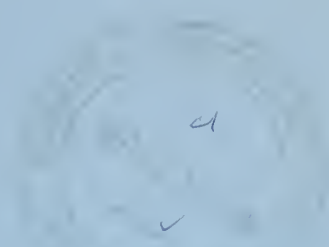


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One of Alberta's Earliest Water Power Wheels Installed near Jasper about 1895



*Alberta Power Commission
Annual Report
1955*



GOVERNMENT OF THE PROVINCE OF ALBERTA



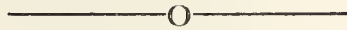
ANNUAL REPORT

OF THE


ALBERTA POWER COMMISSION

FOR THE YEAR ENDING
DECEMBER 31, 1955

EDMONTON



J. G. MACGREGOR
CHAIRMAN



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January 31st, 1956.

The Honorable R. Reiersen,
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, 1955.

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

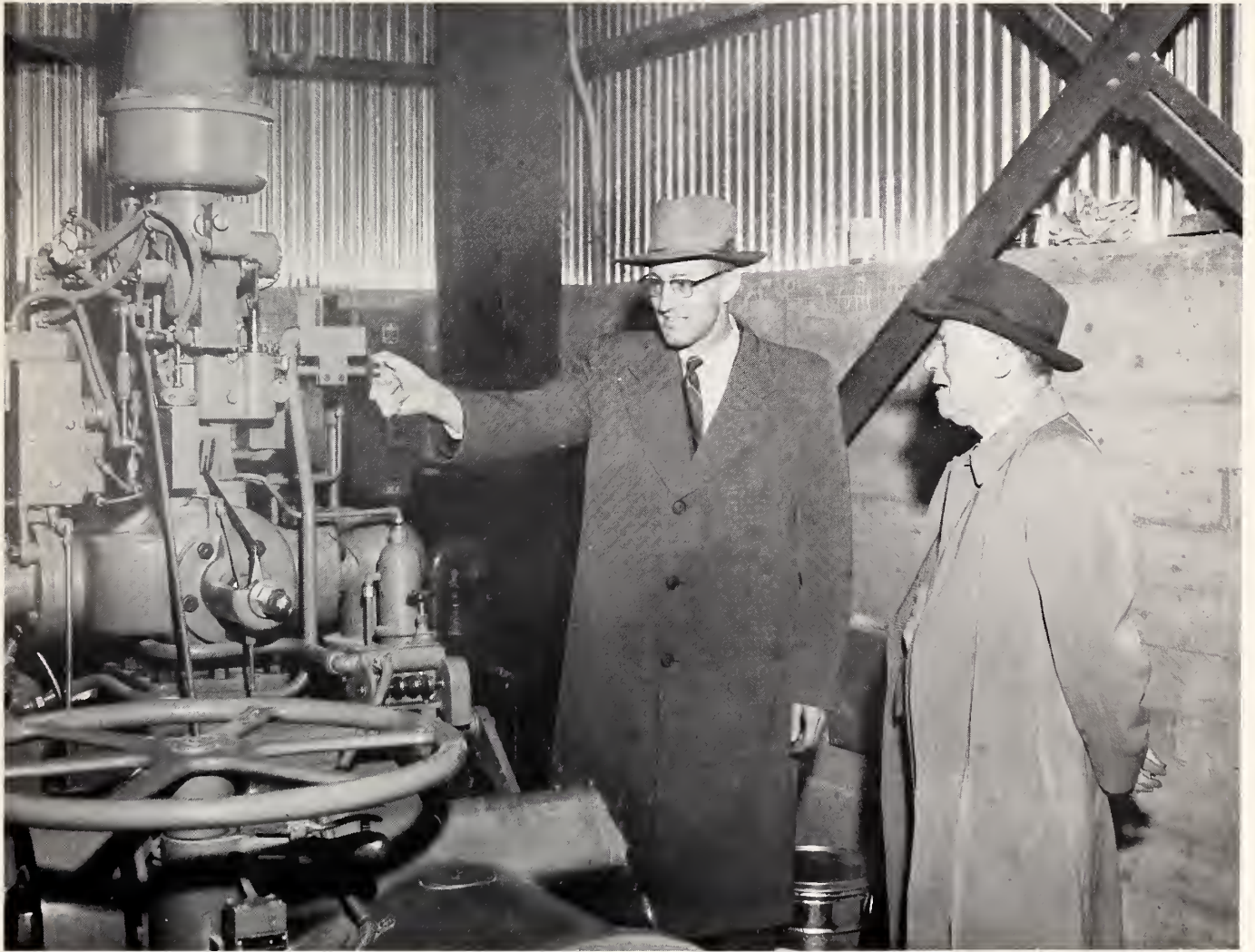
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J. G. MacGregor,
Chairman

W. J. Dick,
Member

J. E. Oberholtzer,
Member

J. L. Reid,
Member and Secretary



The Hon. Mr. Reiersen starting the 5,000 K.W. unit in Calgary Power Ltd.'s Interlakes Plant.

