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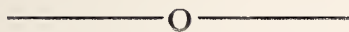
One of Alberta's Earliest Water Power Wheels Installed near Jasper about 1895



*Alberta Power Commission
Annual Report
1954*



GOVERNMENT OF THE PROVINCE OF ALBERTA

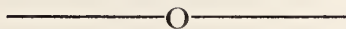


ANNUAL REPORT


OF THE

ALBERTA POWER COMMISSION

FOR THE YEAR ENDING
DECEMBER 31, 1954
EDMONTON



J. G. MacGREGOR
CHAIRMAN



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January 31st, 1955.

The Honorable N. A. Willmore, ,
Minister of Industries and Labour,
Administration Building,
Edmonton, Alberta.

Sir:

I have the honor to submit herewith the Annual Report of the Alberta Power Commission for the calendar year ended December 31st, 1954.

An audited statement of receipts and disbursements of the Alberta Power Commission will be sent under separate cover.

Respectfully submitted,

ALBERTA POWER COMMISSION

J. G. MacGregor,
Chairman.

ALBERTA POWER COMMISSION

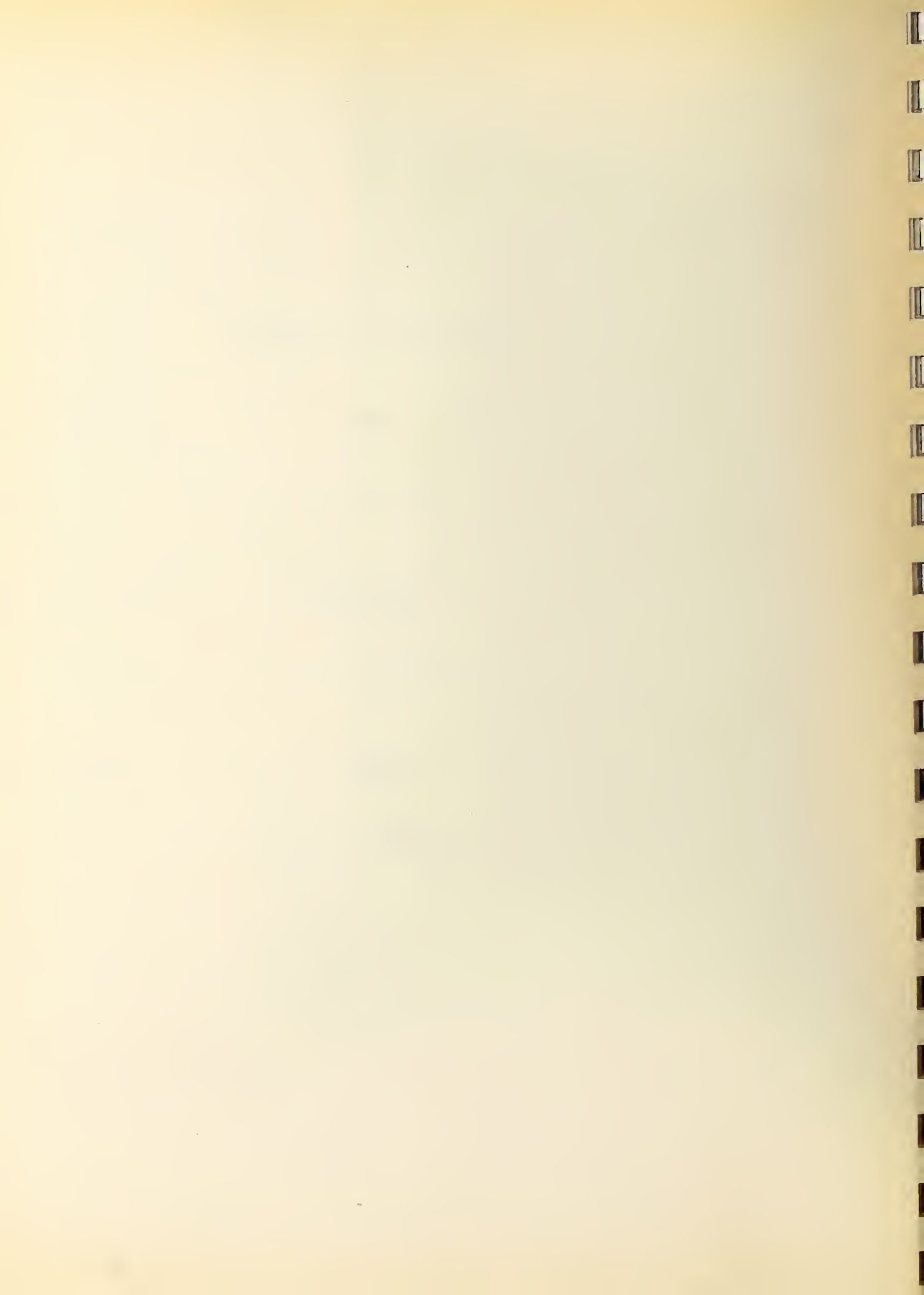
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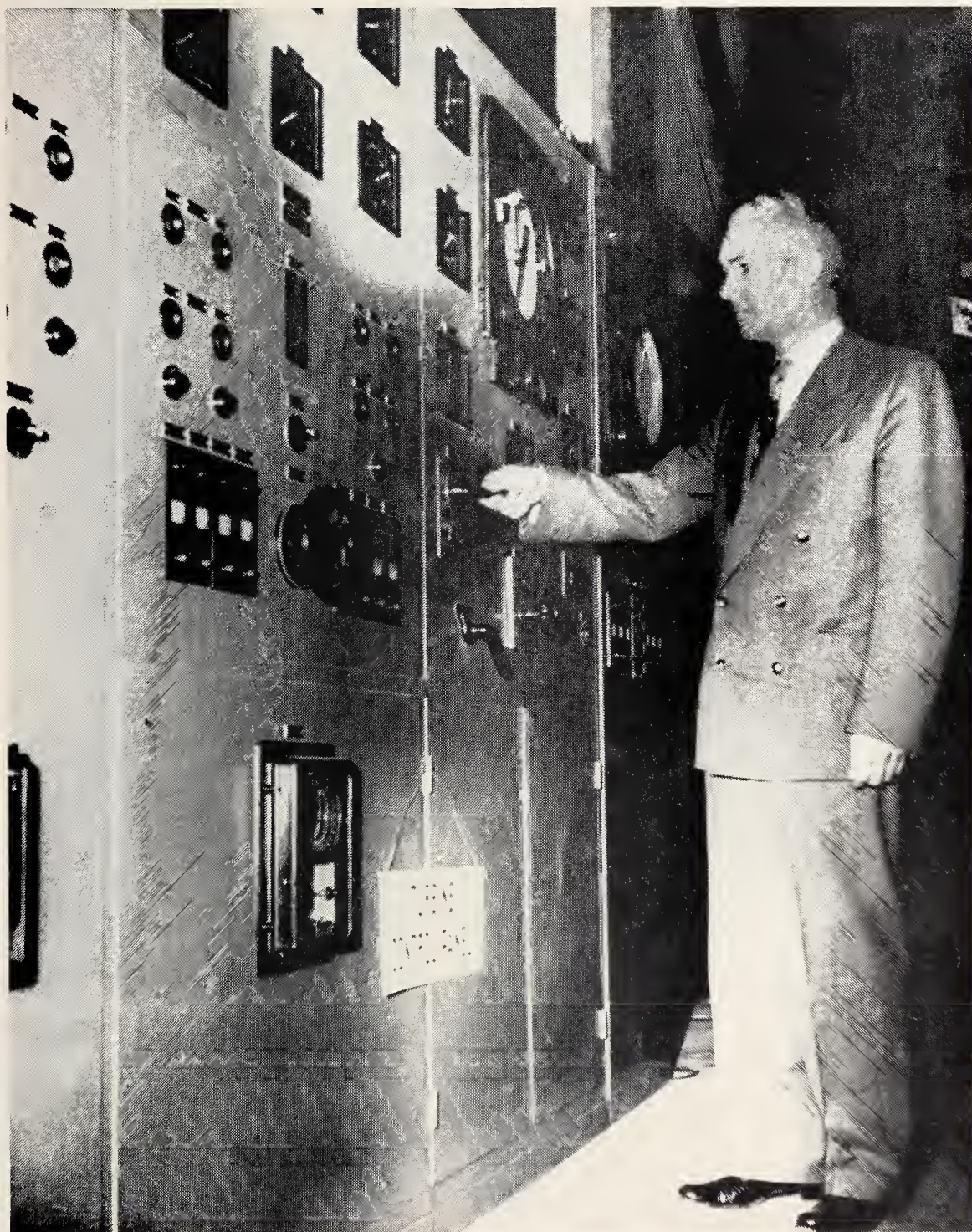
J. G. MacGregor,
Chairman

W. J. Dick,
Member

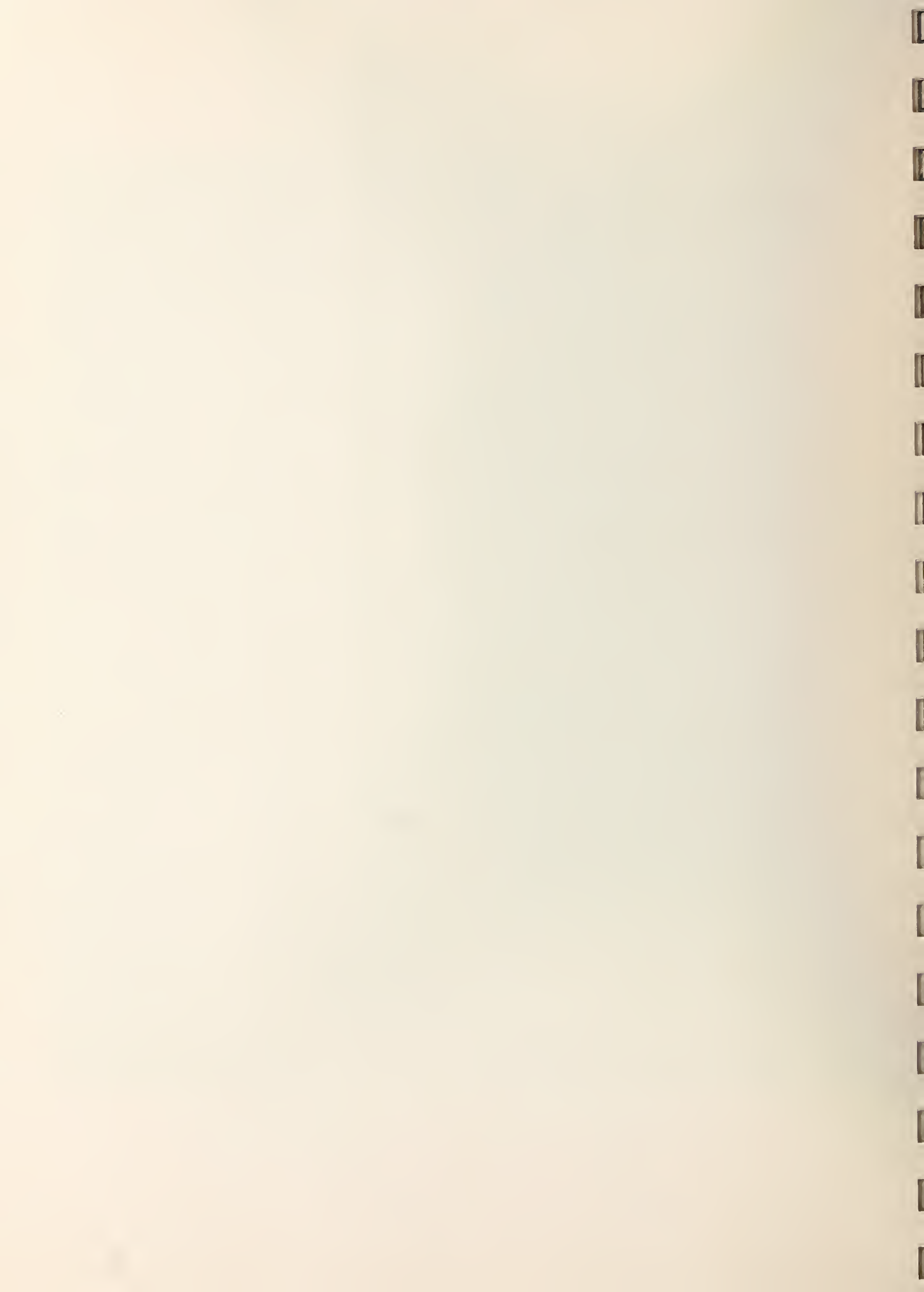
J. E. Oberholtzer,
Member

J. L. Reid,
Member and Secretary





The Hon. Mr. Willmore puts Canada's First Gas Turbine on the Line



ALBERTA POWER COMMISSION

ANNUAL REPORT

For Year Ending December 31st, 1954.

The Alberta Power Commission is not an operating Commission; that is, it does not own or operate any power plants, transmission lines or distribution systems. In this respect it is different from the Power Commissions in all the other Provinces, except Prince Edward Island and Newfoundland. Keeping this in mind, it might be well to consider the duties and the responsibilities of the Power Commission. Its duties at present, under the Power Commission Act, are only those of a regulatory or supervisory nature. These duties are largely covered by Section 6 of the Power Commission Act, which is as follows:

"Whenever required so to do by the Lieutenant Governor in Council the Commission shall inquire into, examine and investigate,-

- (a) water powers and water privileges in Alberta, their value and capacity;
- (b) the existing facilities for the manufacture and distribution of power in Alberta;
- (c) such other matters relating to power and its distribution in Alberta as the Lieutenant Governor in Council from time to time may require;

and shall report thereon to the Lieutenant Governor in Council."

The Commission feels that its principal duties at the present time are three fold.

1. The collection of statistics in connection with the Central Station Industry in the Province, and the study of these statistics so that the people of the Province will have a true picture of the industry.

2. The study of hydro-electric sites and other power possibilities in the Province. During the past year there have been no direct studies of specific hydro-electric sites. The Commission, however, has been engaged in a study of the existing network of transmission lines in the Province with particular reference to how this should be extended to reach areas not now being served from the network. The following are two or three examples of these areas under consideration: the area north and east from Boyle to Lac La Biche; the territory east of Consort; and the area between Medicine Hat and Empress. We will refer to this question later in the report.

3. Farm Electrification. This is the phase of its work to which the Commission has devoted most of its time. As the number of electrified farms increases the problems of farm electrification become more complicated. The Commission has devoted a great deal of effort towards making farm electrification available in some of the more remote areas of the Province. Surveys of some of these areas have been made in order to ensure that the lines which should be built into those areas are built in the most economical manner possible and in a manner that will make the comforts of farm electrification available to as many farmers as possible. Some saturation studies have been made of areas already electrified, and these are continuing.

It is our opinion that the statistics given in former reports serve a valuable purpose and so these have been continued in this one. These statistics make it possible to compare the progress made in Alberta with that in other parts of Canada. The expansion of the need for electricity in the Province continues at an exceptionally high rate, so that on a percentage basis the industry of Alberta is expanding at a much greater rate than in any other part of Canada.

Tables No. 1 to 8, which follow, show this expansion in statistical form.

Table No. 1 shows the capacity in H.P. of the Central Electric Stations in Canada for the past 10 years:

TABLE NO. 1
Capacity of Central Electric Stations H.P.

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1943	177,366	9,602,794	168,668	512,717
1944	197,995	9,713,791	168,966	511,814
1945	203,837	9,666,947	169,253	511,814
1946	198,189	9,825,459	170,328	534,843
1947	211,598	9,601,157	** 263,609	** 444,488
1948	221,762	10,038,541	292,652	469,202
1949	276,826	10,637,798	311,186	469,042
1950	278,396	11,703,161	313,125	596,482
1951	* 393,000	12,781,610	363,871	596,615
1952	* 406,000	14,221,806	431,243	726,095
1953	* 485,000	* 16,000,000	* 464,000	* 750,000
1954	* 550,000	* 17,500,000		

* Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics.

** One station formerly counted in Manitoba transferred to Saskatchewan.

Increase during the 10 year Period ended 1953

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>*** Saskatchewan</u>	<u>*** Manitoba</u>
1953	485,000	16,000,000	464,000	750,000
1943	177,366	9,602,794	258,668	422,717
Increase:	307,634	6,397,206	205,332	327,283
Percent Increase:	173%	67%	79%	77%
Increase Alberta:	1944-to 1954 - 177%			

*** These figures for Saskatchewan and Manitoba have been corrected to take account of the fact that one station formerly counted as in Manitoba was transferred to Saskatchewan's total in 1947.

Table No. 2 shows the growth of K.W.H. generated net during the past ten years.

TABLE NO. 2

Electric Energy Generated by Central Electric Stations
(Millions of K.W.H.)

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1943	513	40,479	232	2,224
1944	555	40,599	244	2,233
1945	567	40,130	250	2,284
1946	602	41,736	271	2,389
1947	641	43,424	** 763	** 2,032
1948	724	42,390	805	2,056
1949	801	44,419	858	2,160
1950	869	48,494	903	2,449
1951	* 1,055	54,852	979	2,565
1952	* 1,213	59,409	1,079	2,699
1953	* 1,341	65,489	1,168	2,791
1954	* 1,499			

* Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics

** One station formerly counted as in Manitoba now treated as being in Saskatchewan.

Increase during the 10 year Period ended 1953

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>*** Saskatchewan</u>	<u>*** Manitoba</u>
1953	1,341	65,489	1,168	2,791
1943	513	40,479	632	1,824
Increase:	828	25,010	536	967
Percent Increase:	161%	62%	85%	53%
Increase Alberta:	1944 to 1954 - 170%			

*** These figures for Saskatchewan and Manitoba have been corrected to take account of the fact that one station formerly counted as in Manitoba was transferred to Saskatchewan's total in 1947.

