to the actual line routes prior to the 1986 season.

4.4 TEST SPANS

During the 1984/85 observation period the two (2) remaining test spans were not instrumented. The test spans were visited regularly and treated as passive collectors.

6.1 SUMMARY OF PASSIVE ICE METER DATA

6.2 SUMMARY OF ANEMOMETER DATA

6.3 SUMMARY OF TEST TOWER DATA

APPENDIX 6.1

SUMMARY OF PASSIVE ICE METER DATA

APPENDIX I

SUMMARY OF PASSIVE ICE METER DATA

1984 - 1985

LOCATION		OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY
BUCHANS	*C18*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	1.3cm Glaze 1 day	No Accumulation	No Accumulation	No Accumulation
DEER LAKE	*S19*	----------	----------	----------	-NOT MONITORED-	----------	----------	----------	----------
SPRINGDALE	*C23*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	1.3cm Glaze - 2-days Wet snow with 5cm icicles - 2 days	Trace of Glaze with icicles 2 - Days	No Accumulation	No Accumulation
STONEY BROOK	*C24*	No Accumulation	No Accumulation	No Accumulation	Trace of Glaze 1 - Day	No Accumulation	No Accumulation	No Accumulation	No Accumulation
GANDER AIRPORT	*S25*	No Accumulation	No Accumulation	Trace Rime - 1 - Day	Trace Glaze-1day 0.7cm Glaze-1day 0.6cm Glaze-1day	Trace Glaze-1day 0.3cm - 0.6cm Glaze - 3 Days	0.2cm Glaze 1 Day	No Accumulation	0.3cm Glaze & Trace of Rime
BAY D'ESPOIR	*S27*	No Accumulation	No Accumulation	No Accumulation	Trace of Rime 1 Day	No Accumulation	No Accumulation	No Accumulation	No Accumulation
SUNNYSIDE	*C28*	No Accumulation	No Accumulation	No Accumulation	Trace of Wet Snow 2 - Days	No Accumulation	No Accumulation	No Accumulation	No Accumulation
WESTERN AVALON	*C32*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulatim
HOLYROOD	*C33*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	Trace of Rime	Trace of Rime 2 - Days	No Accumulation	No Accumulation
HARBOUR DEEP	*C35*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	0.8 cm Glaze 2 - Days	No Accumulation	No Accumulation	No Accumulation
PORT BLANDFORD	*C40*	.2cm Rime 1-Day	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation

SUMMARY OF PASSIVE ICE METER DATA

1984 - 1985

LOCATION		OCTOBER	NOVEMBER	DECEMBER	JANUARY	FEBRUARY	MARCH	APRIL	MAY
WABUSH	*S01*	Trace of Rime 2 - Days	----------	----------	-NOT MONITORED-	----------	----------	----------	----------
CHURCHILL FALLS	*S02*	----------	----------	----------	-NOT MONITORED-	----------	----------	----------	----------
GOOSE BAY	*S04*	No Accumulation	Trace of Glaze 3 - Days Wet snow & ice Pellets - 1 Day	0.4 cm Glaze	Trace of Freezing Drizzle	Trace of Freezing Drizzle 2-Days	Trace of Freezing Drizzle-1 Day	Trace of Freezing Drizzle - 4Days	- No Accumulation
POINT AMOUR	*C07*	----------	----------	----------	-NOT MONITORED-	----------	----------	----------	----------
YANKEE POINT	*C09*	0.6 cm Ice 1 Day	0.6 cm Ice 1 Day	No Accumulation	No Accumulation	1.3 & 2.0 cm Glaze - 2 Days	1.5 cm Ice 3 Days	No Accumulation	No Accumulation
PLUM POINT	*C10*	No Accumulation	Trace of Glaze	No Accumulation	Trace of Rime 3 Days	No Accumulation	Some Ice Due To Melting & Freezing Snow	No Accumulation	Icicles & Traces of Rime
HAWKES BAY	*C11*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation
DANIEL'S HARBOUR	*C12*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation
GROS MORNE NATIONAL PARK	*C13*	No Accumulation	1.5 cm of Wet Snow/Ice	1 cm Ice & Snow 9 Days Duration	No Accumulation	0.5cm Glaze with icicles - 1 Day 0.2 cm Glaze	Trace of Glaze	No Accumulation	No Accumulation
PORT-AUX-BASQUE	*S16*	No Accumulation	1 cm Wet Snow 2 Days	Wet Snow with Trace of Rime	Trace of Glaze 3 Days	0.6 cm Glaze with icicles - 1 Day	No Accumulation	No Accumulation	No Accumulation
BURNT POND	*C17*	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation	No Accumulation