ALBERTA POWER COMMISSION

ANNUAL REPORT

For Year Ending December 31st, 1955.

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; the Empress area, and Fort Assiniboine. The question of the extension of a transmission system west to Hinton has been under consideration, as well as the problem of extending Central Station power to the Sturgeon Lake oil field.
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. Many surveys have been made of farming areas not yet electrified and more will be carried out during the next year. The question of saturation of farm electrification has been studied and is discussed later in the report.

Alberta's Golden Jubilee year has been one of exceptional progress in industrial expansion. This is reflected in the demand for electric power. The year 1955 has shown the phenomenal increase of 15% in the K.W.H. generated. The expansion of the need for electricity in the Province is expected to continue at a very high rate. In this respect Alberta is expanding at a greater rate than 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 ten 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>
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	375,277	13,030,592	363,871	612,595
1952	386,102	14,221,806	431,243	726,095
1953	498,252	15,661,037	464,416	752,250
1954	* 550,000	* 17,500,000	* 504,000	* 825,000
1955	* 618,000	* 19,000,000	* 540,000	* 865,000

* 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 1954

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1954	550,000	17,500,000	504,000	825,000
1944	197,995	9,713,791	258,966	421,814
Increase:	352,005	7,786,209	245,034	403,186
Percent Increase:	178%	80%	95%	96%

* Increase Alberta: 1945 to 1955 - 203%

*** 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>
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	62,860	1,174	2,754
1954	* 1,499	69,137	1,288	3,008
1955	* 1,728			

* 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 1954

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>*** Saskatchewan</u>	<u>*** Manitoba</u>
1954	1,499	69,137	1,288	3,008
1944	555	40,599	644	1,833
Increase:	944	28,538	644	1,175
Percent Increase:	170%	70%	100%	64%
Increase Alberta:	1945 to 1955	-	205%	

*** 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>
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
1953	1,624	3,008	1,878	4,960

These are Dominion Bureau of Statistics figures
and the 1954 figures are not yet available.

Increase during the 10 year Period ended 1953

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1953	1,624	3,008	1,878	4,960
1943	670	1,535	883	4,226
Increase:	954	1,473	995	734
Percent Increase:	14.2%	96%	113%	17%

Manitoba has an exceptionally high figure for K.W.H. 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 centers, 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>
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
1953	2.91	1.70	3.52	1.23

These are Dominion Bureau of Statistics figures and the 1954 figures are not yet available.

Decrease during the 10 year period ending 1953

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1943	4.83	1.80	4.61	.99
1953	2.91	1.70	3.52	1.23
Decrease:	<u>1.92</u>	<u>.10</u>	<u>1.09</u>	Increase: <u>.24</u>
Percent Decrease:	40%	6%	24%	Increase: 24%

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>
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	221	3,817	151	221
1954	* 237			
1955	* 261			

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

Increase during the 10 year Period ending 1953

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1953	221	3,817	151	221
1943	101	2,169	74	114
<hr/>				
Increase:	120	1,648	77	107
Percent increase:	119%	76%	104%	94%

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	384,389	* 17,700	* 39,000
1954	* 30,504		* 23,000	* 42,000
1955	* 34,768		* 30,000	* 43,000

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

TABLE NO. 7

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	2,420	1,915	2,943
1954	* 2,830			
1955	* 2,892			

* 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>
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	* 26,856	213,176	20,899	32,237
1954	* 31,736			
1955	* 36,233			

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

TABLE NO. 9

K.W.H. generated per Capita

<u>Year</u>	<u>Population</u>	<u>K.W.H. Generated x 10⁶</u>	<u>K.W.H. Generated/Capita</u>
1946	803,000	602	750
1947	825,000	641	777
1948	854,000	724	848
1949	835,000	801	905
1950	913,000	869	952
1951	939,000	1,055	1,123
1952	970,000	1,213	1,250
1953	1,002,000	1,341	1,338
1954	1,039,000	1,499	1,443
1955	1,066,000	1,728	1,621

PRESENT STATUS OF THE INDUSTRY

The statistics for the Central Station Industry for the year 1955 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 10 to 13 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. 13 gives further details of the generating plants and their output. It will be noted that it is divided into four groups, A. B. C and D.

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. This group includes the hydro plants of Calgary Power Ltd., which are rated as follows:

<u>Plant</u>	<u>Capacity</u>	
	HP	KW
Bearspaw	- 22,000	17,000
Ghost	- 67,450	51,000
Horseshoe	- 20,000	14,000
Kananaskis	- 24,000	19,000
Barrier	- 16,000	13,000
Cascade	- 23,000	18,000
Rundle	- 23,000	17,000
Spray	- 62,000	50,000
Three Sisters	- 3,600	3,000
Pocaterra	- 18,400	15,000
Interlakes	- 6,900	5,000
	<u>286,350</u>	<u>222,000</u>

Group B takes in the Peace River country and includes the territory served by Canadian Utilities Limited and Northland Utilities Limited. During the year the systems of these companies are tied together by a transmission line from Fairview to Rycroft. A transmission line was built from Grande Prairie east to the vicinity of Valleyview to serve the Sturgeon Lake oil field. A transmission line was also extended from Grimshaw to Manning, so that now the whole of the Peace River country is on one interconnected system.