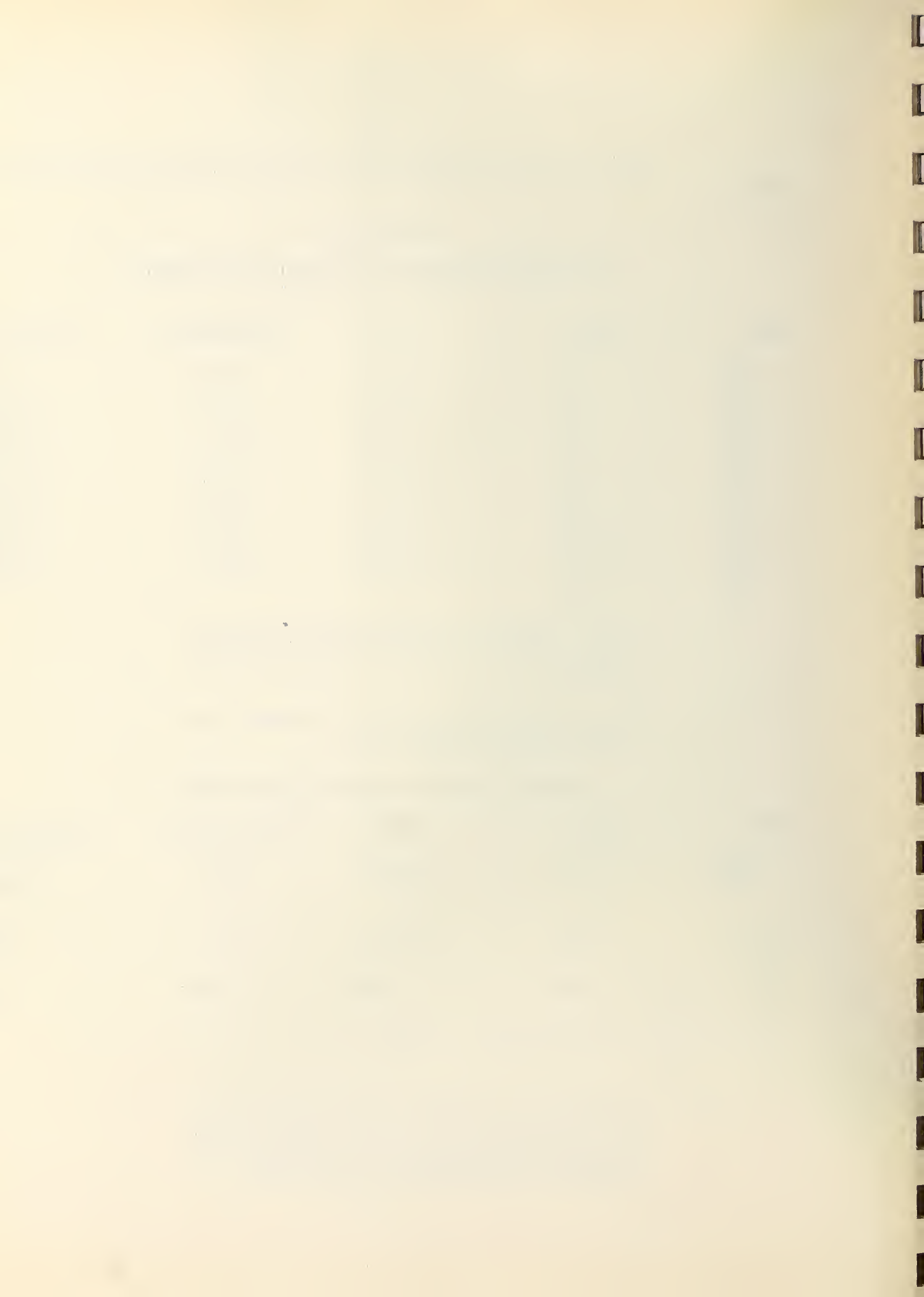


TABLE NO. 3

Annual K.W.H. used per Domestic Customer

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1942	656	1,506	866	4,062
1943	670	1,535	883	4,226
1944	698	1,598	908	4,234
1945	735	1,693	953	4,399
1946	819	1,844	1,018	4,433
1947	882	1,951	1,034	4,304
1948	989	2,078	1,115	4,628
1949	1,073	2,168	1,199	4,694
1950	1,224	2,413	1,353	4,783
1951	1,384	2,617	1,531	4,813
1952	1,473	2,809	1,677	4,868

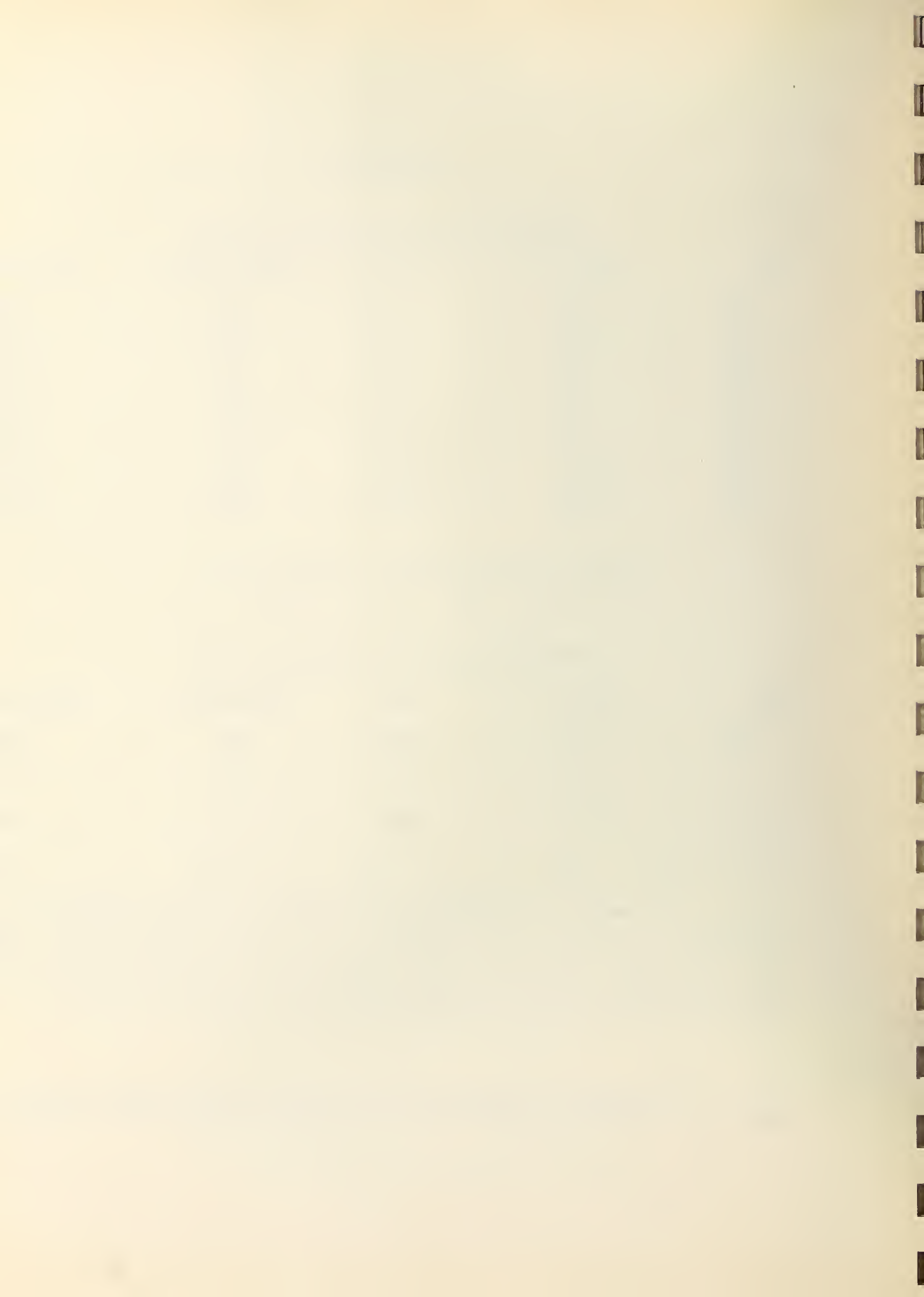
These are Dominion Bureau of Statistics figures and the 1953 figures are not available yet.

Increase during the 10 year Period ended 1952

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1952	1,473	2,809	1,677	4,868
1942	656	1,506	866	4,062
Increase:	817	1,303	811	806
Percent Increase:	125%	87%	94%	20%

Manitoba has an exceptionally high figure for K.W.H.s used per domestic customer. This is partly due to the fact that one city alone - Winnipeg - contains a large percentage of the total population of the province. It is also due to the fact that the cost of developing the water power sites adjacent to Winnipeg was possibly the cheapest in the world. This provided cheap power for the people of the City of Winnipeg, and since fuel was expensive there, electricity was used extensively for cooking and heating, and a happy combination of low rates produced high use, and vice versa.

The figure for Canada for K.W.H. used per year per domestic customer is high because it takes into account the high consumption in Manitoba, and in Ontario.



It will be noted also that Saskatchewan's consumption is higher than that in Alberta. This is largely due to the fact that all cities in Alberta, and many of the smaller centres, use natural gas for cooking and water heating, whereas until recently gas has not been available in Saskatchewan, and the consumers there tend to use electricity for these purposes.

TABLE NO. 4

Costs in Cents per K.W.H. Domestic Customers Only

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1942	4.87	1.87	4.64	1.00
1943	4.83	1.80	4.61	.99
1944	4.74	1.75	4.55	.99
1945	4.59	1.66	4.39	1.02
1946	4.18	1.62	4.29	1.02
1947	3.93	1.60	4.27	1.08
1948	3.72	1.60	4.09	1.06
1949	3.54	1.59	3.95	1.11
1950	3.28	1.61	3.80	1.15
1951	3.16	1.65	3.70	1.18
1952	3.06	1.65	3.59	1.21

These are Dominion Bureau of Statistics figures and the 1953 figures are not yet available.

Decrease during the 10 year Period ending 1952

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1942	4.87	1.87	4.64	1.00
1952	3.06	1.65	3.59	1.21
	—	—	—	—
Decrease:	1.81	.22	1.05	Increase: .21
Percent Decrease:	37%	12%	23%	Increase: 21%

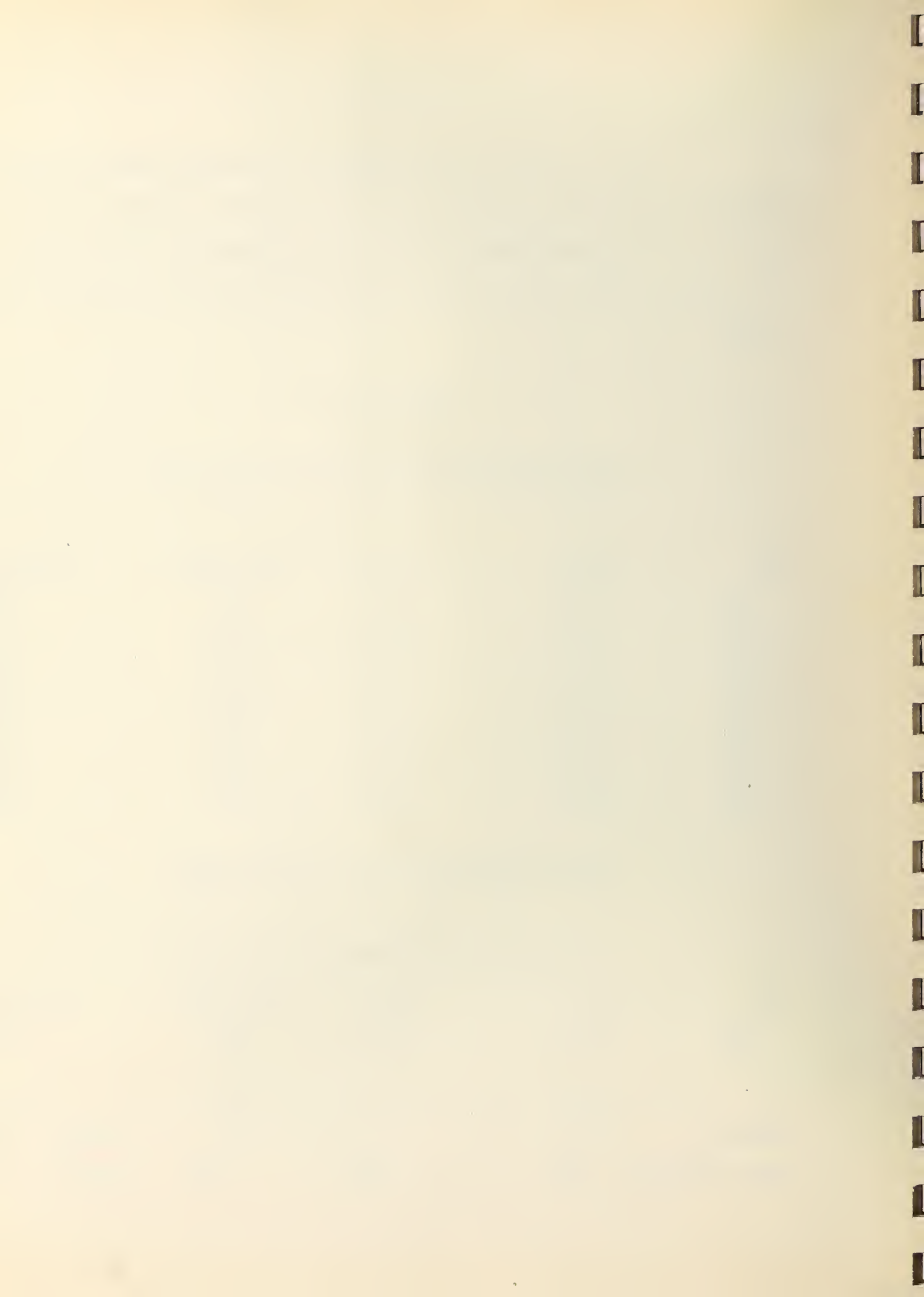


TABLE NO. 5
Total Number of Customers of Central Electric Stations
(Thousands)

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1942	98	2,125	73	113
1943	101	2,169	74	114
1944	105	2,238	77	118
1945	112	2,333	82	121
1946	121	2,477	90	131
1947	131	2,643	97	148
1948	142	2,822	106	151
1949	157	3,076	114	163
1950	172	3,270	121	179
1951	186	3,440	127	194
1952	200	3,621	139	209
1953	* 222			
1954	* 237			

* Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics.

Increase during the 10 year Period ending 1952

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1952	200	3,621	139	209
1942	98	2,125	73	113
Increase:	102	1,496	66	96
Percent Increase:	105%	70%	90%	85%

TABLE NO. 6
Number of Farms Served by Central Electric Stations
as at December 31 each year

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1945	1,620	130,078	417	1,236
1946	1,391	148,272	486	2,311
1947	2,275	169,518	739	3,496
1948	3,393	213,205	1,227	5,694
1949	5,017	250,866	2,299	11,155
1950	* 11,032	303,727	4,057	16,964
1951	* 13,479	336,345	* 6,278	* 25,324
1952	* 18,055	359,870	* 12,000	* 33,000
1953	* 24,181		* 17,700	* 39,000
1954	* 30,504		* 23,000	* 42,000

* Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics.

TABLE NO. 7

Farm Consumption in K.W.H. per Farm per Year

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1945	1,178	1,359	729	1,119
1946	1,752	1,558	940	1,077
1947	1,690	1,686	900	1,678
1948	1,883	1,711	860	1,940
1949	2,128	1,752	880	2,113
1950	2,250	1,932	880	2,359
1951	* 2,340	2,085	1,266	2,475
1952	* 2,550	2,228	1,527	2,666
1953	* 2,783			
1954	* 2,830			

*

Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics.

TABLE NO. 8

Total Pole Line Mileage
(Includes transmission, distribution and rural lines)

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1944	4,534	80,073	4,117	4,534
1945	4,782	83,178	4,252	4,534
1946	5,450	89,231	4,920	5,739
1947	6,271	98,530	4,353	8,262
1948	7,552	113,411	5,009	11,564
1949	10,103	135,329	5,371	16,785
1950	12,108	151,726	5,712	20,472
1951	* 17,255	170,582	9,574	24,439
1952	* 21,254	190,316	13,858	28,514
1953	* 26,866			
1954	* 31,736			

*

Figures marked thus are Alberta Power Commission figures, the others are from the Dominion Bureau of Statistics.

PRESENT STATUS OF THE INDUSTRY

The statistics for the Central Station Industry for the year 1954 follow. Some of the minor figures are estimates only due to the fact that the report has to be prepared before the various utilities have completed their statistics for the past year. It is not likely, however, that these minor estimates will be in error by more than 1% or 2%, so that the error in the whole will be negligible. Wherever a figure has been estimated it is marked "Est."

Tables 9 to 12 deal with plant capacity, peak load, and K.W.H. generated. They break up the figures to show what was generated by hydro, steam, and internal combustion engines, and also to show the proportions generated by the publicly owned and the privately owned plants. Table No. 12 gives further details of the generating plants and their output. It will be noted that it is divided into five groups, - A, B, C, D and E.

The largest, Group A, contains those power plants which are connected by transmission lines, so that we speak of them as being in the interconnected system. Group A, covers most of the Province. As well as including the towns served by the Calgary Power Ltd., and Canadian Utilities Limited, it includes the cities of Calgary, Red Deer and Medicine Hat, and the towns of Ponoka, Fort Macleod and Cardston. In most cases these places do not generate their own power, but purchase it from Calgary Power Ltd., and retail it to their inhabitants.

Group B takes in the Peace River country and includes the territory served by Canadian Utilities Limited and Northland Utilities Limited. During 1954 a line was built from Fairview to Rycroft. This ties together the systems of Northland Utilities Limited and of Canadian Utilities Limited, so that herein we shall refer to these combined systems as the interconnected system of the Peace River country.

Group C formerly included the system of Northland Utilities Limited from Sangudo to Greencourt. This system was sold to Calgary Power Ltd. early in 1954, so that from that time on this area is included in the interconnected system of Group A. The figures shown under Group C in this report are only those for the period during which Northland Utilities Limited operated this area.

Under Group D are listed the miscellaneous towns served by Northland Utilities Limited in the area north and west of Edmonton. These towns are all isolated towns with the exception of Athabasca, where, as at the end of 1954, there was a line running from Athabasca to Rochester.

Under Group E we have included the other isolated towns in the Province, such as the Town of Edson, which is served by a municipal plant, and various small towns more or less on the fringes of the Province, such as Empress, Fort McMurray, Hines Creek, Kinuso, etc.

The interconnected system shown as Group A had, in 1954, a combined capacity of 396,900 K.W., and generated 1,471,882,756 K.W.H. It served 223,961 customers. This system accounts for 97% of the generating capacity of the Province, 98% of the K.W.H. generated, and 94% of the number of customers.

TABLE NO. 9

The following Companies or Municipalities provide Central Station Electrical Service in the Province. This table gives preliminary data as to their plant capacity, their loads, and the K.W.H. they generated net in 1954.

Privately Owned

<u>Name of Company:</u>	<u>Plant Capacity Dec. 31/54 K.W.</u>	<u>Peak Load on Plants during 1954</u>	<u>K.W.H. Generated Net - 1954</u>
1. Calgary Power Ltd.	203,000	185,000	854,271,700(1)
Canadian Utilities Ltd.	38,895(2)	31,665	110,627,498(3)
Northland Utilities Ltd.	6,960	4,720	13,732,909
East Kootenay Power Co. Ltd. (4)	12,500	6,200	356,490
Misc. Plants	1,800	1,075	1,548,723
1. Total:	<u>263,155</u>	<u>1,075</u>	<u>980,537,320</u>

Publicly Owned

<u>Name of Municipality:</u>			
2. City of Edmonton	90,000	83,000	307,404,600
City of Lethbridge	13,500	8,800	35,406,900
City of Medicine Hat	43,400	39,900	174,037,500(5)
Town of Edson	1,189	500	1,747,717
2. Total:	<u>148,089</u>		<u>518,596,717</u>
Plus 1. Total:	<u>263,155</u>		<u>980,537,320</u>
GRAND TOTAL:	<u>411,244</u>		<u>1,499,134,037</u>

(1) Includes some miscellaneous diesel generation.

(2) Includes one 1,200 K.W. unit at Fairview.

(3) Includes 524,800 K.W.H. generated at Fairview.

(4) The East Kootenay Power's plant is located at Sentinel some two or three miles inside the Alberta border. While this energy is generated in Alberta, most of it is exported to British Columbia. The amount generated by the East Kootenay plant accounts in a large measure for the discrepancy between the figures of the Dominion Bureau of Statistics and the Alberta Power Commission.

(5) Includes 135,306,370 K.W.H. to Calgary Power Ltd.

TABLE NO. 10

It is interesting to rearrange the figures of Table No. 9 so as to list them according to whether the power was generated by hydro, steam, or internal combustion plants.

HYDRO

<u>Name of Company</u>	<u>Plant Capacity Dec. 31/54 K.W.</u>	<u>Peak Load on Plants during 1954</u>	<u>K.W.H. Generated Net - 1954</u>
Calgary Power Ltd.	203,000	185,000	854,271,700(1)
Northland Utilities Ltd.	666	430	3,235,218
Total Hydro:	<u>203,666</u>		<u>857,506,918</u>

STEAM

Canadian Utilities Ltd. (6)	34,500	28,300	100,405,566
East Kootenay Power Co. Ltd. (4)	12,500		356,490
City of Edmonton	90,000	83,000	307,404,600
City of Lethbridge	13,500	8,800	35,406,900
City of Medicine Hat	43,400	39,900	174,037,500(5)
Total Steam:	<u>193,900</u>		<u>617,611,056</u>

INTERNAL COMBUSTION

Canadian Utilities Ltd.	4,395(2)	3,365	10,221,932(3)
Northland Utilities Ltd.	6,294	4,290	10,497,691
Town of Edson	1,189	500	1,747,717
Misc. Plants	1,800	1,075	1,548,723
Total Internal Combustion:	<u>13,678</u>		<u>24,016,063</u>
<u>GRAND TOTAL:</u>	<u>411,244</u>		<u>1,499,134,037</u>

- (1) Includes some miscellaneous diesel generation.
- (2) Includes one 1,200 K.W. unit at Fairview.
- (3) Includes 524,800 K.W.H. generated at Fairview.
- (4) See footnote (4) on Table No. 9.
- (5) Includes 135,306,370 K.W.H. sold to Calgary Power Ltd.
- (6) Includes 7,500 K.W. gas turbine.