ABSTRACT OF THE WIND

SUMMARY

HAWKES BAY

	JUNE 84	JULY 84	AUG. 84	SEPT. 84	OCT. 84	NOV. 84	DEC. 84	JAN. 85	FEB. 85	MAR. 85	APR. 85	MAY 85
Total Mileage for Month	8170	8261	8448	10600	8988	10477	12934	11772	6918	9581	10309	8158
Greatest Mileage in 24 Hrs.	486	506	620	704	602	902	884	848	516	664	716	706
Greatest Mileage & Prevailing Dir. for 1 Hr.	32 SW	32 SW	32 SW	34 SW	36 SW & NW	48 W	52 SW	50 E	30 N	36 SW	36 SW	36 W
Date of Greatest Mileage for 1 Hr.	17th	8th	28th	26 & 29	5th 26 & 31	2nd & 3rd	7th	21st	10th	3rd 17th	7th 9th	5th
Average Speed for Month (mph)	11.4	11.4	11.4	14.7	12.1	14.6	17.4	15.8	10.3	12.6	14.3	11.0
Longest Continued - Direction	SW	SW	SW	SW	SW	W	NW	NW	SW	SW	W	E
- Hours	43	38	39	45	39	42	40	37	38	43	29	17
Prevailing Direction - By Mileage	SW 2491	SW 5058	SW 4002	SW 4147	SW 3585	SW 3173	NW 3479	SW 2845	SW 2871	SW 3436	SW 3836	SW 1854
- By Total Hrs.	SW 155	SW 377	SW 236	SW 220	SW 211	SW 235	NW 168	SW 194	SW 217	SW 206	SW 231	SW 158
Peak Gust (mph)	44 SW	48 SW	40 SW	45 SW	47 SW	61 W	68 SW	68 SE	40 N	44 NW	48 SW	45 NW

NOTE: Instrument records in imperial units.

APPENDIX 6.3

SUMMARY OF TEST TOWER DATA

TABLE OF DATA

SITE BIG HILL

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	-	-	-	not visited -	-
85-02-12	10	321	-10	Bare	N/A
85-03-19	-	-	-4	Bare	N/A
85-04-27	5	225	-5	1" Rime	300

TABLE OF DATA

SITE #10 MAIN RIVER

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION (Deg
84-12-14	5	225	-12	Bare	-
85-02-13	-	-	-2	Bare	-
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #9 LONG RANGE MOUNTAINS

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION (Deg
84-12-14	10	045	-10	Bare	-
85-02-13	-	-	-4	Bare	-
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #13 PARSONS POND

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. ^{o}C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	-	-	-12	Bare	-
85-02-13	-	-	-9	Bare	-
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #15 PARSONS POND

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	-	-	-12	Bare	-
85-02-13	-	-	-9	Bare	-
85-03-14	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #14 PARSONS POND

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Trace of Glaze	-
85-02-13	-	-	-9	Bare	-
85-03-15	-	-	-9	1" Rime on Tower	-
85-04-27	-	-	-5	1" Hard Rime on Tower	225

TABLE OF DATA

SITE #2 PORTLAND CREEK

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION (Deg°C)
84-12-14	10	225	-12	18" Pendant Glaze	225
85-02-13	5	210	0	Tower is down (failed turn buckle)	-
85-03-15	-	-	-	Not Visited -	-
85-04-27	-	=	-	Not Visited -	-

TABLE OF DATA

SITE #2a PORTLAND CREEK

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	215	-12	Trace of Glaze	-
85-02-12	8	50	-9	2" Rime on Tower	-
85-03-15	-	-	-4	1" Rime on Tower	-
85-04-	-	-	-5	Bare	-

TABLE OF DATA

SITE #2b PORTLAND CREEK

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	10	225	-12	12" Pendant Glaze	225
85-02-13	7	190	-2	30" Rime on Tower	210
85-03-15	-	-	-4	15" Rime on 5' Tower Level 12" Rime on Guys	225
85-04-27	-	-	-5	4" Rime on Tower (5' Level)	225

TABLE OF DATA

SITE #2d PORTLAND CREEK

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Trace of Glaze	-
85-02-13	5	210	-1	10" Rime on Tower 6" Rime on Guys	210
85-03-15	-	-	-4	2" Rime on Tower	225
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #2e PORTLAND CREEK

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Dec
84-12-14	-	-	-12	Bare	-
85-02-12	10	321	-7	Bare	-
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #3 HILLS OF ST. JOHN

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #16 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Bare	-
85-02-13	4	210	-1	No Accumulation	N/A
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #17 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Bare	-
85-02-13	5	210	-3	2" Rime Accumulation on parts of Tower	N/A
85-03-15	-	-	-4	Bare	-
85-04-22	-	-	-5	Bare	-

TABLE OF DATA

SITE #18 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. ^{o}C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Bare	-
85-02-13	5	220	-3	1" Rime on Guys	N/A
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #19 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. ^{o}C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Bare	-
85-02-13	5	210	-4	Bare	N/A
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #20 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION(Deg
84-12-14	5	225	-12	Bare	-
85-02-13	4	210	-5	Bare	-
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-

TABLE OF DATA

SITE #12 - CAT ARM

DATE	WIND SPEED (MPH)	WIND DIR. (TRUE)	TEMP. °C	ACCUMULATION NOTED	DIRECTION OF ACCUMULATION (Deg
84-12-14	5	225	-12	Bare	-
85-02-13	5	210	-5	No Accumulation	N/A
85-03-15	-	-	-4	Bare	-
85-04-27	-	-	-5	Bare	-