In former reports Group C included the system of Northland Utilities Limited from Sangudo to Greencourt. This has now been absorbed into the Calgary Power Ltd. system. Group C in the present report is the same as Group D in previous reports and includes various towns served by Northland Utilities Limited in the area north and west of Edmonton.

Under Group D we have included the other isolated towns in the Province, such as Edson, which is served by a municipal plant, and various small towns in the fringe areas of the Province. The extension of the various transmission systems is rapidly reaching out and bringing service from the interconnected system to these smaller places.

The interconnected system shown as Group A had, in 1955, a combined capacity of 445,900 K.W., and generated 1,693,344,331 K.W.H. It served 248,649 customers. This system accounts for 97% of the generating capacity of the Province, 98% of the K.W.H. generated, and 95% of the number of customers.

TABLE NO. 10

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 1955.

Privately Owned

<u>Name of Company</u>	<u>Plant Capacity Dec. 31/55 K.W.</u>	<u>Peak Load on Plants during 1955</u>	<u>K.W.H. Generated Net - 1955</u>
1. Calgary Power Ltd.	222,000	217,700	932,681,600
Canadian Utilities Ltd.	41,395 (1)	37,800	140,141,812(2)
Northland Utilities Ltd.	7,131	5,900	18,955,840
East Kootenay Power Co. Ltd.(3)	12,500	5,500	102,960
Misc. Plants	<u>1,400</u>	<u>800</u>	<u>1,000,000</u>
1. Total:	284,426		1,092,882,212

Publicly Owned

Name of Municipality:

2. City of Edmonton	120,000	102,000	381,689,600
City of Lethbridge	13,500	10,400	39,974,200
City of Medicine Hat	43,400	40,600	211,418,100(4)
Town of Edson	<u>1,189</u>	<u>630</u>	<u>2,150,213</u>
2. Total:	178,089		635,232,113
Plus 1. Total:	<u>284,426</u>		<u>1,092,882,212</u>
GRAND TOTAL:	462,515		1,728,114,325

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

(2) Includes some K.W.H. generated at Fairview.

(3) 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.

(4) Includes 170,703,800 K.W.H. sold to Calgary Power Ltd.

TABLE NO. 11

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

Name of Company	Plant Capacity Dec. 31/55 K.W.	Peak Load on Plants during 1955	K.W.H. Generated Net - 1955
Calgary Power Ltd.	222,000	217,700	932,681,600
Northland Utilities Ltd.	666	460	3,251,456
Total Hydro:	<u>222,666</u>		<u>935,933,056</u>

STEAM

Canadian Utilities Ltd. (5)	34,500	33,700	127,477,871
East Kootenay Power Co. Ltd. (3)	12,500	5,500	102,960
City of Edmonton	120,000	102,000	381,689,600
City of Lethbridge	13,500	10,400	39,974,200
City of Medicine Hat	43,400	40,600	211,418,100(4)
Total Steam:	<u>223,900</u>		<u>760,662,731</u>

INTERNAL COMBUSTION

Canadian Utilities Ltd.	6,895(1)	4,100	12,663,941(2)
Northland Utilities Ltd.	6,465	5,440	15,704,384
Town of Edson	1,189	630	2,150,213
Misc. Plants	1,400	800	1,000,000
Total Internal Combustion:	<u>15,949</u>		<u>31,518,538</u>
GRAND TOTAL:	<u>462,515</u>		<u>1,728,114,325</u>

- (1) Includes one 1,200 K.W. unit at Fairview
- (2) Includes some K.W.H. generated at Fairview.
- (3) See Footnote (3) on Table No. 10.
- (4) Includes 170,703,800 K.W.H. sold to Calgary Power Ltd.
- (5) Includes 7,500 K.W. gas turbine.

TABLE NO. 12

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 31st, 1955.

<u>Method of Generation</u>	<u>% of Power Generated</u>	<u>% of Capacity</u>
Hydro	54.2	48.2
Steam	44.0	48.4
Internal Combustion	1.8	3.4
	<hr/>	<hr/>
	100	100
Publicly owned	36.8	38.5
Privately owned	63.2	61.5
	<hr/>	<hr/>
	100	100
	<hr/>	<hr/>