TABLE NO. 11

The following table may be of interest as showing the relative position of steam, hydro and internal combustion in the Province, and of publicly owned and privately owned plants as at December 31, 1954.

<u>Method of Generation</u>	<u>% of Power Generated</u>	<u>% of Capacity</u>
Hydro	57.2	49.6
Steam	41.2	47.1
Internal Combustion	1.6	3.3
	<hr/>	<hr/>
	100	100
Publicly Owned	34.6	36.0
Privately Owned	65.4	64.0
	<hr/>	<hr/>
	100	100
	<hr/>	<hr/>

TABLE NO. 12

SUMMARY OF GENERATING PLANTS IN ALBERTA

as at December 31, 1954

Owner	Hydro		Steam		Internal Combustion	
	K.W. Rating	K.W.H. generated net - 1954	K.W. Rating	K.W.H. generated net - 1954	K.W. Rating	K.W.H. generated net - 1954
A. <u>Within the inter-connected system.</u>						
Calgary Power Ltd. (only)	203,000	854,271,700				
Canadian Utilities Ltd.			34,500	100,405,566		
East Kootenay Power Co. Ltd.			12,500	356,490		
City of Edmonton			90,000	307,404,600		
City of Lethbridge			13,500	35,406,900		
City of Medicine Hat			43,400	174,037,500		
TOTAL GROUP A.	203,000	854,271,700	193,900	617,611,056		
B. <u>Systems within the Peace River country mostly interconnected with each other.</u>						
Canadian Utilities Ltd.					4,395	10,221,932
Northland Utilities (including Manning and Valleyview)					4,235	7,437,053
TOTAL GROUP B.					8,630	17,658,985
C. <u>Sanguo - Greencourt System (1)</u>						
Northland Utilities Ltd.						351,744
TOTAL GROUP C.						351,744
D. <u>Isolated Towns served by Northland Utilities Ltd.</u>						
Athabasca System					794	1,177,112
Jasper	666	3,235,218			975	986,714
Wildwood (1)						54,325
Lac La Biche					290	490,743
TOTAL GROUP D.	666	3,235,218			2,059	2,708,894
E. <u>Other Isolated Towns</u>						
Town of Edson					1,189	1,747,717
Misc. Plants including Slave Lake Utilities, Consort, Empress, Ft. McMurray					1,800	1,548,723(Est.)
TOTAL GROUP E.					2,989	3,296,440
TOTAL ALL GROUPS	203,666	857,506,918	193,900	617,611,056	13,678	24,016,063
TOTAL HYDRO	203,666	857,506,918				
TOTAL STEAM	193,900	617,611,056				
TOTAL INTERNAL COMBUSTION	13,678	24,016,063				
GRAND TOTAL	411,244	1,499,134,037				

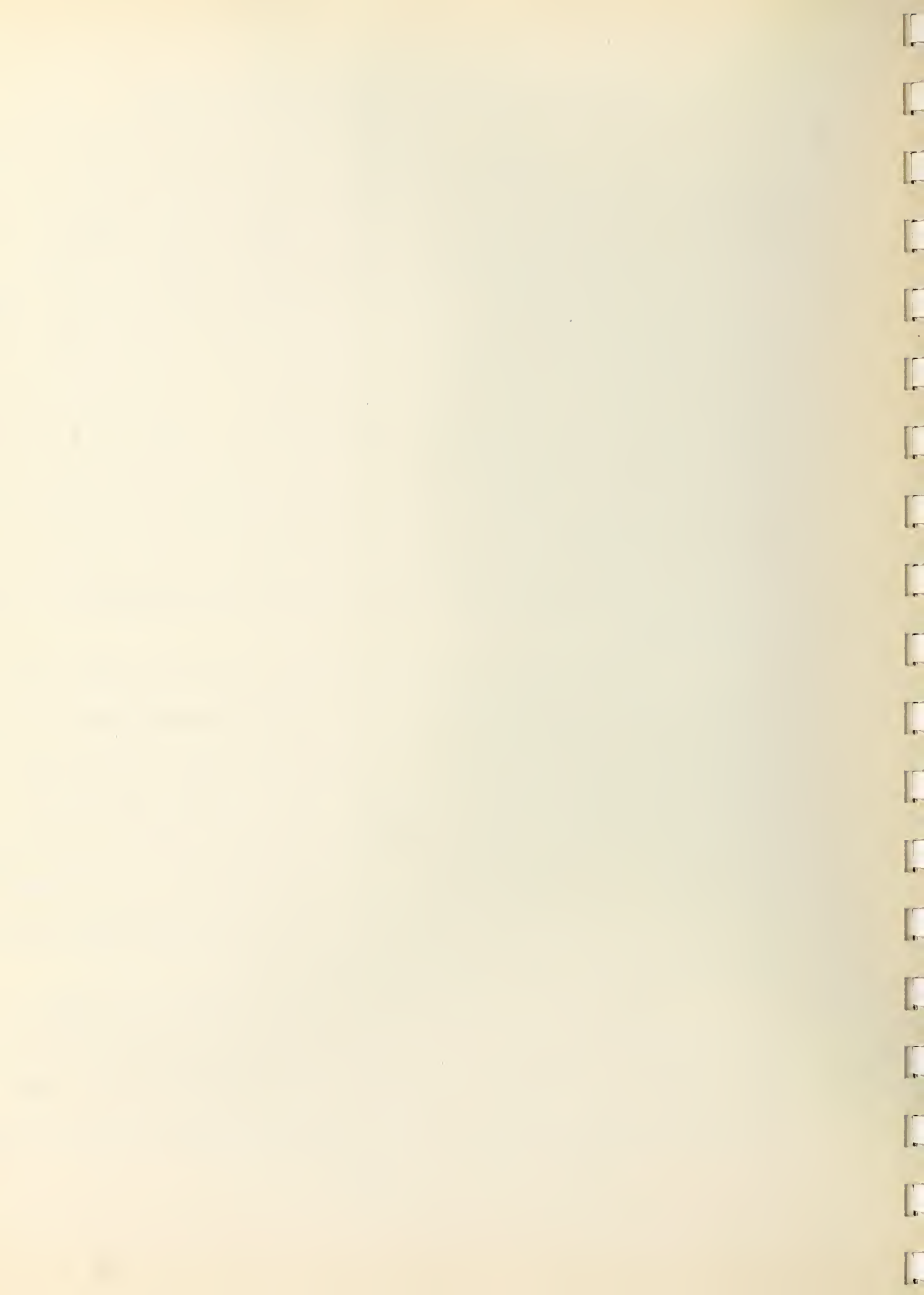
(1) Sold to Calgary Power Ltd. during 1954.

The following comments deal with the Province as a whole.

K.W.H. Generated: The actual increase in K.W.H. generated for use in the Province was approximately 14%. The figure for the increase of K.W.H. actually generated in the Province was only 11.8%. The output of the East Kootenay Power Company's Sentinel Plant, while properly considered as K.W.H. generated in Alberta, was in reality energy generated which, in the main, was exported to British Columbia. During 1954 the Sentinel Plant suspended operations. This has the effect of reducing the K.W.H. generated in Alberta in 1954, but had little effect on the K.W.H. generated for use in Alberta. Generation by the hydro plants increased only 7.4%, while that of the steam plants increased 18.7%. The hydro plants were operated in the most efficient manner possible, making the best use of all their water. The steam plants of Edmonton and Medicine Hat took up the slack and increased their generation. One factor that should be taken into consideration in this is that the new unit in the Ghost River plant and the Bearspaw unit came on late in the year.

Internal combustion plants increased their output by 8.7%. This, of course, is largely that generated by Northland Utilities Limited and Canadian Utilities Limited in the Peace River country. The actual K.W.H. generated by internal combustion plants in the Peace River country increased approximately 14%; so that the energy generated by internal combustion engines by these two Companies has increased considerably. The percentage decrease in energy generated by internal combustion engines is due to the fact that several areas which were formerly served by isolated internal combustion engines have now been absorbed into one or other of the interconnected systems.

Peak Load: The actual increase in peak load used in the Province was approximately 12%, but owing to the fact that in previous years the Sentinel plant of the East Kootenay Power Company was operated for twelve months in the year, while it was closed down during the later months of 1954 (the peak period), the increase of peak



load generated in the Province is less than this by about 3%. The increase of 12% in the peak load, while less than last year, is nevertheless, a large increase. Under present conditions it is about what is to be expected. Peak load usually occurs in December, and then only during the last few days before Christmas. It is greatly affected by weather. Extreme cold and blizzard conditions cause a very large increase in peak load. The weather in December, 1954, was unusually mild, but so was December, 1953. Since the weather in December of both years was approximately the same, this increase of 12% in peak load may be considered a fair indication of how the load in the Province is growing. If, however, December, 1954, had been stormy the peak load would probably have been another 6,000 K.W. above what it was. The following figures show our estimate of the actual coincident peak for the Province.

TABLE NO. 13

System	Estimated Peak Load K.W. 1954
_____	_____
Interconnected system, less East Kootenay Power Co. Ltd.	327,100
East Kootenay Power Co. Ltd.	3,200 (1)
Canadian Utilities Ltd. (Peace River country)	3,365
Northland Utilities Ltd.	4,620
Edson	500
Miscellaneous plants	1,075 (Est.)
	<u>339,860</u>

(1) Sentinel Plant not operated during last months of 1954. This peak was supplied from B.C. Plant.

The figures for generation in Tables No. 9 to 13 are those for the Central Station Industry only. These are the figures usually quoted in the Canada Year Book, and by other organizations gathering statistics.

In addition to these, of course, much electricity is generated by various industries for their own use. It is hard to know where to draw the line as to how small an industry should be included when gathering statistics of this energy generated. In Table No. 14, we have collected this information under the headings of mines, Provincial Government plants and other industries.

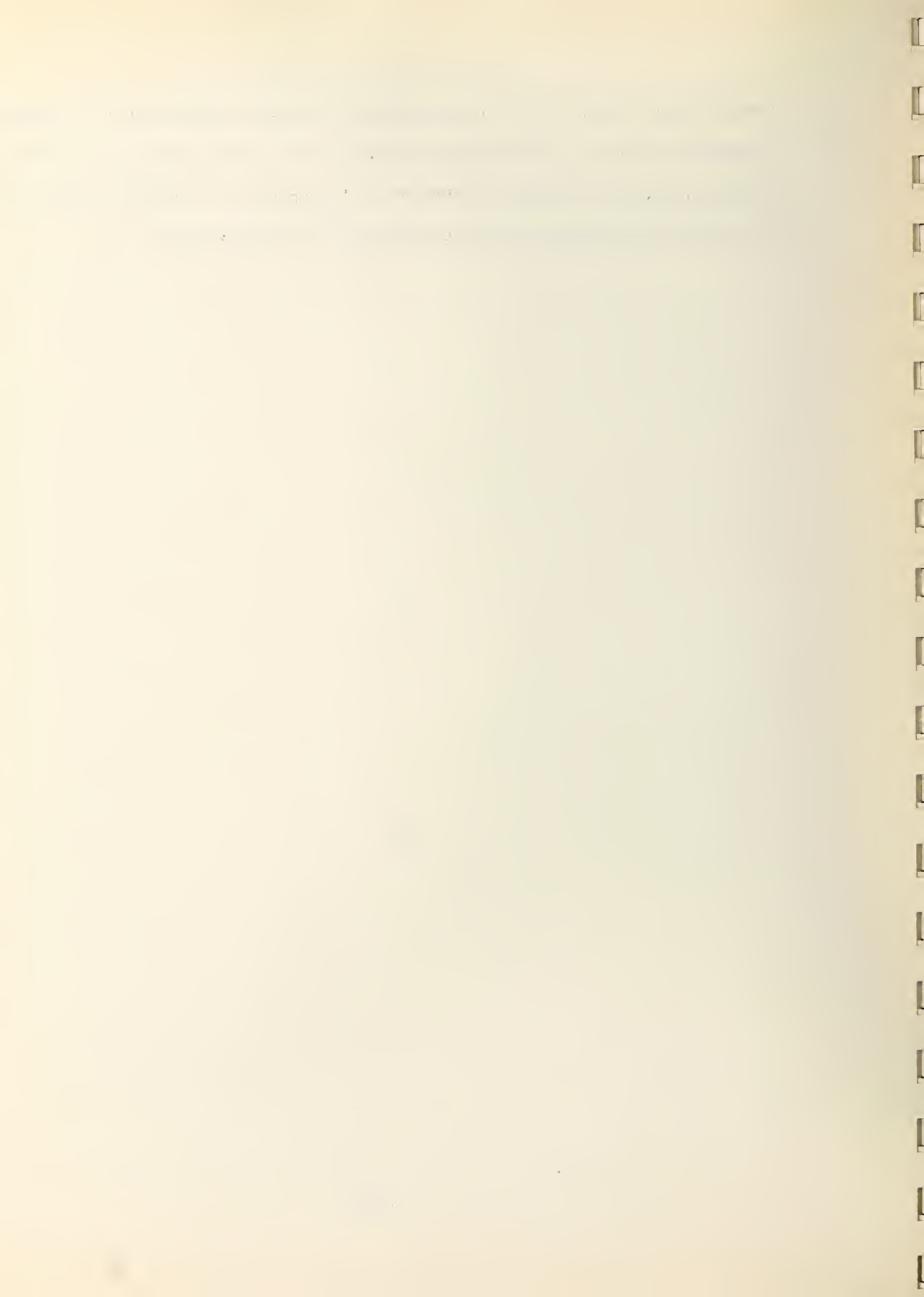
TABLE NO. 14
Industries Generating all or part of their own power

	<u>Plant Capacity K.W.</u>	<u>K.W.H. Generated</u>
Mines	4,285	10,491,530
Other Industries	24,970	73,746,000
Provincial Government Plants	3,591	6,423,000
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>
	32,846	90,660,530
	<hr style="width: 100%;"/>	<hr style="width: 100%;"/>

The new industries in the Clover Bar and Fort Saskatchewan area generate a large part of their requirements, and this accounts for the increase in the above table over the figures for the previous year. The Sherritt Gordon plant operates a 2,500 K.W. turbine and with this generates a large part of its total requirements, the remainder being purchased from Calgary Power Ltd. The Celanese plant has three 6,000 K.W. generators installed and produces all of its own power.

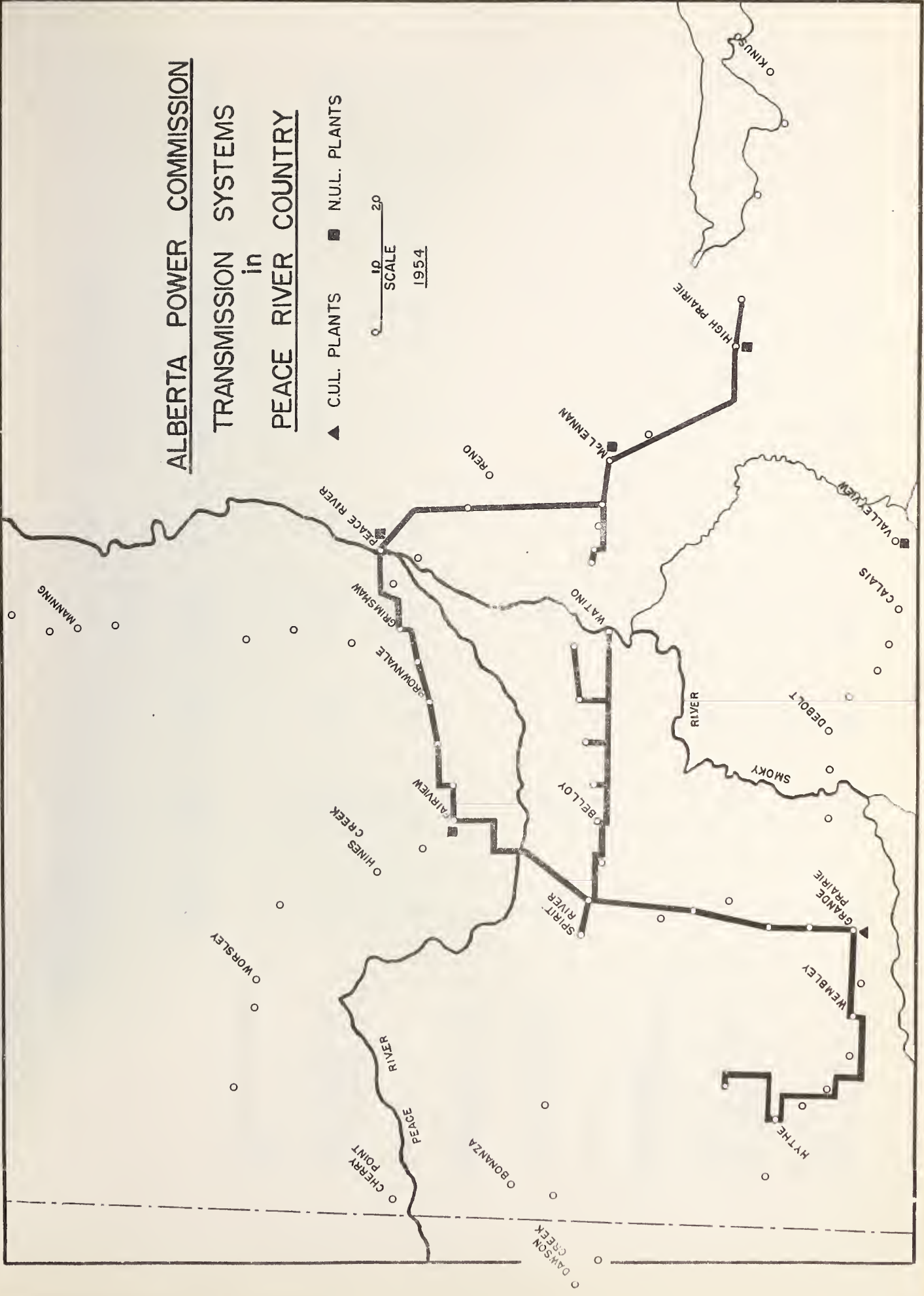
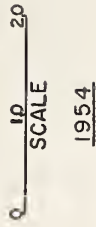
Transmission lines in the Province increased by 444 miles to a total of 8,425,

which includes 2,927 miles of Company-owned farm lines. Distribution line mileage increased by 125 miles to 2,766. The total mileage of all farm lines increased by 4,308 miles, so that the total farm mileage at the end of 1954 was 23,472. The total mileage of all power lines in the Province at the end of December, 1954, was 31,736.



ALBERTA POWER COMMISSION
TRANSMISSION SYSTEMS
 in
PEACE RIVER COUNTRY

▲ C.U.L. PLANTS ■ N.U.L. PLANTS



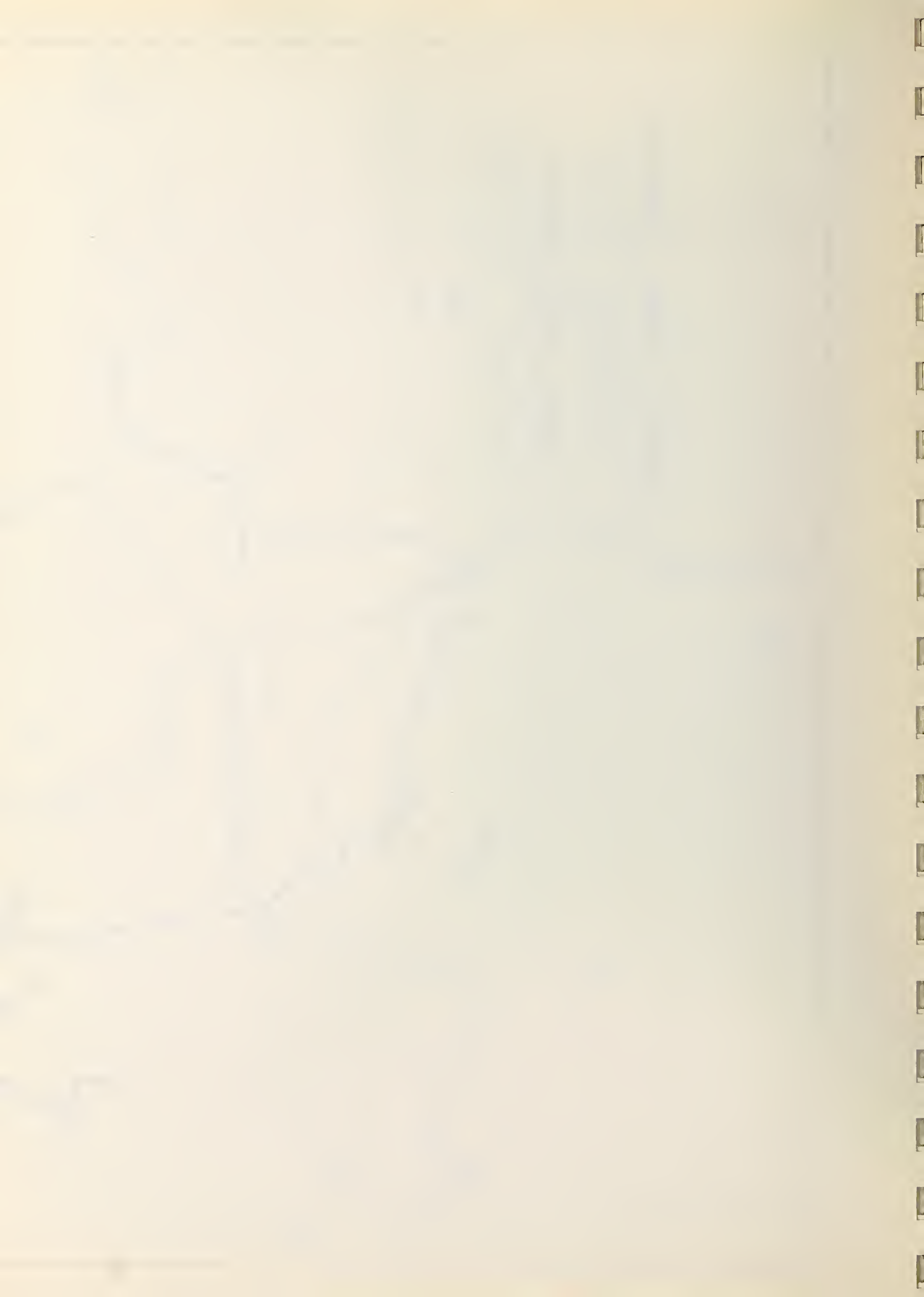


TABLE NO. 15

Total Circuit Miles of Transmission Lines in the Province by Regional Groups as at December 31, 1954.
 This includes Company Owned Farm Lines, but does not include the Co-operative Owned Farm Lines

VOLTAGE

	2,300 to 4,600 V.	6,900 to 12,000 V.	13,800 V.	22,000 V.	33,000 V.	50,000 V.	66,000 V.	132,000 V.	Total
A. <u>Within the Interconnected System</u>									
Calgary Power Ltd.		1,152	49	2,836	59	107	749	838	5,790
Canadian Utilities Ltd.	58	369	43	968	266		299		2,003
City of Medicine Hat			28				48		28
East Kootenay Power Co. Ltd.	6	26							80
Total Group A.	64	1,547	120	3,804	325	107	1,096	838	7,901
B. <u>Systems within the Peace River Country</u>									
Canadian Utilities Ltd.	6	21	61	116			29		233
Northland Utilities Ltd.	23	45		142					210
Total Group B.	29	66	61	258			29		443
D. <u>Isolated Towns of Northland Utilities Ltd. etc.</u>									
Jasper			17						17
Athabasca - Colinton		8		45					53
Lac La Biche		5							5
Slave Lake Utilities	6								6
Total Group D.	6	13	17	45					81
TOTAL ALL GROUPS:	<u>92</u>	<u>1,626</u>	<u>198</u>	<u>4,107</u>	<u>325</u>	<u>107</u>	<u>1,125</u>	<u>838</u>	<u>8,425</u>

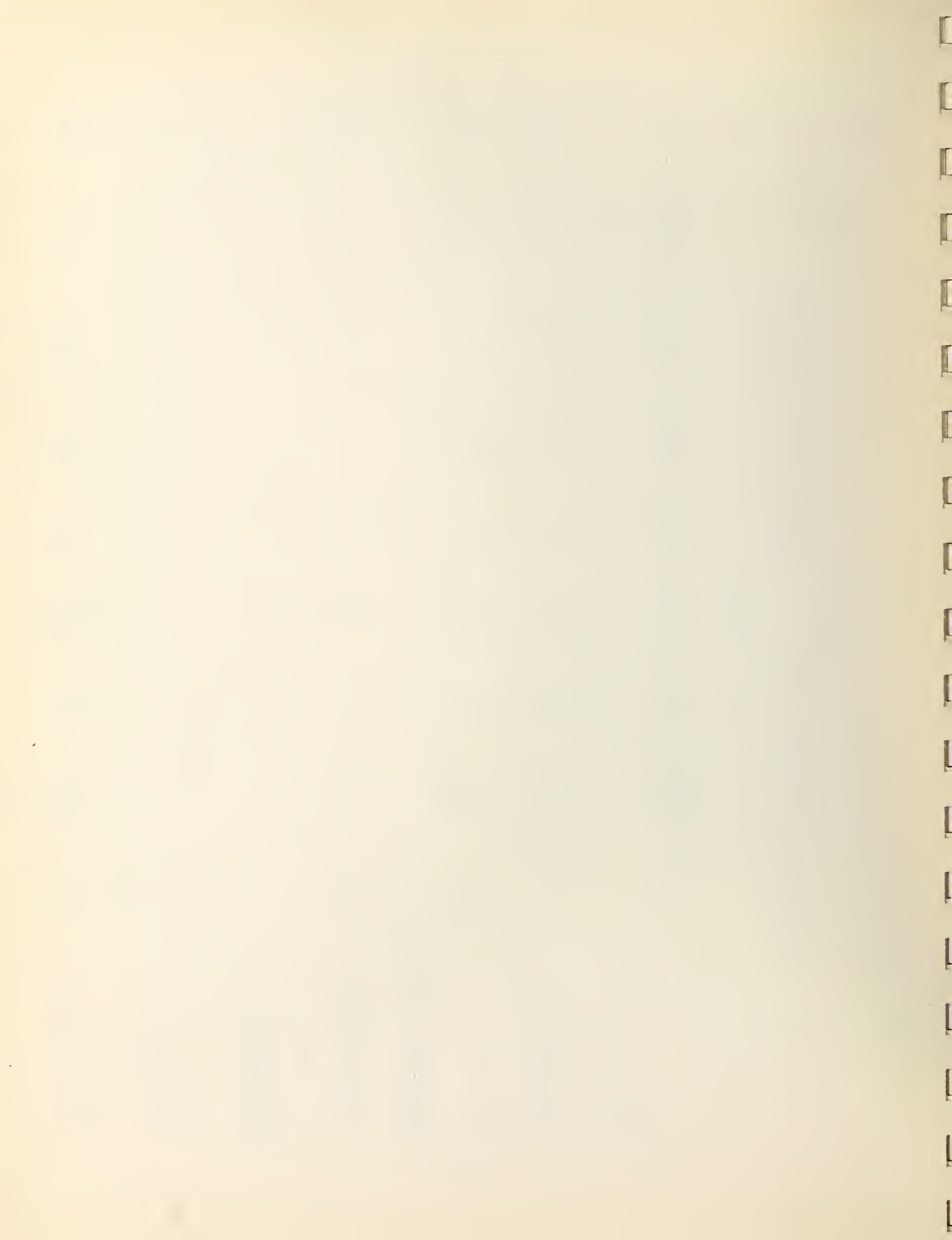


TABLE NO. 16

SUMMARY OF DISTRIBUTION SYSTEMS IN ALBERTA
As at December 31, 1954

	Total Number of Customers Served (Includes Rurals)	K.W.H. Sold (Less Sales to other Co.s) (Includes Rurals)	Circuit Miles of Line (Excludes Rurals)
A. <u>Within the Interconnected System</u>			
Calgary Power Ltd.	68,979	560,644,500	698
Canadian Utilities Limited	27,107	79,822,742	377
East Kootenay Power Co. Ltd. (1)	1,085	10,295,234	14
City of Edmonton	55,063	269,740,209	555
City of Calgary	51,949	269,583,994	566
City of Lethbridge	8,000(Est.)	29,400,000(Est.)	100(Est.)
City of Medicine Hat	5,800(Est.)	34,900,000(Est.)	110(Est.)
City of Red Deer	3,335	11,408,339	39(Est.)
Town of Cardston	860(Est.)	2,800,000(Est.)	25(Est.)
Town of Fort Macleod	650(Est.)	1,900,000(Est.)	12(Est.)
Town of Ponoka	1,133	2,899,023	23
Total Group A.	223,961	1,273,394,041	2,519
B. <u>Systems Within the Peace River</u>			
Canadian Utilities Ltd.	4,019	8,475,863	50
Northland Utilities Ltd., including High Prairie, McLennan, Valleyview and Manning	4,034	7,350,308	108
Total Group B.	8,053	15,826,171	158
C. <u>Sangudo - Greencourt System (2)</u>			
Northland Utilities Ltd.		291,553	
Total Group C.		291,553	
D. <u>Isolated Towns served by Northland Utilities Ltd.</u>			
Athabasca System	705	1,050,000(Est.)	20
Jasper	593	3,770,000(Est.)	20
Wildwood(2)		47,900	
Lac La Biche	288	450,000(Est.)	7
Total Group D.	1,586	5,317,900	47
E. <u>Other Isolated Towns</u>			
Town of Edson	991	1,600,000	13
Miscellaneous	2,552	1,390,000	29
Total Group E.	3,543	2,990,000	42
GRAND TOTAL	237,143	1,297,819,665	2,766

(1) Includes Towns of Coleman, Frank, Cowley, etc.

(2) Part year only - Sold to Calgary Power Ltd., April, 1954.

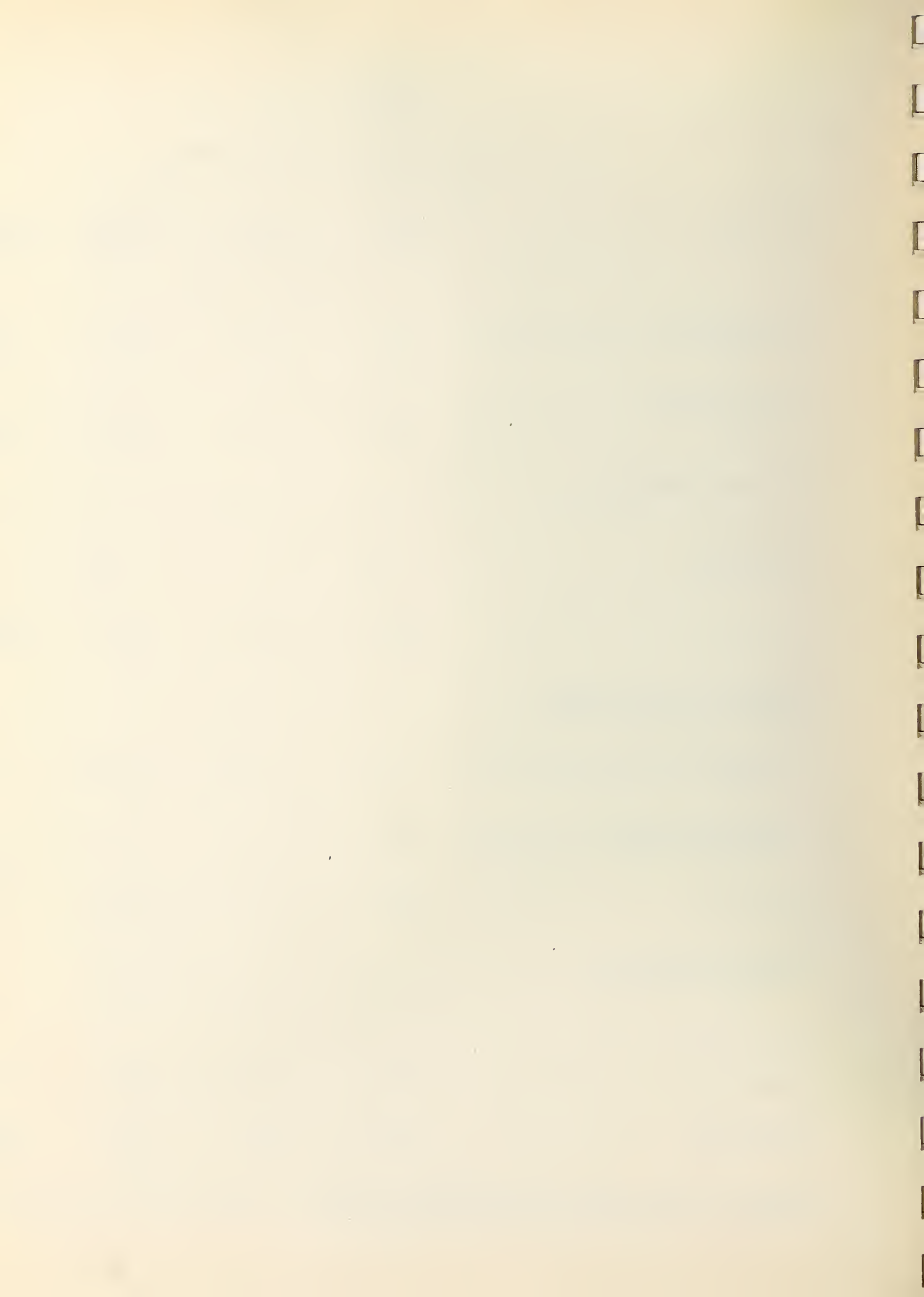
TABLE NO. 17

SUMMARY OF RURAL ELECTRIFICATION SYSTEMS IN ALBERTA

As at December 31, 1954

Owner	Number Farmers Served	Number Non-farmers Served	Total Number Customers	Circuit Miles of Line
A. Calgary Power Ltd.				
Experimental Areas and Individual Rurals (1)	3,771	655	4,426	2,321
R.E.A.s	18,790	3,205	21,995	14,617
Canadian Utilities Ltd.				
Experimental Areas and Individual Rurals (1)	803	110	913	366
R.E.A.s	5,541	449	5,990	4,779
East Kootenay Power Co. Ltd.				
R.E.A.s and Lundbreck Co-op.	90	48	138	118
City of Edmonton	98		98	50
City of Calgary	168		168	85
City of Red Deer	24		24	10
Town of Ponoka	7		7	4
Total Group A.	29,292	4,467	33,759	22,350
B. <u>Systems Within the Peace River Country</u> <u>mostly interconnected with each other</u>				
Canadian Utilities Limited				
Experimental Areas and Individual Rurals (1)	75	88	163	32
R.E.A.s	466	30	496	521
Northland Utilities Limited				
Experimental Areas and Individual Rurals (1)	111		111	45
R.E.A.s	374	25	399	370
Total Group B.	1,026	143	1,169	968
D. <u>Isolated Towns Served by</u> <u>Northland Utilities Limited, etc.</u>				
Company Owned Rurals (1)	31		31	10
R.E.A.s	146	25	171	140
Other Companies	9		9	4
Total Group D.	186	25	211	154
GRAND TOTAL:	30,504	4,635	35,139	23,472

(1) The lines to serve these farms are the property of the Power Companies. This mileage is also included in the table showing transmission lines under the heading of 6,900 to 12,000 volt lines, etc.



DATA RE CENTRAL ELECTRIC STATIONS IN ALBERTA BY REGIONAL GROUPS

As at December 31, 1954

Plants	Group A	Group B	Group C	Group D	Group E	Total
K.W. Rating	396,900	8,630		2,725	2,989	411,244
K.W.H. Generated	1,471,882,756	17,658,985	351,744	5,944,112	3,296,440	1,499,134,037
<u>Transmission Lines</u>						
Miles of Line	7,901	443			81	8,425
<u>Distribution Lines</u>						
Number of customers served	223,961	8,053		1,586	3,543	237,143
K.W.H. Sold	1,273,394,041	15,826,171	291,553	5,317,900	2,990,000	1,297,819,665
Miles of Line	2,519	158		47	42	2,766
<u>Rural Lines</u>						
(1) Number of Farms Served	29,292	1,026		186		30,504
(1) Number of Non-farmers Served	4,467	143		25		4,635
(2) Miles of Farm Line	22,350	968		154		23,472
(3) Miles of R.E.A. Line	19,514	891		140		20,545

(1) Included in Number of Customers shown under Distribution Lines.

(2) Partly included in Number of miles of Transmission Lines.

(3) Not included in Miles of Line shown under Distribution or Transmission Lines.

The following is a more detailed summary of the increases in generating capacity, transmission lines, etc., during the year 1954.

Calgary Power Ltd.

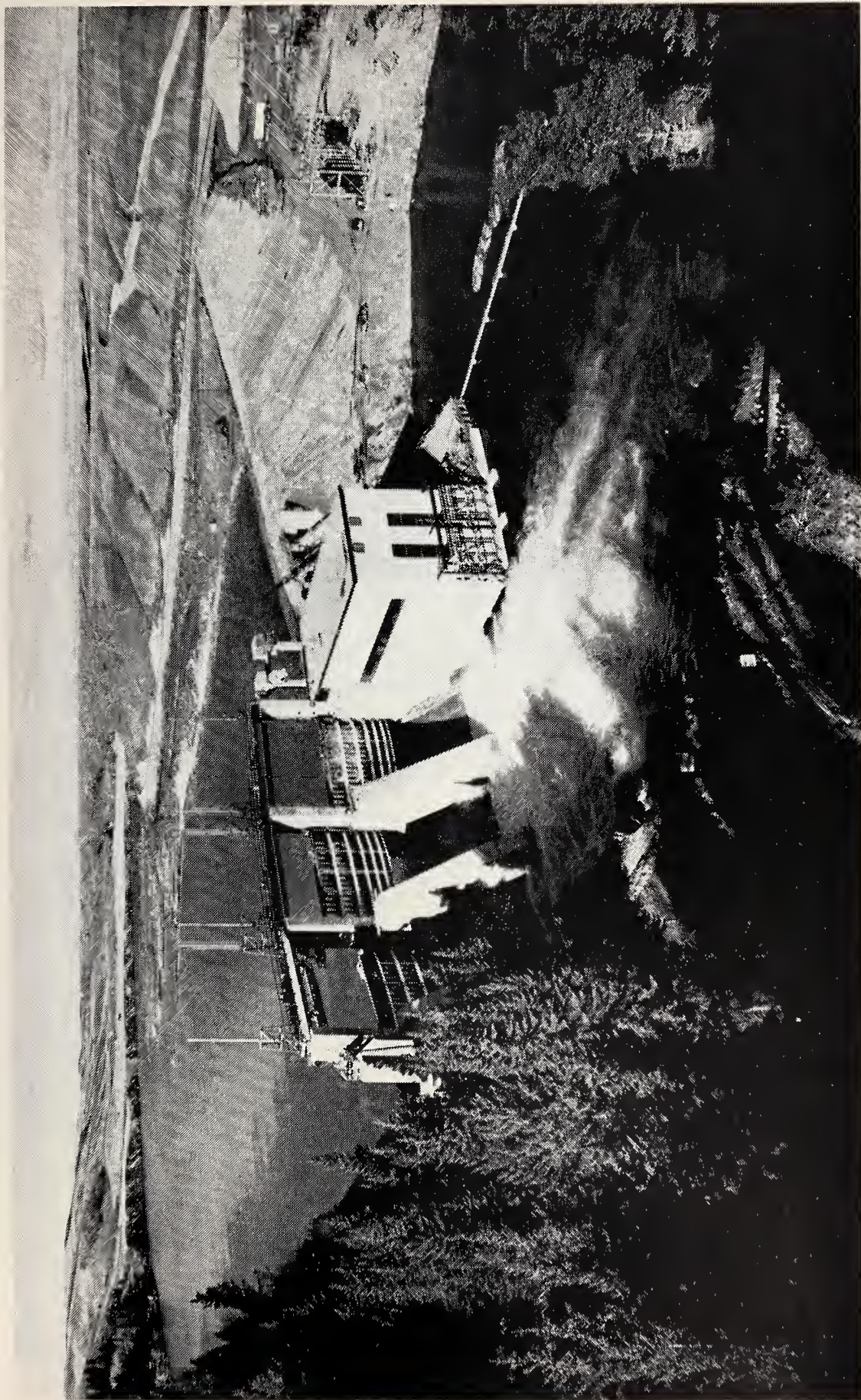
(1) Changes in Plant Capacity.