TABLE NO. 13
SUMMARY OF GENERATING PLANTS IN ALBERTA
AS AT DECEMBER 31, 1955

Owner	Hydro		Steam		Internal Combustion	
	K.W. Rating	K.W.H. Gener- ated, 1955	K.W. Rating	K.W.H. Gener- ated, 1955	K.W. Rating	K.W.H. Gener- ated, 1955
A. Within the inter-connected system						
Calgary Power Ltd. (only)	222,000	932,681,600	34,500	127,477,871		
Canadian Utilities Ltd.			12,500	102,960		
East Kootenay Power Co. Ltd.			120,000	381,689,600		
City of Edmonton			13,500	39,974,200		
City of Lethbridge			43,400	211,418,100		
City of Medicine Hat						
TOTAL GROUP A	222,000	932,681,000	223,900	760,662,731		
B. Peace River Interconnected System						
Canadian Utilities Ltd					6,895	12,663,941
Northern Utilities Ltd					4,278	12,101,134
TOTAL GROUP B					11,173	24,765,075
C. Isolated Areas Served by Northland Utilities Ltd.						
Athabasca System					922	1,587,346
Jasper	666	3,251,456			975	1,406,206
Lac La Biche					290	609,698
TOTAL GROUP C	666	3,251,456			2,187	3,603,250
D. Other Isolated Towns						
Tom of Edson					1,189	2,150,213
Misc. Plants including Slave Lake Utilities, Ft. McMurray, Hines Creek, etc.					1,400	(Est.) 1,000,000
TOTAL GROUP D.	222,660	935,933,056	223,900	760,662,731	15,949	3,150,213
TOTAL ALL GROUPS	222,660	935,933,056	223,900	760,662,731	15,949	3,150,213
TOTAL HYDRO						
	222,666	935,933,056				
TOTAL STEAM						
	223,900		935,933,056			
TOTAL INTERNAL COMBUSTION						
	15,949		31,518,538			
GRAND TOTAL:	462,515	1,728,114,325	1,728,114,325	1,728,114,325		

The following comments deal with the Province as a whole.

K.W.H. Generated. The increase in K.W.H. generated was approximately 15%.

The generation by the hydro plants increased only 9%, while that of the steam plants increased 23%. The hydro plants were operated in the most efficient manner possible, making the best use of all their water. The steam plants at Edmonton and Medicine Hat took up the slack and increased their generation. The new hydro units in the Pocaterra and Interlakes plant came on very late in the year so that, while they were useful in carrying the peak load, very little was generated by these plants.

Internal combustion plants increased their output by 31%. This power, of course, is largely that generated by Northland Utilities Limited and Canadian Utilities Limited in the Peace River country where there has been a large increase in demand for power. This has been due in part to the increased activity in the Sturgeon Lake oil field, although the full impact of this field is not yet manifest. The percentage increase in output of internal combustion plants would have been greater if it were not for the fact that the extension of transmission lines has made it possible to shut down a number of small diesel plants.

Peak Load. The increase in peak load for the Province has been 22%. This is an exceptional increase. This was due in part to the fact that the December peak loads in 1953 and 1954 were lower than they would have been if the weather in those months had not been unusually mild. While the increase in peak load has been 22%, this is because we are comparing the load of the month of December, 1955, with its severely cold weather, with the load in the mild month of December, 1954. It is possible that if we could correct for the difference in the weather the increase in the peak load would have been of the order of 15%. The following figures show an estimate of the actual coincident peak for the Province:

TABLE NO. 14

System	Estimated Peak Load K.W., 1955
Interconnected system, less East Kootenay Power Co. Ltd.	398,400
East Kootenay Power Co. Ltd.	5,500 (1)
Canadian Utilities Ltd. (Peace River country)	4,100
Northland Utilities Ltd.	5,900
Edson	630
Miscellaneous plants	800
	415,330

(1) Sentinel Plant was not operated for most of the year but did come on during December.

Transmission lines in the Province increased by 543 miles to a total of 8,968, which includes 2,965 miles of Company-owned farm lines. Distribution line mileage increased by 448 miles to 3,214. The total mileage of all farm lines increased by 3,544 miles, so that the total farm mileage at the end of 1955 was 27,016. The total mileage of all power lines in the Province at the end of December, 1955, was 36,233.

TABIE NO. 15

Total Circuit Miles of Transmission Lines in the Province by Regional Groups as at December 31, 1955.
This includes Company-owned Farm Lines, but does not include the Co-operative-owned Farm Lines

	VOLTAGE						Total		
	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.
<u>A. Within the Interconnected System.</u>									
Calgary Power Ltd.	13	1,169	66	3,106	59	51	787	851	6,102
Canadian Utilities Ltd.	67	381	18	1,064	245		307		2,082
City of Medicine Hat			30						30
East Kootenay Power Co. Ltd.	<u>6</u>	<u>26</u>					<u>48</u>		<u>80</u>
Total Group A.	86	1,576	114	4,170	304	51	1,142	851	8,294
<u>B. Systems Within the Peace River Country</u>									
Canadian Utilities Ltd.	13	22	4	167			111		317
Northland Utilities Ltd.	<u>23</u>	<u>54</u>		<u>193</u>					<u>270</u>
Total Group B.	36	76	4	360			111		587
<u>C. Isolated Towns of Northland Utilities Ltd., etc.</u>									
Jasper			19						19
Athabasca - Colinton		8		45					53
Lac La Biche		5							5
Slave Lake Utilities	<u>10</u>								<u>10</u>
Total Group C.	10	13	19	45					87
TOTAL ALL GROUPS	<u>132</u>	<u>1,665</u>	<u>137</u>	<u>4,575</u>	<u>304</u>	<u>51</u>	<u>1,253</u>	<u>851</u>	<u>8,968</u>