By completing the construction of the Bearspaw plant and by increasing the capacity of the Ghost River plant, the Company increased its generating capacity by 40,000 K.W. The unit at Bearspaw is capable of generating 17,000 K.W., and the installation of the third unit at the Ghost plant raised the capacity of that plant by 23,000 K.W. This unit, which is larger than either of the previous units, will be used principally for supplying peak loads.

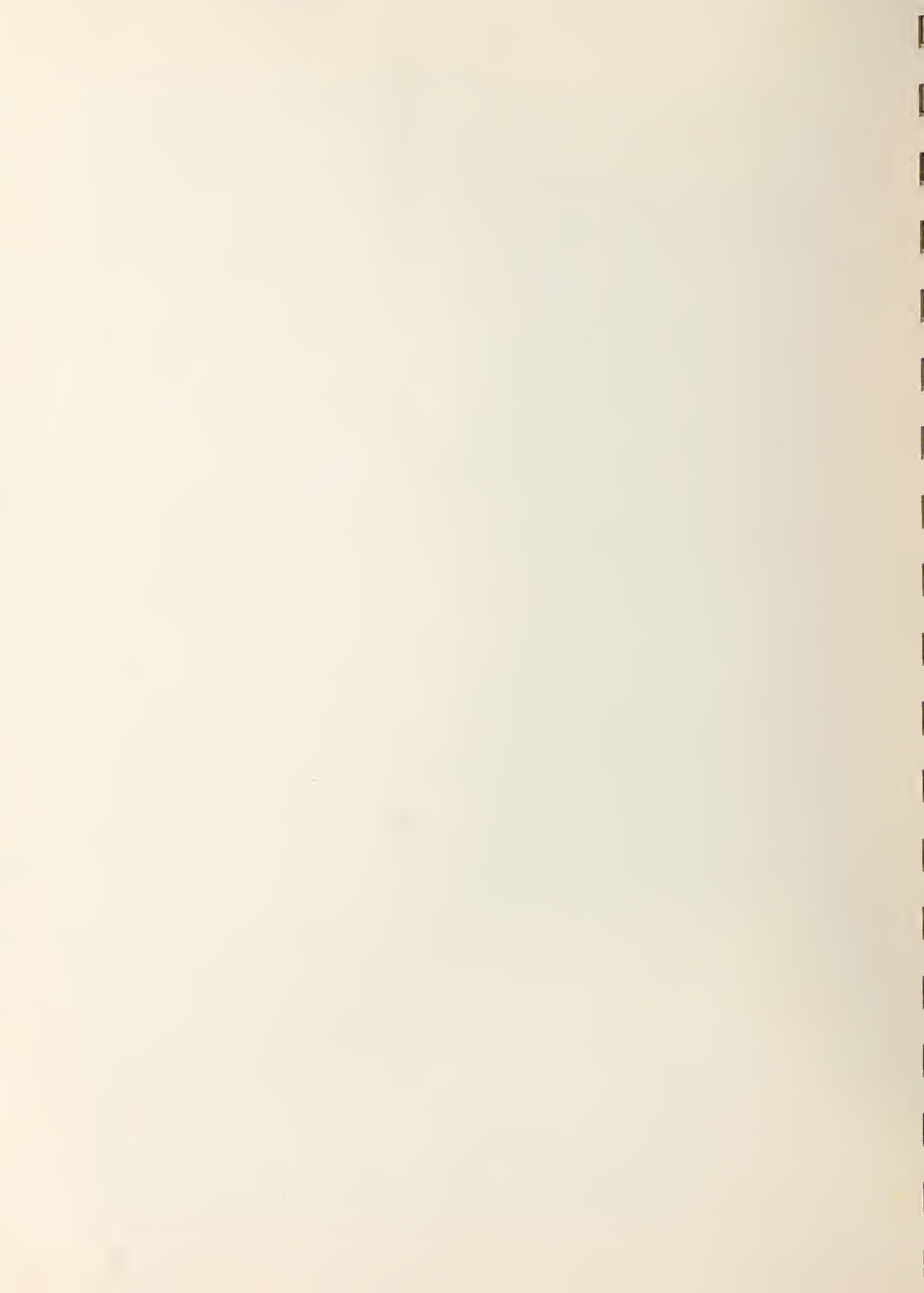
The Company's Pocaterra-Interlakes project is scheduled for completion in the fall of 1955. The main dam foundations are ready to receive fill material in the spring; the reservoir clearing operations are over 90% complete except for burning, which will be done this winter; the pipeline grade is complete except for some rock excavation; a good start has been made on the Pocaterra powerhouse foundations and the excavation for the Interlakes powerhouse and placing of foundations have been completed. This development is expected to add 18,000 K.W. to the supply next year. Of this, 13,000 will be in the Pocaterra plant and 5,000 in the Interlakes plant.

The Company's steam plant at Wabamun has been started and is expected to be in operation by the fall of 1956. During the summer and fall of 1954 the intake and discharge canals and the powerhouse yard and substructure excavation work was carried out in preparation for active construction of the powerhouse in 1955.

The Company also carried out investigations on the North Saskatchewan, Brazeau and Athabasca Rivers. Some of these developments may not take place in the near future, but undoubtedly these projects will be started before too many years go by. Since



The Bears Paw Plant of Calgary Power Ltd.



the question of development of power on the North Saskatchewan River will have a bearing on the winter flow at Edmonton, and thus on the problem of pollution, work may be started to develop a plant on that river sooner than we might otherwise expect.

(2) Major Changes in Interchange Agreements.

There have been no changes in interchange agreements.

(3) Additional Transmission Lines.

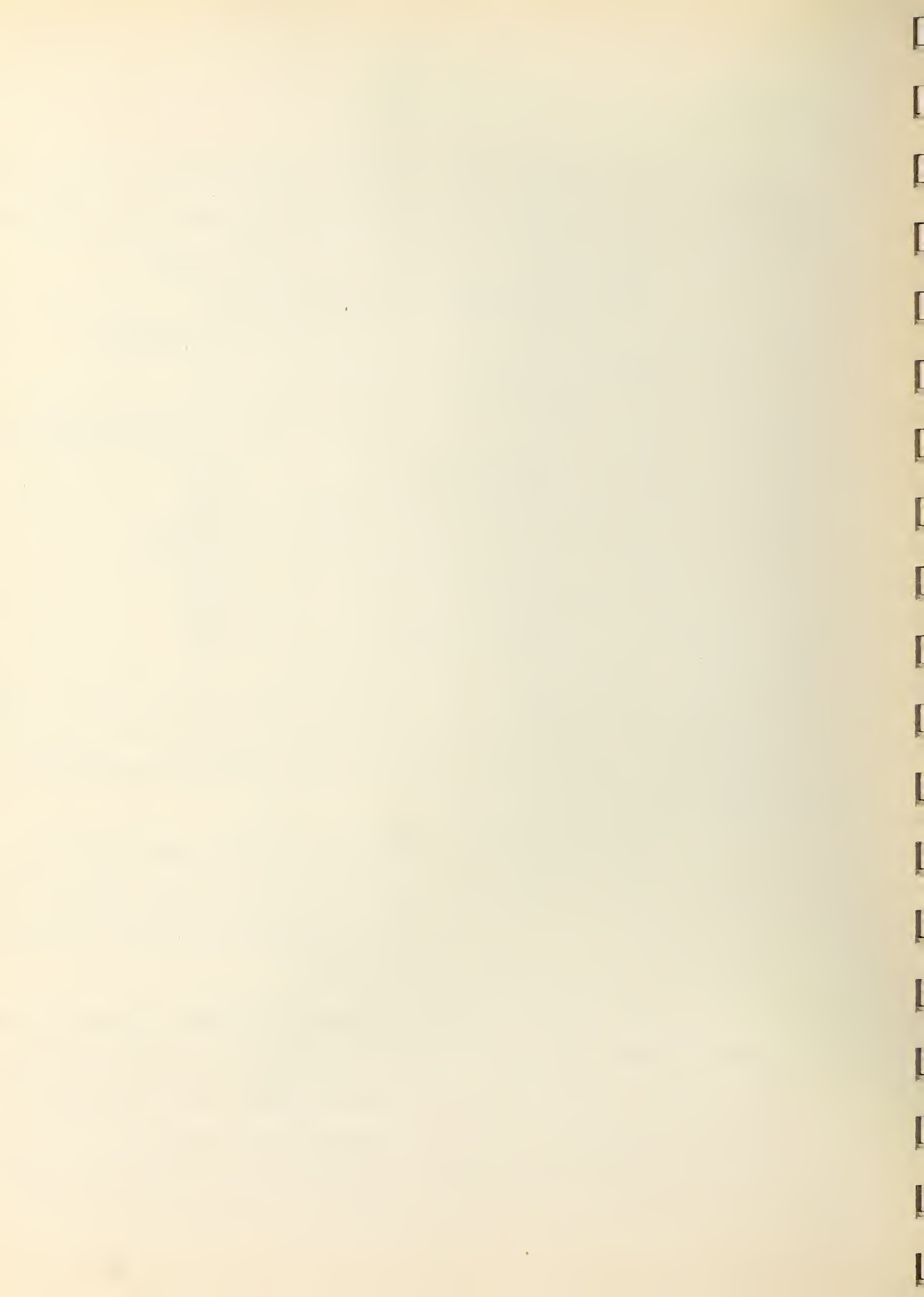
During the year the Company built the following transmission lines:

Wabamun to Entwistle	66 KV
Entwistle to Wildwood	22 KV
Evansburg to Rochfort Bridge	22 KV
Enchant to Lomond	22 KV
Entwistle to Drayton Valley	66/22 KV
Thorhild to Newbrook	66 KV
Medicine Hat to Irvine	22 KV
Vauxhall to Hays	22 KV
Westlock to Fawcett	22 KV
Newbrook to Boyle	66 KV

A 5,000 KVA 69/13.2 KV substation was constructed in Northeast Calgary to supply the new industrial and residential areas being developed in this part of the City. This substation will be supplied from the new 69 KV transmission line connecting the East Calgary substation and Bearspaw plant.

A 25,000 KVA 69 KV substation was established at the Bearspaw Power Development approximately 11 miles west of Calgary. The transformer bank in this case consists of used equipment released from the Ghost Power Development by virtue of the fact that this station was converted entirely to 138 KV voltage.

Load growth in the Edmonton area has necessitated increasing transformer capacity, stepping down from the 138 KV to 72 KV bus. A new 50,000 KVA throughput auto transformer has been installed at this station in parallel with an existing 25,000 KVA throughput auto transformer, and a 10,000 KVA bank of static capacitors has been installed for voltage improvement and to provide the required increase in transmission line capability.



The 6,000 KVA 69/23 substation at Fort Saskatchewan for serving the Sherritt Gordon Mines Ltd. Refining Plant and other loads in this area was completed.

Substantial load growth in the Sylvan Lake area has necessitated the installation of a 2,000 KVA 69/23 KV transformer in the Sylvan Lake substation.

At Evansburg, the Company has constructed a 2,500 KVA 69/23 KV substation including a 23 KV voltage regulator to take care of new towns and oil field loads in this area. A 750 KVA substation was likewise constructed at Wabamun to provide construction power requirements for the Wabamun Steam plant project.

Both of these substations are served by the new 69 KV transmission line running from the vicinity of Winterburn to Evansburg and Drayton Valley. A start has been made on the Drayton Valley substation which will be completed early in 1955.

Voltage regulators on the 23 KV busses were installed at Rockyford and Wetaskiwin while regulators of increased capacity were installed at Fort Macleod and Sylvan Lake.

In many of the above cases the Company felt that these lines would not produce enough revenue to warrant their construction. Nevertheless, the building of these lines made it possible to extend farm electrification to areas which had previously been impossible to serve. It is expected that more lines of this nature will have to be built during the next two or three years and we feel that this Company will be most co-operative in doing all it can to build these lines.

(4) During the year the following Hamlets and Villages were added to the system of Calgary Power Ltd.

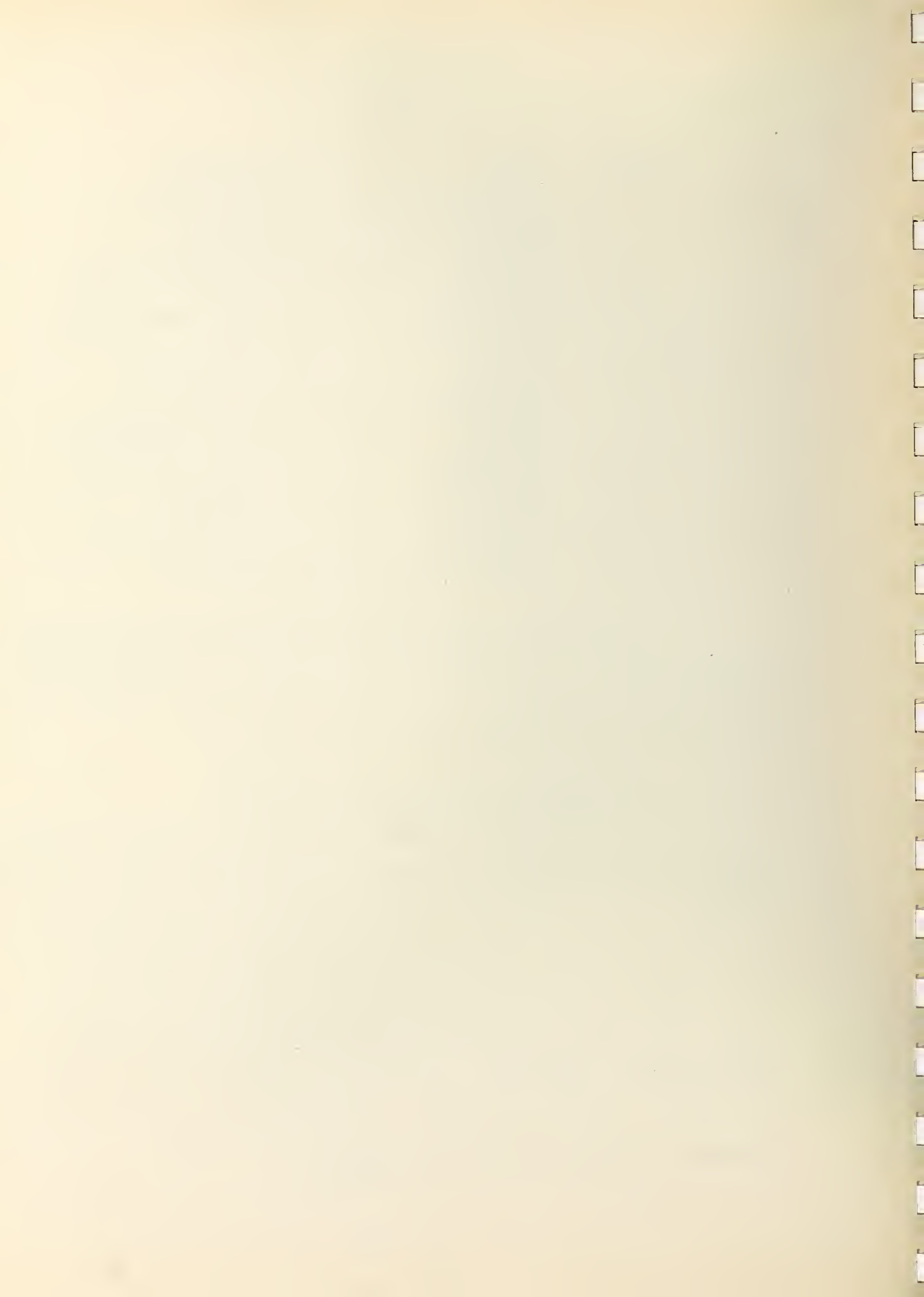
Towns:	Irvine	
Villages:	Boyle	Sangudo
	Evansburg	Wildwood
	Mayerthorpe	Lomond
	Point Alison	

Hamlets:	Abee	Kevisville
	Armada	Lyle Landing
	Bailey Subdivision	Mulhurst
	Baintree	Newbrook
	Bruderheim Subdivision	Nightingale
	Calahoo	Normandeau Gardens
	Conquerville	Opal
	Cooking Lake	Pincher Creek Subdivision
	Crystal Springs	Priddis
	Dapp	Rich Valley
	Del Bonita	Rochfort Bridge
	Drayton Valley	St. Francis
	Entwistle	Strathcona Heights
	Fawcett	South Sunde Subdivision
	Genesee	Sunnyside Subdivision
	Grantham	Tawatinaw
	Greencourt	Telfordville
	Hays	Travers
	Heatherdown	Water Valley
	Jarvie	Whitecroft
	Johnson' Addition - Taber	Walsh

During the year Calgary Power Ltd. purchased the Sangudo, Mayerthorpe and Wildwood properties of Northland Utilities Limited and thus made it possible to serve this area of the Province from a larger system at cheaper rates.

(5) Service to Oil Fields, New Industries, etc.

During the year 1954 the Company received applications for an additional 160 oil well pumping services and additional battery pumping services bringing total applications to some 1,910 oil pumps to date. Service has been extended during the year to some 250 oil wells and 10 battery pumps. Main line extensions have been provided to some oil well pumps in the Bonnie Glen and Legal areas in addition to those fields already being served, such as Acheson, Stony Plain, Barons, Joarcam, Bon Accord, Campbell, Chauvin, Ellerslie, Excelsior, Golden Spike, Leduc, Redwater, and Turner Valley. In addition to oil well and battery pumping services they are also providing electric power for numerous other operations in the various oil fields on their system.