TABLE NO. 16

SUMMARY OF DISTRIBUTION SYSTEMS IN ALBERTA

As at December 31, 1955

	<u>Total Number of Customers Served</u> (Includes Rurals)	<u>K.W.H. Sold</u> (Less Sales to other Co.s) (Includes Rurals)	<u>Circuit Miles of Line</u> (Excludes Rurals)
<u>A. Within the Interconnected System</u>			
Calgary Power Ltd.	78,388	635,260,800	1,027
Canadian Utilities Ltd.	29,400	100,431,915	371
East Kootenay Power Co. Ltd. (1)	1,060	9,747,931	14
City of Edmonton	62,611	306,073,252	597
City of Calgary	55,768	311,930,409	620
City of Lethbridge	8,800 (Est.)	32,800,000 (Est.)	104
City of Medicine Hat	6,140	40,714,214	113
City of Red Deer	3,790	13,038,709	40
Town of Cardston	871	2,750,000	30
Town of Fort McLeod	650 (Est.)	1,900,000 (Est.)	12 (Est.)
Town of Ponoka	1,171	3,154,804	23
	<hr/>	<hr/>	<hr/>
TOTAL GROUP A.	248,649	1,457,802,034	2,951
 <u>B. Systems Within the Peace River</u>			
Canadian Utilities Ltd.	4,607	10,163,745	62
Northland Utilities Ltd., including High Prairie, McLennan, Valleyview and Manning	4,500	9,375,077	110
	<hr/>	<hr/>	<hr/>
TOTAL GROUP B.	9,107	19,538,822	172
 <u>C. Isolated Towns Served by Northland Utilities Ltd.</u>			
Athabasca System	809	1,356,555	32
Jasper	603	4,040,761	22
Lac La Biche	286	559,444	8
	<hr/>	<hr/>	<hr/>
TOTAL GROUP C.	1,698	5,956,760	62
 <u>D. Other Isolated Towns</u>			
Town of Edson	884	1,860,000	14
Miscellaneous	1,000	900,000	15
	<hr/>	<hr/>	<hr/>
TOTAL GROUP D.	1,884	2,760,000	29
	<hr/>	<hr/>	<hr/>
<u>GRAND TOTAL:</u>	<u>261,338</u>	<u>1,486,057,616</u>	<u>3,214</u>

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

TABLE NO. 17

SUMMARY OF RURAL ELECTRIFICATION SYSTEMS IN ALBERTA
As at December 31, 1955

	Number Farmers Served	Number Non-Farmers Served	Total Number Customers	Circuit Miles of Line
<u>A. Calgary Power Ltd.</u>				
Experimental Areas and Individual Rurals (1)	3,844	678	4,522	2,390
R.E.A.'s	21,547	3,887	25,434	16,425
<u>Canadian Utilities Ltd.</u>				
Experimental Areas and Individual Rurals (1)	810	110	920	368
R.E.A.'s	6,374	506	6,880	6,014
<u>East Kootenay Power Co. Ltd.</u>				
R.E.A.'s and Lundbreck Co-Op.	96	49	145	124
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	<u>32,968</u>	<u>5,230</u>	<u>38,198</u>	<u>25,470</u>
<u>B. Peace River Country</u>				
<u>Canadian Utilities Limited.</u>				
Experimental Areas and Individual Rurals (1)	70	99	169	33
R.E.A.'s	840	38	878	804
<u>Northland Utilities Limited.</u>				
Experimental Areas and Individual Rurals (1)	36	18	36	18
R.E.A.'s	695	155	713	478
Total Group B.	<u>1,641</u>	<u>155</u>	<u>1,796</u>	<u>1,333</u>
<u>C. Isolated Towns Served by Northland Utilities Limited.</u>				
Company-owned Rurals (1)	4		4	3
R.E.A.'s	146	25	171	206
<u>Other Companies</u>				
Total Group C.	<u>9</u>	<u>25</u>	<u>9</u>	<u>4</u>
Total Group C.	<u>159</u>	<u>25</u>	<u>184</u>	<u>213</u>
GRAND TOTAL	<u>34,768</u>	<u>5,410</u>	<u>40,178</u>	<u>27,016</u>

(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.

TABLE NO. 18

DATA RE CENTRAL ELECTRIC STATIONS IN ALBERTA BY REGIONAL GROUPS
As at December 31, 1955

	<u>Group A</u>	<u>Group B</u>	<u>Group C</u>	<u>Group D</u>	<u>Total</u>
<u>Plants</u>					
K. W. Rating	445,900	11,173	2,853	2,589	462,515
K.W.H. Generated	1,693,344,331	24,765,075	6,854,706	3,150,213	1,728,114,325
<u>Transmission</u>					
Miles of Line	8,294	587	87		8,968
<u>Distribution</u>					
Number of customers	248,649	9,107	1,698	1,884	261,338
K.W.H. sold	1,457,802,034	19,538,822	5,956,760	2,760,000	1,486,057,616
Miles of line	2,951	172	62	29	3,214
<u>Rural</u>					
Number of farms (1)	32,968	1,641	159		34,768
Number of non-farms (1)	5,230	155	25		5,410
Miles of farm line (2)	25,470	1,333	213		27,016
Miles of R.E.A. line (3)	22,563	1,282	206		24,051

(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 generating capacity, transmission line facilities, etc., added during the year 1955.

Calgary Power Ltd.

(1) Changes in Plant Capacity

By completing the Pocaterra - Interlakes project, Calgary Power Ltd. added 20,000 K.W. to its generating capacity. Of this 15,000 K.W. is in the Pocaterra plant and 5,000 K.W. in the Interlakes plant.

Construction of the Company's steam plant at Wabamun is on schedule and is expected to be in operation by the fall of 1956.

During 1955, work on the intake and discharge canals was continued and the powerhouse substructure was completed and the superstructure is well under way. Installation of equipment has begun and will continue until the plant is completed.

The Company continued its investigations on the North Saskatchewan River, but no definite plans for the development have been formulated.

(2) Additional Transmission Lines

During the year Calgary Power Ltd. built the following transmission lines:

Calgary Tie Line	138 KV
Edmonton Tie Line	138 KV
Oneway to Parrhead	66 KV
Bearspaw to Nose Creek Sub	66 KV
From Buck Creek southwest to oil wells	22 KV
Drayton Valley to Buck Creek Pumping Station	22 KV
Drayton Valley to Violet Grove and southwest to oil wells	22 KV
East Edmonton Substation to Premier Steel Mills	22/13 KV
Red Deer to Joffre Oil Field	22 KV
Cascade to Banff	13.8 KV

A 5,000 KVA 23/13.2 KV substation at the Interlakes Plant, and an 18,750 KVA 138/13.2 KV substation at the Pocaterra Plant were constructed to feed the output of these new hydro electric stations into the existing 138 KV line between Horseshoe Plant at Bellevue. The Interlakes Plant power is transmitted at 23 KV to the Pocaterra Plant where it is stepped down through a 5,000 KVA transformer to the plant 13.2 KV bus.

At Drayton Valley a 5,000 KVA 69/23 substation was completed in anticipation of a fast growing load in the Pembina Oil Field area.

A 2,500 KVA 23.9/13.8 KV transformer was installed at the Ghost Plant substation to supply power to the Shell Oil Company's gas plant at Jumping Pound and other existing 23 KV loads.

A new 5,000 KVA 69/13 KV substation was established in the northwest section of the City of Calgary to take care of load growths in this area.

Voltage regulators (23KV) were installed at Drayton Valley, Evansburg, and Wetaskiwin. At the Cascade Power Plant a 13 KV regulator was placed in service for improving the voltage to the Town of Banff while a 4 KV regulator was installed at Camrose to handle the city's load. All of the above regulators were 5,000 KVA throughput capacity.

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

Towns: Nil.