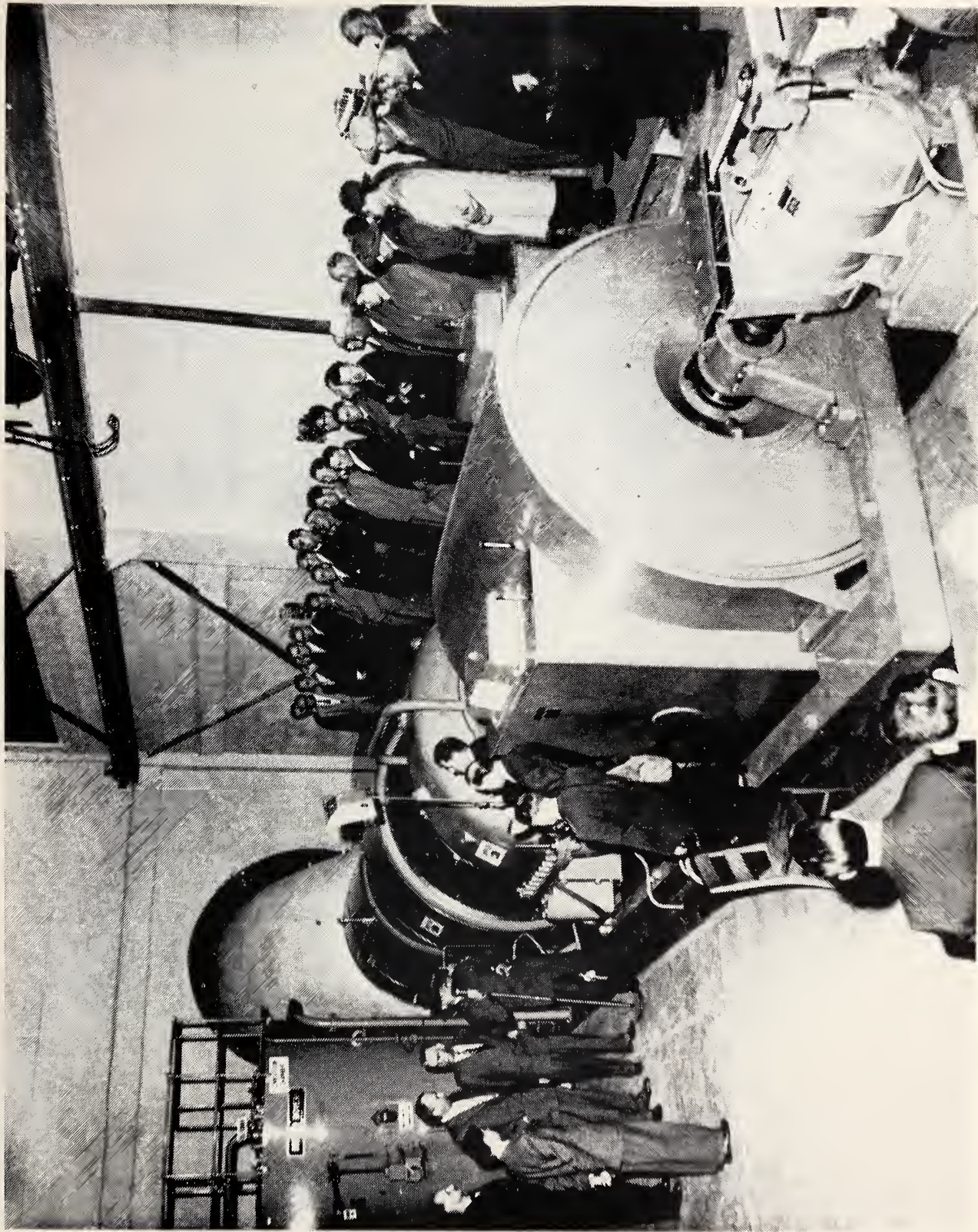


(1) Changes in Plant Capacity

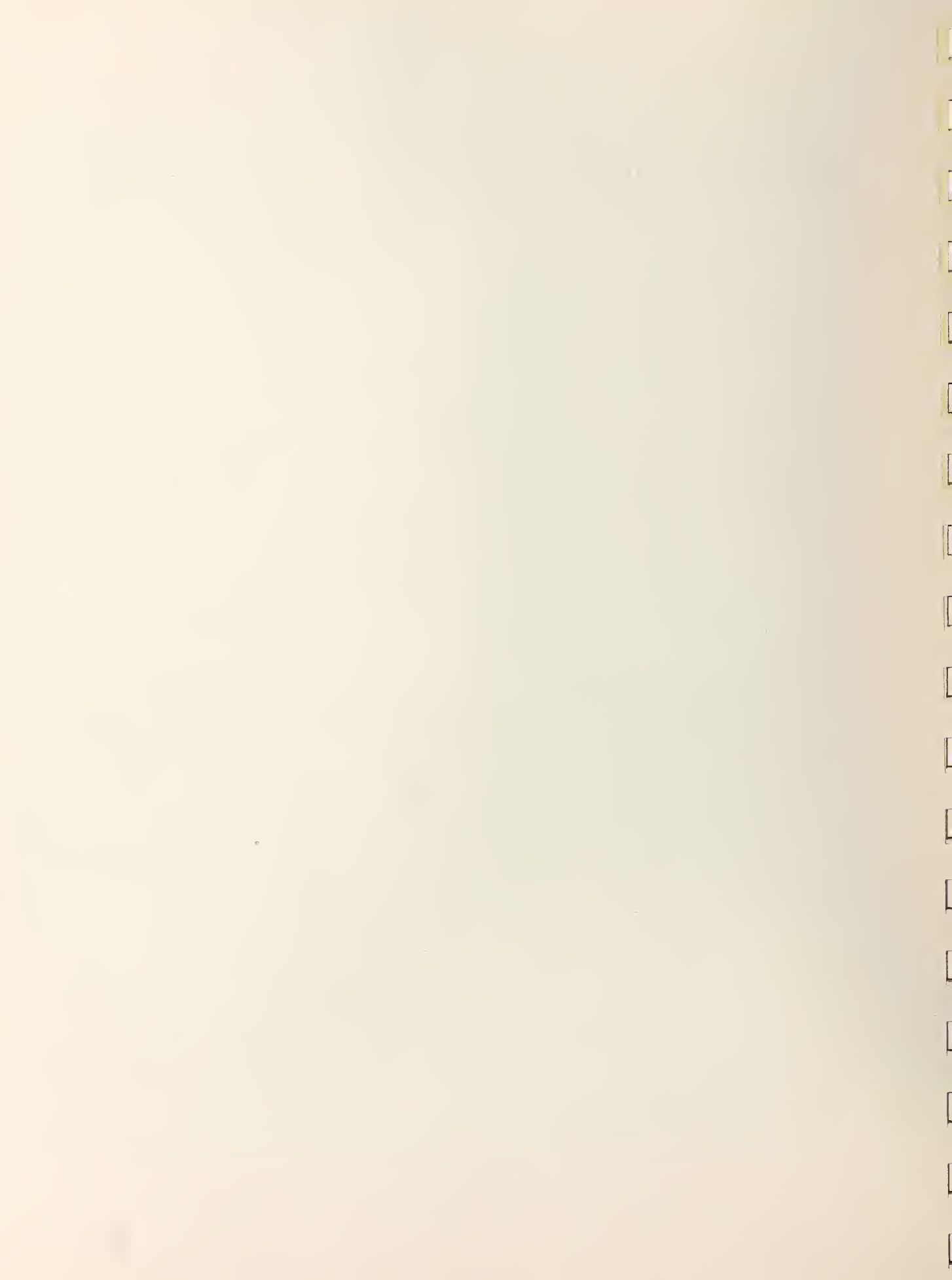
During the year the erection of Canada's first gas turbine was completed in the Company's Vermilion plant. At present this machine operates on natural gas and is rated at 7,500 K.W. While gas turbines are beyond the experimental stage, nevertheless the operation of this unit will be an interesting experiment to watch to see if these units might not be adapted to meet Alberta's needs. This unit may pave the way for the installation of further gas turbines in some of the more remote locations in Alberta where a supply of gas is available, but where only a relatively small quantity of power is needed, and where power is not available from an interconnected system. Gas Turbines may be installed in conjunction with interconnected systems, but where power is available from these interconnected systems, the installation of an isolated gas turbine would not produce power as cheaply as it can be obtained from an interconnected system. The gas turbine has two features which may make it very useful in Alberta. As the temperature decreases the output of a gas turbine increases, so that in this climate where we get our peak loads in the winter time, it should be especially valuable. A gas turbine, moreover, takes a minimum supply of water, which, in some locations, might be the governing factor.

Canadian Utilities Limited has entered into an agreement with Northland Utilities for the joint operation of the latter Company's gas-fuelled diesel plant at Fairview. During the year each Company installed in this plant one additional Cooper-Bessemer engine and generator rated at 1,200 K.W. The installation of these two units brings the total capacity of the Fairview plant to 3,400 K.W., of which Canadian Utilities Limited owns one 1,200 K.W. unit.

Canadian Utilities Limited has announced plans for the building of a new coal-fired steam power plant on the Battle River near Forestburg. The first unit of this plant will be a 32,000 K.W. turbine which is expected to go into operation in the fall of



Canadian Utilities Limited 7,500 K.W. Gas Turbine



1956. The coal supply will come from two new nearby producers, - the Battle River Coal Company and the Forestburg Collieries.

(2) Transmission Lines

During the year the Company built the following transmission lines:

Drumheller to Stettler	66 KV
Rycroft to Fairview	66 KV
Veteran to Monitor	22 KV
Wanham to Watino	22 KV

The line from Rycroft to Fairview forms a connecting link between the system of Northland Utilities Limited north of the Peace River, and the system of the Company south of the river. This, as well as making possible an interchange of power, also ensures greater continuity of service to all the people in the Peace River country. This line also contains the longest span in Alberta, - that over the Peace River which is 3,762 feet.

As well as building these transmission lines the Company has increased the necessary substation facilities at various points in the Province. At Fenn a 69/24 KV substation of 3,000 KVA capacity was set up to provide power for the former transmission line to Drumheller. This provides service to the oilfields in the area. At Two Hills the capacity of the 34.5/24 KV substation was increased from 1,000 to 2,000 KVA. Capacity of the 69 KV substations at Castor and Hanna was increased from 1,500 to 3,000 KVA.

(3) Towns and Villages added to the Company's system in 1954.

Benton	Loyalist
Buffalo Lake	Veldt
Peoria	Smoky Heights
Blueberry Mountain	Silver Heights
Eaglesham	Talbot
Tangent	Flat Lake
Watino	Halcourt
Monitor	Elmsworth
Poplar Ridge	Rio Grande
Teepee Creek	Huallen
Bonnyville Beach	Fox Creek
Valhalla	

Northland Utilities Limited

(1) Changes in Plant Capacity

Northland Utilities Limited made various minor changes in their power plants. During the year they sold the Sangudo-Greencourt system to Calgary Power Ltd., and this area is now served by that Company's transmission lines.

Northland Utilities Limited entered into an agreement with Canadian Utilities Limited whereby the two Companies operate the Fairview plant jointly. During the year each Company installed in this plant one additional Cooper-Bessemer engine and generator rated at 1,200 K.W. The installation of these two units brings the total capacity of the Fairview Plant to 3,400 K.W., of which Northland Utilities Limited owns units totalling 2,200 K.W.

During the year Northland Utilities Limited purchased the power plant at Valleyview.

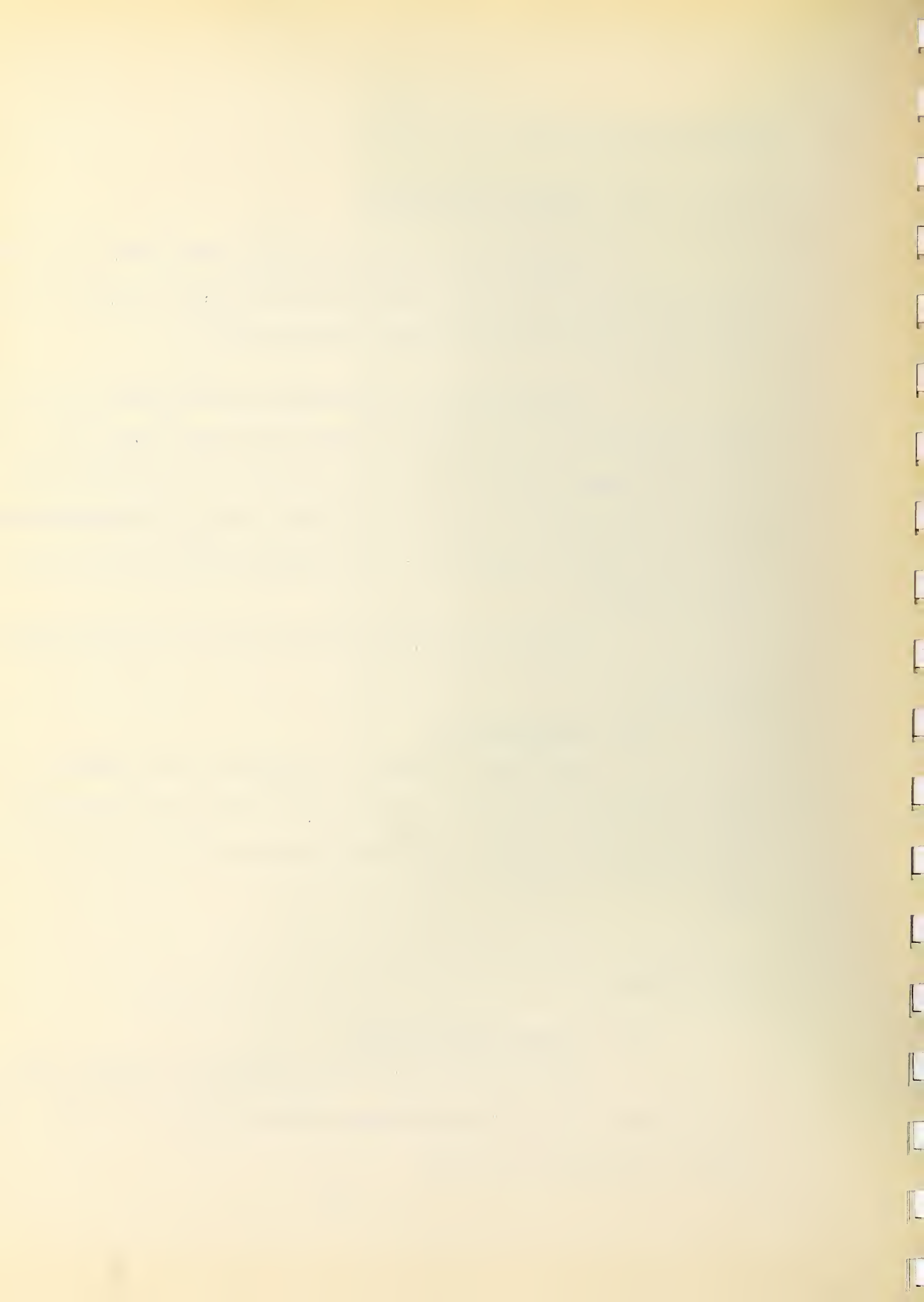
(2) Transmission Lines

The Company extended its transmission line from McLennan to High Prairie, so that it now serves all the towns from Fairview on the west through to Peace River Town, and then south to McLennan and Enilda, by means of an interconnecting transmission line.

City of Edmonton

(1) Changes in Plant Capacity

The City proceeded with the construction of an addition to the City's steam plant and with the work of installing an additional 30,000 K.W. turbine, which is expected to come on the line in 1955.





Architects Drawing of Canadian Utilities Limited Forestburg Steam Plant

FORECAST TO 1958

In the 1951 Power Survey we made an estimate of the peak load for each of the years to 1960. For the years since that time the estimate has proved tolerably accurate. The estimate for 1960 was 620,000 K.W. At December 31st, 1954, the installed capacity of plants in the Province was 411,000 K.W. At December 31st, 1944, - ten years ago - this capacity was only 149,000, so that the increase in the ten year period has been 177%, - a truly amazing increase.

We expect that the rate of increase for the next few years will continue to be high, although it is hardly likely that the present excessively high rate of increase will continue. The peak load of 1954 was an increase of 12% over that for 1953. The corresponding increase for last year was 15%, so that the rate of increase is dropping. The effect of the large new Pembina oil field has not yet made itself felt. It is possible that during the next year or so this may again bring increases of peak load of the same order experienced during the period of 1950 to 1953.

Table No. 19 shows the growth which we believe will take place in the electrical load of the Province from now until 1958. It shows the actual capacity in K.W. of the power plants in the Province as at December 31st, 1953, the increase in capacity during 1954, and the estimated peak load that occurred in 1954. It then goes on to deal with these year by year until 1958, showing our forecast of peak load and what the Companies and Municipalities are planning to do to meet that peak load. It will be noted that the estimated peak load of December 31st, 1954, was approximately 340,000 K.W. The figures for estimated peak load commencing with the year 1955 are the same as in our forecast of some years ago. These may be a little high but we do not see any point in revising them at the moment. The actual peak load of nearly 340,000 K.W. in 1954 is a great deal lower than it might have been if the weather had been cold. We believe that if adverse weather had prevailed just before Christmas, the peak load might have exceeded 350,000 K.W.



Composite Picture of Proposed Wabamun Steam Plant

TABLE NO. 19

Forecast of Generating Capacity in K.W.
(Not taking account of isolated small plants)

	<u>Capacity added during year</u>	<u>Capacity at end of year</u>	<u>Estimated Peak Load</u>
Capacity at Dec. 31, 1953		362,282	313,000
<u>Capacity Added During 1954</u>			
Calgary Power Ghost Extension	23,000		
Bearspaw	17,000		
Canadian Utilities - Vermilion	7,500		
C.U.L. & N.U.L. - Fairview	2,400		
Less isolated plants decommissioned	- 938		
	<hr/>		
Total capacity added during 1954	48,962	48,962	
Total capacity Dec. 31, 1954		<hr/> 411,244	340,000
		say- 411,000	
<u>Capacity to be added during 1955</u>			
Calgary Power - Pocaterra	13,000		
Interlakes	5,000		
City of Edmonton	30,000		
	<hr/>		
Total capacity to be added during 1955	48,000	48,000	
Total capacity Dec. 31, 1955		<hr/> 459,000	410,000
<u>Capacity to be added during 1956</u>			
Calgary Power - Wabamun	66,000		
Canadian Utilities Ltd. - Forestburg	32,000		
	<hr/>		
Total capacity to be added during 1956	98,000	98,000	
Total capacity Dec. 31, 1956		<hr/> 557,000	450,000
<u>Capacity to be added during 1957</u>			
Total capacity to be added during 1957	Nil	Nil	
Total capacity Dec. 31, 1957		<hr/> 557,000	495,000
<u>Capacity to be added during 1958</u>			
City of Edmonton New Plant	60,000		
Calgary Power Ltd. - addition hydro plant	40,000		
	<hr/>		
Total capacity to be added during 1958	100,000	100,000	
Total capacity Dec. 31, 1958		<hr/> <hr/> 657,000	<hr/> <hr/> 535,000

It will be seen from a study of Table No. 19 that there was ample reserve capacity to meet the load in 1954. The Power Commission has always felt that there should be enough reserve capacity in the power plants of the Province so that if the largest unit should break down during the December or January peak load period there would still be enough capacity to carry the load. The largest unit in the Province at the moment is a 45,000 K.W. generator in the Spray plant. If this had broken down during the peak load in December, 1954, the various power plants, by pooling their resources, could have carried the load. The following table, which is derived from Table No. 19, shows the anticipated capacity at the end of any year, the estimated peak load and the reserve capacity.

TABLE NO. 20

<u>Year</u>	<u>Capacity at end of year</u>	<u>Estimated Peak Load</u>	<u>Reserve Capacity</u>
1954	411,000	340,000	71,000
1955	459,000	410,000	49,000
1956	557,000	450,000	107,000
1957	557,000	495,000	62,000
1958	657,000	535,000	122,000

It appears that if the present plans for additional units are carried out we should have ample reserve capacity until 1958. During 1956 the Calgary Power Ltd.'s Wabamun unit of 66,000 K.W. should come on the lines. When it does it will be the largest unit in Alberta. In 1958 it is anticipated that the City of Edmonton will install a 60,000 K.W. unit. After 1956 it would be advisable to have 60,000 or 66,000 K.W. of spare capacity. As the electrical load in the Province grows we may expect the size of these units to increase and it should not be long before we see a unit of 100,000 K.W. operating in the Province. These large steam units are considerably more efficient than smaller ones

and installation of such large units will tend to keep the cost of power down. At the same time experience seems to point to the fact that these large steam turbines are a little more vulnerable to breakdown than hydro units. This being the case, it becomes increasingly important to watch our reserve capacity.