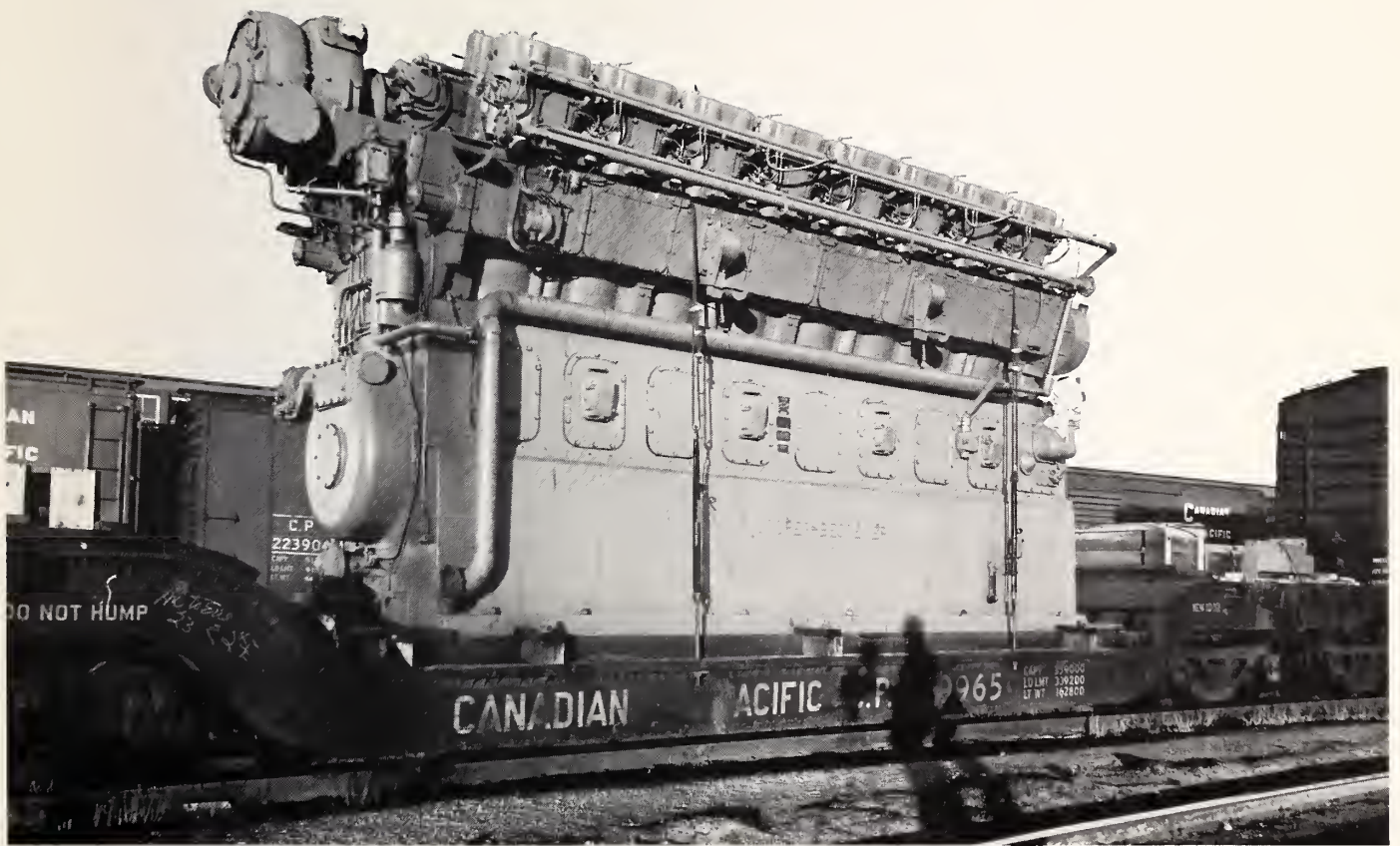
Villages: Ghost Park
Silver Beach

Hamlets:

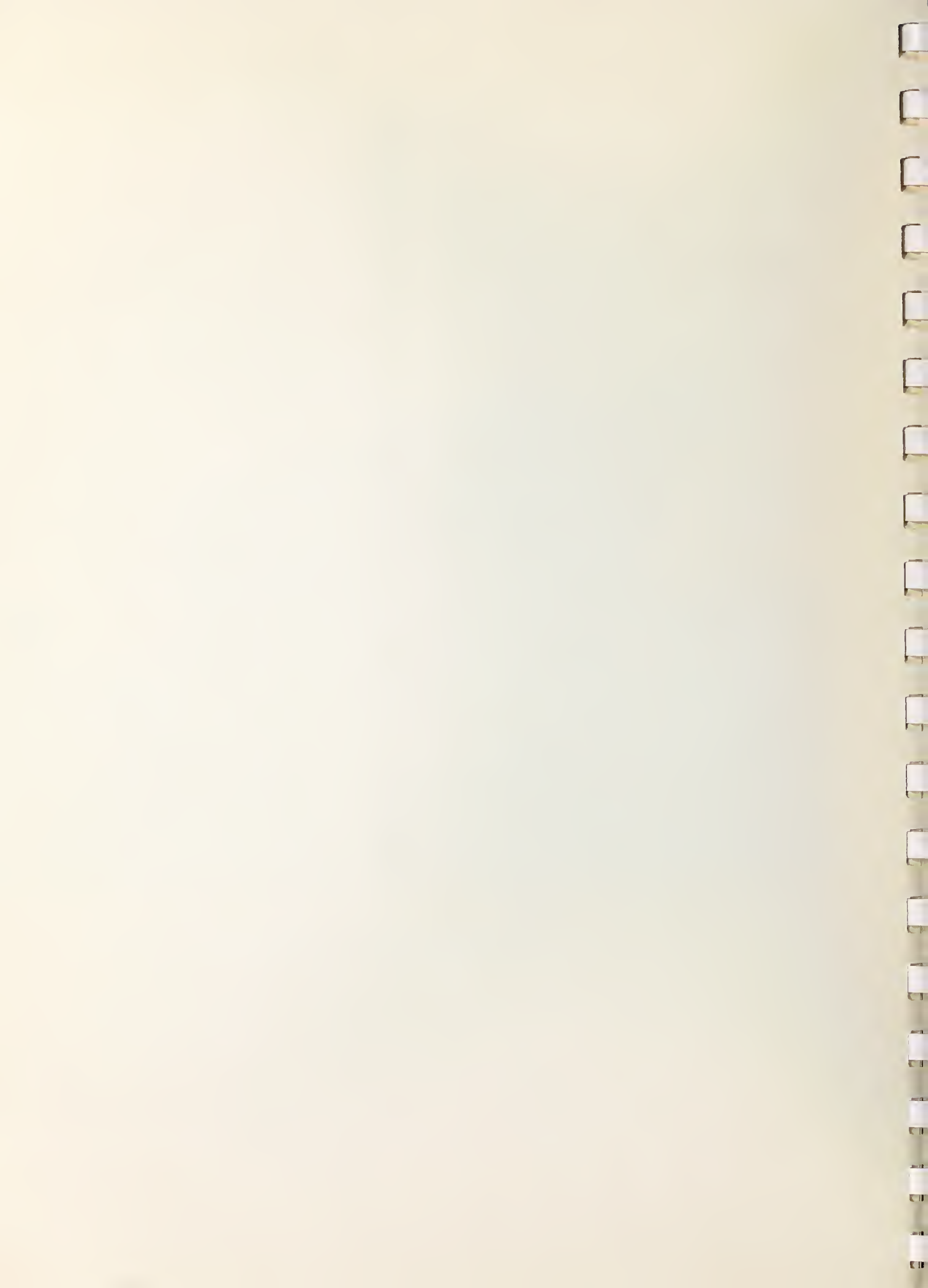
Blue Ridge	Hoping	Seven Persons
Buck Creek	Hulbertsland Subdiv.	Silver Bay
Campbelltown	Manyberries	Texaco Lakeview
Cherhill	Nemiscam	Tomahawk
Chesternmere	Orion	Tiger Lily
Darwell	Plamondon	Violet Grove
Ellscott	Pembina Pipe Townsite	Winnifred
Etzikom	Royalite Townsite	Whitla
Fallis Corner	Sarles Subdiv.-Sundre	Whitecourt
Flatbush	Schuler	