The question of reserve capacity is tied up with the question of interconnecting transmission lines between the various systems. This problem is always being considered and will receive more study in the future.

Interrelated with this problem of connecting tie lines is the question of extending the transmission system to some of the areas of the Province not now served by Central Station Power. The Commission, along with the Companies, has been making a study of this problem and hopes to continue this study next year. Ultimately the transmission network must be extended so that there is no area of any reasonable population which is not served either by the main interconnected system or by that in the Peace River country.

STUDY OF WATER POWER SITES

This year the Power Commission has taken no direct part in the studies which have been going on on the Athabasca River or on the North Saskatchewan River. Calgary Power Ltd. has been continuing its investigations on these rivers and it was felt that at the present time there was no need for the Power Commission to spend money in this manner.

A year ago there was some thought that Canadian Utilities Limited might develop a small hydro plant near Cold Lake. This has turned out to be impractical for the present at any rate.

FARM ELECTRIFICATION

The year 1954 has been another one of achievement in farm electrification. In spite of the wettest spring, summer and early fall on record, which delayed construction of rural lines, 6,323 farmers were supplied with Central Station Power. At December 31, 1954, there were 30,504 bona fide farms electrified in Alberta. Hooking up this large number of farms is a direct result of the efficiency of the construction practices and methods of the power companies doing this work. They have done a good job. This achievement has been made possible by the terms of the Revolving Fund Act, and by the desire for farm electrification and the co-operative spirit of the farmers of the Province.

A goal of a further 5,000 electrified farms has been set for 1955. This year should see the expansion of farm electrification into many corners of the Province which hitherto have been too remote from the lines of the interconnected systems to expect electricity. The policy of the Power Commission is to study these areas and to try to work out some arrangement whereby the power companies' feeder lines will be extended to them. The Power Commission has met with a good response from the power companies who have always assumed a responsibility to see that these extensions are made, although they are in most cases extremely unprofitable to the companies.

Two examples of this type of extension which were made in 1954, are the lines of Calgary Power Ltd. east from Medicine Hat to Walsh and Irvine, and the lines of Canadian Utilities from Veteran to Monitor. Both of these lines were built to make it possible to bring farm electrification within reach of the farmers in these areas.

The following table shows the number of farms connected as of December 31, 1954, as well as those still under construction. It also shows the number of non-farm customers served off farm lines.

TABLE NO. 20

ALBERTA POWER COMMISSION

Combined Figures for Alberta

Farm Electrification as at December 31, 1954

	<u>No. Farms Connected</u>	<u>Non-Farms</u>	<u>Hamlet Customers</u>	<u>Total Non-Farm Customers</u>	<u>Total Served off Farm Lines</u>
Experimental Areas Completed R.E.A.s	2,860	449	404	853	3,713
Individual Rurals	25,410	1,321	2,461	3,782	29,192
Farms supplied by Cities	1,935				1,935
	299				299
Total Actually Served	30,504	1,770	2,865	4,635	35,139

UNDER CONSTRUCTION *

	<u>No. Farms Under Construction</u>	<u>Non-Farms</u>	<u>Hamlet Customers</u>	<u>Total Non-Farm Customers</u>	<u>Total Served off Farm Lines</u>
New Areas	1,330	7	101	108	1,438
Additions to old areas	1,620	15	13	28	1,648
Total under construction	2,950	22	114	136	3,086

Number of Farmers in Associations organized or quite definitely requesting service but not yet under construction -

Other Groups or Individuals that are in sight with reasonable certainty for Farm Electrification within 18 months -

<u>New Areas</u>	<u>Additions to Old Areas</u>	<u>Total</u>
1,102	971	2,073
<u>New Areas</u>	<u>Additions to Old Areas</u>	<u>Total</u>
300	605	905

* 'Under Construction' includes any farmers at any stage of construction from staking to energizing.

This table brings out one other point that is often overlooked; that is, the number of non-farmers, such as filling stations, machine shops and country stores, and the number of customers in hamlets who are getting service off these farm lines, and are able to get service only by virtue of the fact that these farm lines have been built. It should be remembered that service to these customers was possible only due to the spread of farm electrification. It should also be borne in mind that, in many cases, the fact that these hamlets were within the area covered by an R.E.A. made the overall cost of joint service low enough to make it feasible for the farmers to build their lines. The farmers and the hamlet customers are mutually dependent.

While there are 30,504 bona fide farmers connected, farm electrification also served 4,635 non-farm customers, who would not otherwise get service. The total number benefiting by the construction of these farm electrification lines is, therefore, 35,139.

It will be noted from the table that the number of farmers whose lines are not yet under construction, but who have made application, or are likely to make application, for farm electrification, is less than it has been at this time of year in the past. We believe that this falling off in the number of farmers applying for service is due partly to the increasing saturation of farm electrification but is mainly the result of the poor crop experienced in many sections of the Province, particularly in the areas west of the railway from Edmonton to Red Deer and in the area north and northeast of Edmonton. Plans are being made to connect the usual quota of 5,000 more farms in 1955.

The figures in the following table show the progress of farm electrification in another way. A similar table has appeared in previous Power Commission reports, but the present table has been revised in the light of a township by township study of the Province. Where previously we had considered only those farmers within ten or fifteen miles of existing transmission lines, we have abandoned this mileage limitation because

experience has shown that if enough farmers are interested the lines can be extended twice as far as this. In preparing the table, therefore, we have zoned the Province into areas that could be served most economically by each power company and we have included the farms in these areas in our calculations.

Present State of Farm Electrification
as at December 31, 1954

Three Companies Only

	<u>Calgary Power Ltd.</u>	<u>Canadian Utilities Limited</u>	<u>Northland Utilities Limited</u>	<u>Total</u>
(a) Total farms in Province				84,315
(b) Total farms within area served by each Company	50,676	25,249	7,171	83,096
(c) Probable number that will take service (80%)	40,540	20,199	5,737	66,476
(d) Farms served by the three Companies	22,561	6,885	662	30,108
(e) Farms served as a percentage of (c) in each Company's area	56%	34%	12%	45.3%

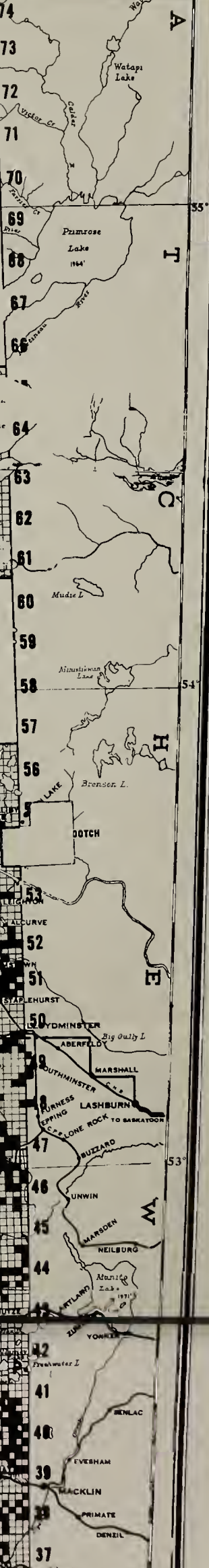
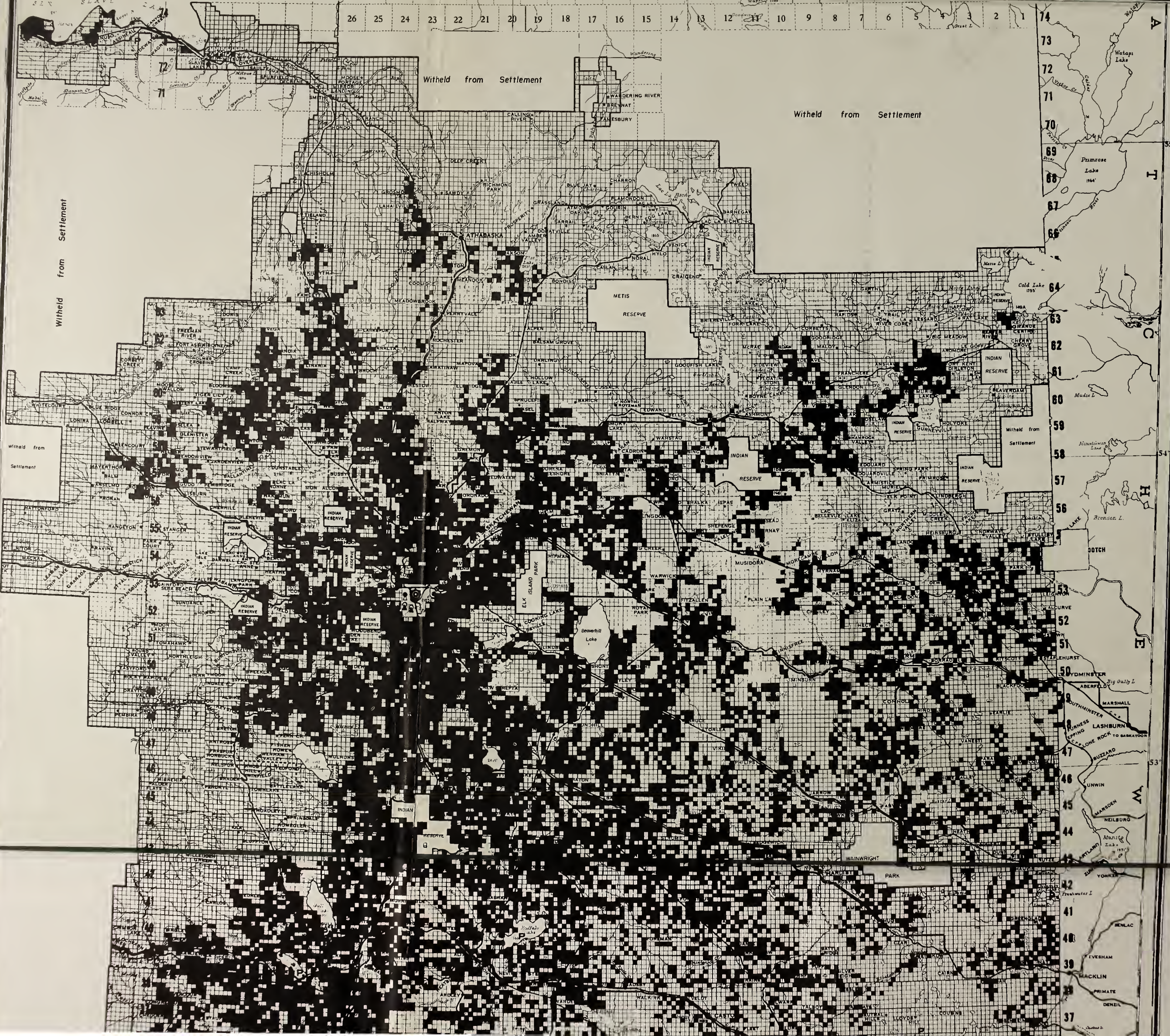
The two maps included in the report show the electrified areas of the Province as at December 31, 1954. Essentially these are the same as previous maps in that a section of land is blacked in if farm electrification is installed on any quarter of that section. A change has been made from previous maps by deleting from this one all areas which at present have no prospect of being settled. These have been left blank on the map with the notation "Withheld from settlement". These areas are either mountainous, forested or have such a type of soil that settlement on them for agricultural purposes is not advisable. In addition to these, all parks, Indian Reserves, etc., have been blocked out. Even after withdrawing these from the map, there are still other areas around the fringe of the map where the land has been surveyed but in which the number of farmers per township is very

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54°

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52°

51°

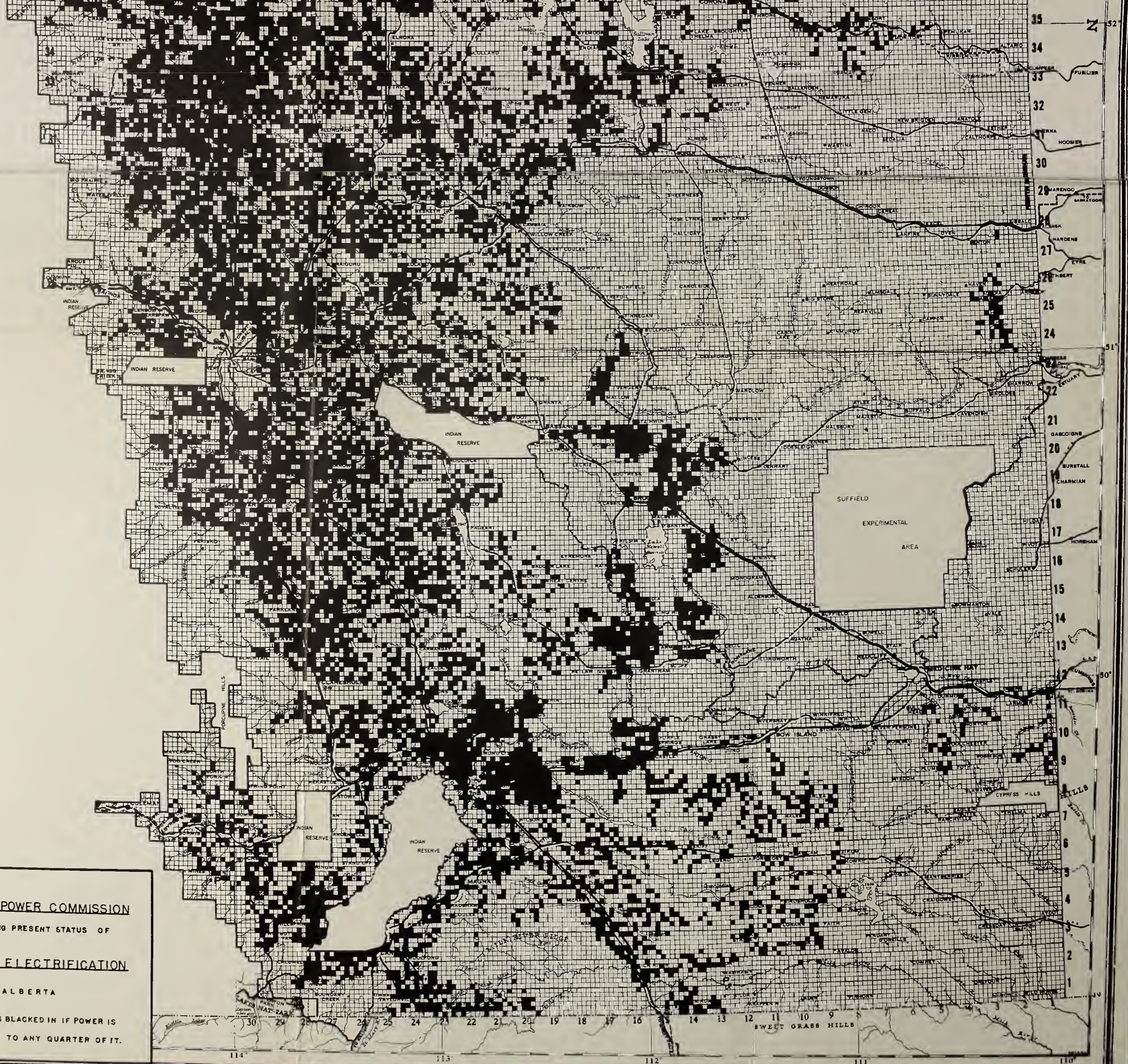
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REVISED
DEC. 31, 1952
DEC. 31, 1953
DEC. 31, 1954

ALBERTA POWER COMMISSION
MAP SHOWING PRESENT STATUS OF
FARM ELECTRIFICATION
IN ALBERTA

A SECTION IS BLACKED IN IF POWER IS
AVAILABLE TO ANY QUARTER OF IT.

Settlement
from
Wifield



REVISED
DEC. 31, 1952
DEC. 31, 1953
DEC. 31, 1954

ALBERTA POWER COMMISSION

MAP SHOWING PRESENT STATUS OF

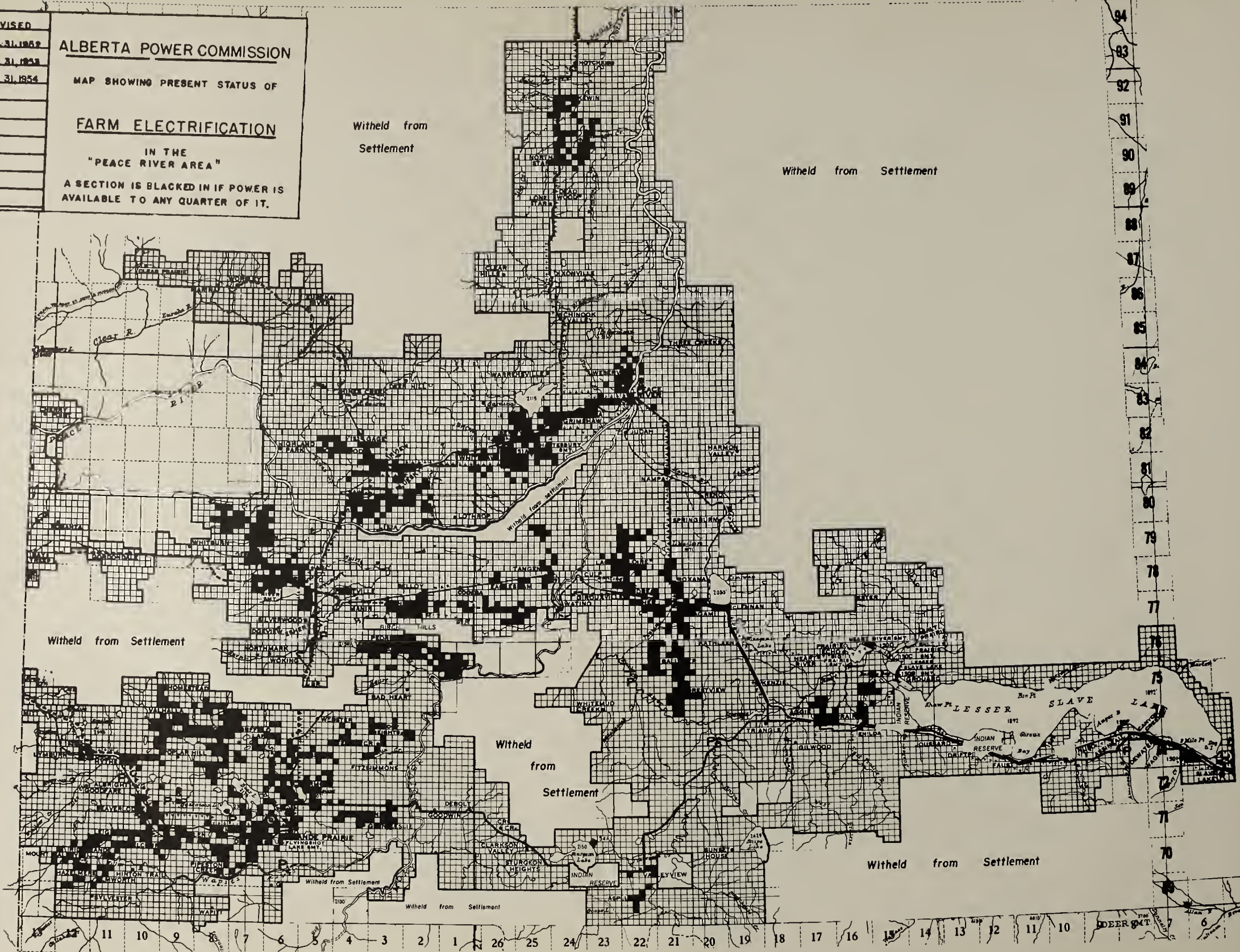
FARM ELECTRIFICATION

IN THE
"PEACE RIVER AREA"

A SECTION IS BLACKED IN IF POWER IS
AVAILABLE TO ANY QUARTER OF IT.

Witheld from
Settlement

Witheld from Settlement



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small - of the order of one or two. Townships 65 to 69 in Range 26, west of the 5th Meridian are examples of this. There are still townships in the Special Areas, - for instance, Townships 22 to 27, in Ranges 5 to 19, inclusive, and others, where a similar density of farmers prevails, and into which it will be almost impossible to introduce farm electrification.

The Power Commission is engaged at present with the study of the question of saturation, but it has not progressed far enough to permit of any definite conclusions.

Farm electrification made good progress in the northern part of the Province this year. Of the 84,315 farmers in Alberta, 30,200 live north of a line drawn east and west through Edmonton. As at December 31, 1954, 5,670 of these, or 19%, had been connected to Central Station service. South of this line there were 54,100 farmers and service has been extended to approximately 24,834 of these, or 46%. The number of farmers served in the Peace River country has increased considerably during 1954 and this is a most encouraging trend. At the end of December, 1954, there were 1,026 farmers served in the Peace River and Grande Prairie areas.

At the end of December, 1954, there were 23,472 miles of farm lines and during the year 4,308 miles had been constructed.

Financing

At the end of December a total of 335 Rural Electrification Associations had been organized. Over the years these have borrowed \$16,000,000.00. At December 31st, 1954, almost \$4,000,000.00 had been paid back. The investment of all rural lines in the Province is approximately \$28,000,000.00

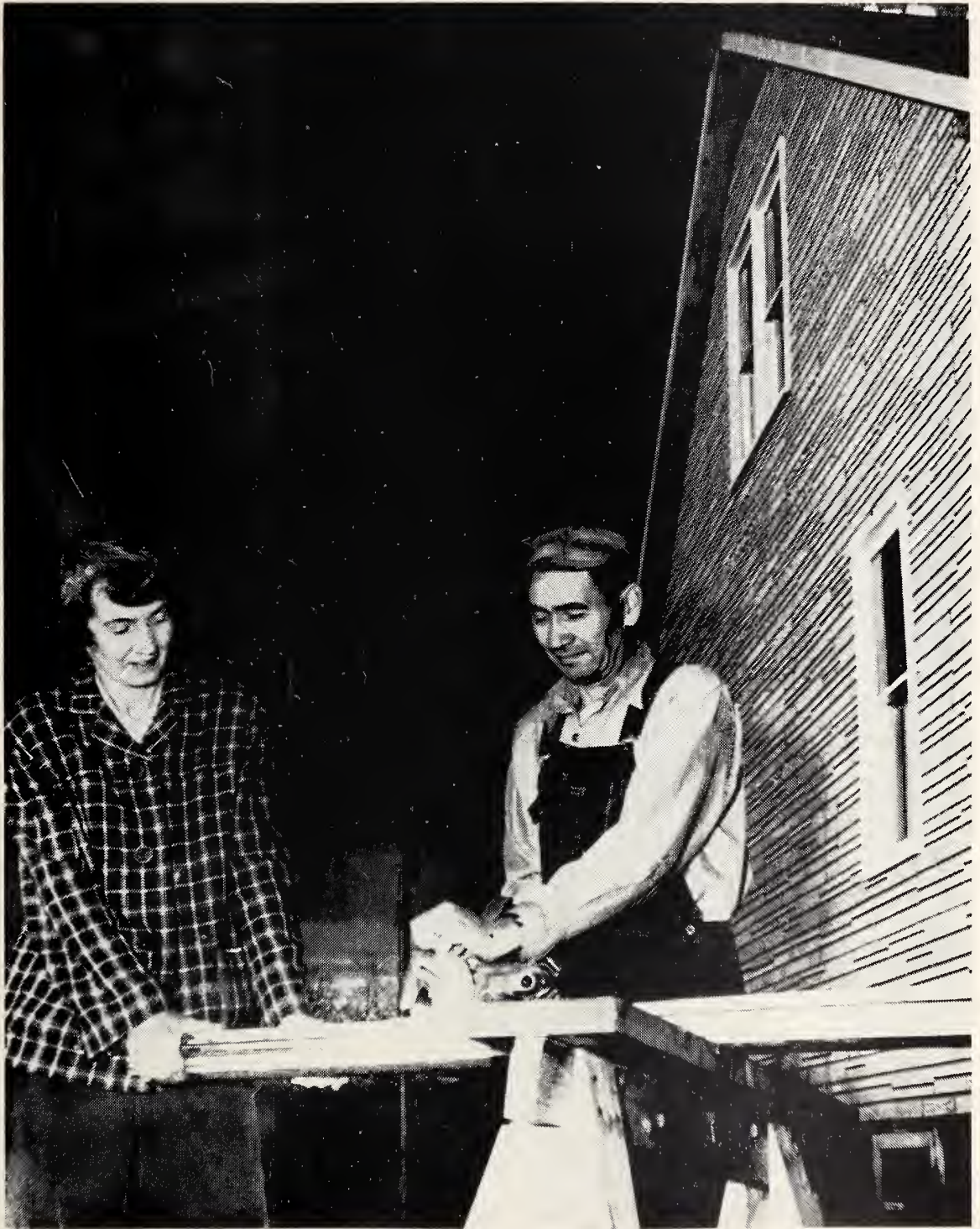
The Rural Electrification Revolving Fund Act, which was passed at the 1953 Session of the Legislature, has been of great assistance to all farmers who have been connected during the past two years. By the end of 1954 the Power Commission had given approval to 380 applications for loans under this Act. While all of this money may not have been borrowed by the end of December, the approvals covered 10,764 farmers at an

estimated cost of about \$12,387,000.00. During 1954 very few farmers availed themselves of the Co-operative Guarantee Act to borrow money.

We believe that nearly all the farmers seeking farm electrification during 1955 will make use of the Revolving Fund Act, so that it is expected that another \$5,000,000.00 will be borrowed by the farmers during that year. When the Rural Electrification Revolving Fund Act was set up \$10,000,000.00 was set aside to be used for farm electrification. This amount of money has been nearly used up, so that it will be necessary to provide more money in this fund during the 1955 Session of the Legislature.

Area Coverage and Surveys

During the year the Power Commission has dealt with many routine matters involving R.E.A.s and the problems of area coverage. When consideration is given to construction of lines in any area the Power Commission sees that the whole area is mapped and that all the farmers in that area are contacted so as to give them a chance to be included in the original construction. If the principles of area coverage are carried out not only are the operating costs going to be less in the future but the first cost of building lines is going to be a great deal less. During the past year the Power Commission has made a number of maps and carried out a considerable amount of survey work in various areas in the Province. One tendency which it has to combat is the desire of a small closely knit group of farmers seeking to organize themselves into an R.E.A. so as to get lines built to them at low cost without having any regard to their neighbours beyond them. The Commission has taken the stand that all of the logical area should be served at one time and that even if all the farmers in that area do not come on at the beginning they will at least have been given the opportunity of doing so. There is considerable resistance at times on the part of small farm groups to this policy of the Commission. The Power Companies as a whole have done a good job in bringing about area coverage. The boundaries of the existing R.E.A.s have been laid out so that as far as possible all farms which are not yet



Farm Electrification Comes to the New Home of Ralph Steinhauer on the Saddle Lake Indian Reserve

electrified can be included with one or other of the existing R.E.A.s in such a manner as to ensure the optimum economy of construction.

Let us look at the figures on farm electrification again for a moment. There are 84,000 farmers in the Province. We expect to be able to serve 67,000 of these before the program of farm electrification can be considered as near completion. At the end of December, 1954, over 30,500 of these were being served. We hope to serve an additional 5,000 in each of the years 1955 and 1956. When at the end of 1956 we will have reached 40,000 farmers, we will then be serving 48% of all the farmers in the Province.

The frame work of farm electrification as it is at the end of 1954 will permit service to be extended to many thousands more farmers within existing R.E.A.s. As well as farmers within this framework there are still many thousand farmers in what we call the fringe areas. These have been laid out into what appears to us to be reasonable areas to be included within one R.E.A. and in many cases organization work is progressing in these regions. It may be necessary to provide in some manner for the extension of power lines into the heart of some of these areas to feed them. Once the extension of these power lines is ensured the regular program of farm electrification in that area can go ahead.

The problem of making farm electrification available to the farmers in the fringe areas and in the northern areas of the Province is more difficult than it has been in the vast central area. In this central part of the Province the farming areas have all been continuous. The farmers in the fringe areas, however, are on strips of good land which run back from the main area of good land in the form of long bays. These long strips of farming areas are in many cases too far away from existing transmission lines to be served except by extensions of main lines. It becomes necessary in cases like this to organize all the farmers in such a strip of land into one or more R.E.A.s, which should be built the same year. In some cases it is necessary to ask the Power Companies concerned to subsidize such an area by building a feeder line, some part of the cost of which has to be borne by the

Power Company. It should be borne in mind that the Power Companies arrange for the building of farm distribution lines for the farmers at cost. The Companies also supply power at cost. The Power Companies are therefore not making any money on farm electrification so that they have no profit to justify them in spending money for such feeder lines as we have mentioned. These lines are necessary, nevertheless, if the farmers in the more remote areas are to get power at anything less than prohibitive cost.

During the past year questions of this kind have been discussed with the Companies to see if the problem of getting feeder lines built into certain fringe areas could not be solved in this manner. The Power Commission has found not only the utmost co-operation on the part of the Power Companies but at times they have suggested of their volition, certain areas into which they were prepared to build such lines. Discussions of this nature are taking place all the time with gratifying results.

As a supplement to this and so as to quicken the pace of the spread of farm electrification in the more remote areas, to promote efficiency of construction and to keep down the cost of lines, consideration has been given to an amendment of the Revolving Fund Act whereby extra money may be advanced by the Provincial Treasurer. Assistance of this kind might help greatly in bringing into being farm electrification in areas such as that north and east of Medicine Hat, in the Crooked Creek area, and the Manning area, and possibly to some extent in the Lac La Biche and other outlying parts of the country.

In some areas of the Province service is still being given to towns and villages from small diesel plants. The Power Commission is looking to the day when the network of transmission lines will reach to these towns. This will provide a cheaper source of supply to the inhabitants of these towns and will also open up new fields for farm electrification.

The whole question of service to fringe areas is one in which the element of time will play a large part. The Power Commission is trying to speed up the time factor and we believe has taken some successful steps in that direction.

Telephone Interference

The problem of the interference of R.E.A. lines with mutual and with long distance telephone lines is one that is on the increase. It is inherent in power lines of all sizes and voltages that they will create a noisy interference on telephone lines. If the interference rises above a certain level the telephone circuits are rendered useless. This is a knotty problem involving R.E.A.s, mutual telephone organizations, the Alberta Government Telephones, and the Power Companies. It is also a highly technical problem. It appears that a solution to this problem can only be worked out by experimentation to see what specific conditions create telephone interference in one area or another and then to see what remedial measures may be applied to R.E.A. lines, the mutual lines, or the Alberta Government Telephone lines. Some tests and experiments have already been made in a joint effort on the part of the Alberta Government Telephones, Calgary Power Ltd., Farm Electric Services Ltd., and the Power Commission. It is expected that these tests will be carried forward on a larger scale in 1955.

When we have enough information to know what will ward off or cure the interference in any particular case, it will then be a case of spending the necessary money to remedy the situation. In some cases this could be relatively costly, but if the farmers of Alberta are to enjoy the benefits of both farm electrification and telephone communication this money will have to be raised in some manner.

Checking Costs

During the year the Commission has checked all the cost statements which the Companies send to R.E.A.s showing the costs of building their lines. In addition to this, some field checks have been made on various farm areas. With very minor exceptions these costs have always been found to be correct. These costs, in some cases, have been checked with auditors. These checks further show that the areas have been constructed at

cost. On the whole, then, we conclude that the Power Companies are building these areas at cost and that, from an engineering standpoint, they are building them efficiently.

The Power Commission feels that it is its duty, not only to investigate problems brought to it, but also to investigate any phases of farm electrification which it believes requires study.

The question of the overheads which the Power Companies charge to the R.E.A.s has been given some study. The three main companies all have different systems of computing this overhead. It appeared to the Commission that this matter should be investigated. This work is not yet complete, but indications point to the fact that, while the three Companies compute their overhead on a different basis, nevertheless they can and do justify all the charges made to this overhead.

It might be advisable here to explain this matter of overhead. There are actually three or four different steps leading up to the energizing of an R.E.A.

1. Before construction can be started the Power Companies do a great deal of work in contacting farmers, in making surveys of the area to be served and in making maps and estimates. In many cases they work out five or six different estimates before arriving at the final layout of lines.

2. They also order the material, often many months in advance and are faced with paying interest on the money which they borrow to finance this material.

3. The Power Companies draw the final plans showing where lines run and submit these plans to the various municipalities and other Government bodies to obtain the necessary approvals before these lines can be built.

4. The actual construction of the lines is usually turned over to a contractor.

5. Finally, the areas have to be inspected and gone over fairly carefully before they can be turned on.

Most of the charges under items 1, 2, 3 and 5 are hard to allocate directly to one R.E.A. For this reason it is the practice of the Power Companies to keep track of the money spent on these items during the year and then, at the end of the year, to allocate this overhead to the R.E.A.s constructed during the year. This is done by charging them a percentage of the cost of material and labour. This percentage is what we call overhead.

The question of the correctness of operating charges made to farmers is constantly under study. We believe that the Power Companies are doing a very good job of keeping these charges down and of accounting to the farmers for these charges. In most cases the charges are less than the monthly charges made to the farmer in his power bill, so that at the end of each year the Power Companies have been able to make a refund to the deposit reserves of the Associations.

In the matter of deposit reserves, the whole system of farm electrification in the Province has not been in operation long enough to come to a very definite conclusion on these matters, but the question is not being overlooked. In a preliminary study of this question of depreciation and deposit reserve accounts it appears that the deposit reserve being set aside at present by the different Companies is approximately correct. At any rate, in the United States 1.08% of the total cost of the lines is set aside each year for depreciation. This was done after lengthy study on the part of the Rural Electrification Authority at Washington, and seems to be a fairly sound conclusion. The deposit reserves being set aside in Alberta are not too different from this. At the moment we are inclined to say that the present manner of setting aside reserves in Alberta should not be altered.

The Rural Electrification Short Courses which have been put on under the supervision of the Department of Agriculture appear to be performing a very worthwhile function. During the winter of 1953-4 some fourteen of these courses were held in the Province. They seem to be fulfilling a need and during the current winter the Department of Agriculture is putting on many more of these courses, although the actual course has

been shortened to one week.

The annual use of electricity per farmer in the Province in 1954 has been approximately 2,830 K.W.H. It is somewhat difficult to arrive at this figure. It cannot be done by taking the total K.W.H. sold to farmers and dividing it by the number of farms connected at the end of the year. Farmers' meters are read every three months. Those farmers connected after September 30th will not have their meters read until after December 30th, so that in trying to estimate annual K.W.H. per farmer, the farmers who are connected after September 30th cannot be counted.

The K.W.H. used per farmer per month is low when the farmer is first connected, but increases rapidly during the first year or so. Since 6,323 farmers were connected in 1954, the consumption of these farmers will be low. This will have the effect of making an average figure for K.W.H. per farm per year seem lower than it would actually be if all farmers had been connected for a period of, say, three years. When, therefore, we use this figure of 2,830 K.W.H. per farmer per year, we should realize that the average farm that has been connected for three years, will use a great deal more than this.

Nevertheless, when we consider this figure of 2,830 K.W.H. per farmer per year, it is obvious that electricity has become a necessity in farming operations. It becomes all the more obvious that everything possible should be done to see that electricity is provided to at least 80% or 85% of our farmers as soon as possible.

There is no need to elaborate on the necessity of farm electrification in our present day standard of living. Electricity is a comfort and a convenience which our farmers have a right to expect. For that reason alone we must see that it is made available to every farmer in all the settled areas of the Province. We must carry on our system of extending farm electrification and see that it continues at the rate of about 5,000 more farms electrified each year until somewhere around 67,000 farms are electrified in the Province.

Electricity provides more than comfort and convenience. It is the most use-

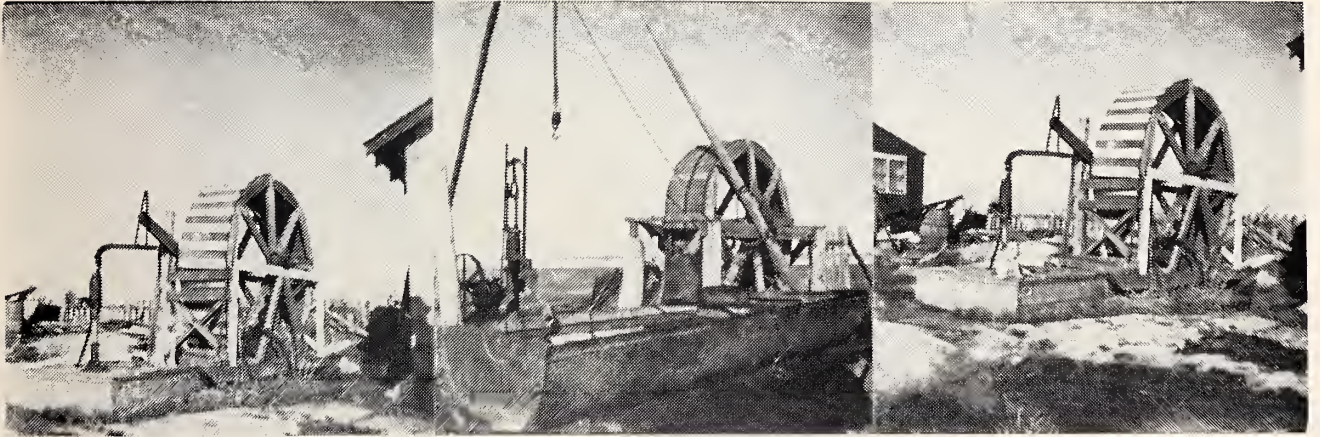
ful tool a farmer can have. It is the one tool which, if used correctly, will repay its cost to the farmer many times over. This is not an idle statement. It is a fact. It is a fact, however, that is not yet fully realized by all of our farmers.

The more use farmers make of electricity the more valuable it becomes to them, and the more money they save by using it. The bad crop year of 1954, culminating in the heavy frost, has made it somewhat difficult for farmers in some areas. Nevertheless, there has been no evidence that any farmer would be willing to part with his use of electricity. A farmer who is using electricity for lights and radio only is not making use of electricity in an economic sense - it is a luxury for him and not an essential tool. When hard times hit such a farmer he may be tempted to try to cut down his costs and to dispense with the luxury of electricity. If many did this we would be left with farm electrification lines strung all over the country but which would be practically abandoned.

Now electricity is not a luxury. In this age it is an economic necessity. Without it life on the farm is drudgery and undesirable. With it farm life becomes miraculously changed. An electrified farm is an ideal place in which to live. We must have a strong and contented agriculture. Electricity will be one of the biggest factors in bringing that about. The Commission is of the opinion that it should consider embarking upon a program aimed at demonstrating the value of electricity to farmers.

During 1954 electricity sold to farmers accounted for 5% of the total electricity sold in the Province. While farmers only used 5% of the K.W.H., they were responsible for 9% of the peak load. Even when we get all the farms electrified the percentage of the Province's electrical output used by farmers will not be large. By 1960 it may be 7% of the total output.

The number of farmers connected during 1954 has established a record. There is a splendid feeling of co-operation between the farmers, the R.E.A.s and the Power Companies. The Power Commission has received the utmost co-operation from the Power



Farm Electrification makes obsolete these dog paddle wheels formerly used for pumping water.

Companies. They have always been most helpful and it has been a pleasure to work with them.

Farm electrification, at the moment, is the principle duty of the Power Commission. It is doubtful if there could be any type of work more rewarding than that which, with trials and tribulations it is true, goes into fostering the spread of farm electrification in the Province. Our goal is the electrification of at least 80% of the farmers in the Province. It is the goal which we must reach and one which we will reach.