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

During the year 1955 Calgary Power Ltd. received applications for an additional 310 oil well pumping services and additional battery pumping services bringing total applications to some 2,200 oil pumps to date. Service has been extended during the year to some 200 oil wells and 50 battery pumps. Main line extensions have been provided to some oil well pumps in the Joffre, Pembina-Fairydell,



The biggest internal combustion engine in Alberta destined for the Grande Prairie plant of Canadian Utilities, Limited.



Westward-Ho areas, in addition to those fields already being served, such as Acheson, Stony Plain, Barons, Joarcan, Bon Accord, Bonnie Glen, Campbell, Chauvin, Ellerslie, Excelsior, Golden Spike, Leduc, Legal, 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.

Canadian Utilities Limited.

(1) Changes in Plant Capacity

During the year Canadian Utilities Limited installed a 2,500 K.W. Cooper-Bessemer engine in its Grande Prairie plant. This unit operates on natural gas and is required to provide power for the Sturgeon Lake oil field south of Valleyview.

The Company's Battle River steam plant of 32,000 K.W. capacity is scheduled for completion in the fall of 1956. Work has been going forward on this all summer and at the moment construction of the plant building and pump house is well under way, while the dam and spillway are almost completed. Over 95% of the earth-fill is in place and the surface covered with riprap, while all major work on the spillway has been completed.

The 1956 spring run-off will be trapped, so that an abundant supply of cooling water will be on hand when the first 32,000 K.W. unit is put on the line. This unit will supply power to both the Drumheller and Vegreville districts.

Coal from two nearby strip mining companies, Forestburg Collieries and Battle River Coal Company, will be used as fuel.

(2) Transmission Lines.

During the year the Company built the following transmission lines:

Acadia Valley to Empress	23 KV
Veteran-Monitor-New Brigden	23 KV
Grande Prairie to Sturgeon Lake (operating at 34 KV)	66 KV

Construction has started on a transmission line to connect the Vermilion Plant and the plant now being built on the Battle River near Forestburg. About one

third of the 83 mile line was completed at the end of 1955. Although built to specifications for carrying 138,000 volts, this line will have an initial transmission voltage of 69,000.

New and growing loads in all districts required the erection of two new substations and increasing the capacity of four existing substations. the locations and descriptions are:-

Clairmont - a new 3,000 KVA substation was built to supply 34,000 volt power to the new transmission line from Clairmont to the Sturgeon Lake oilfield.

Sturgeon Lake Oilfield - Seven miles south of Valleyview a new 1,500 KVA substation was erected to drop the transmission voltage from 34 KV to 25 KV/2300 V for the oilfield distribution system.

The four substations that were enlarged because of natural expansion and load growth are:

Two Hills - increase of 1,500 KVA
Drumheller - increase of 3,000 KVA
Grande Prairie - increase of 750 KVA
Vegreville - increase of 1,500 KVA

Also required and installed were three new voltage regulating stations.

These are:

Marwayne - 375 KVA 34,000 volts
Willingdon - 200 KVA 23,000 volts
Clairmont - 375 KVA 23,000 volts.

(3) Towns and Villages added to the Company's system in 1955

Consort	Sedalia
Empress	Spondin
Compeer	Scollard
Kirriemuir	Codesa
New Brigden	La Corey
Altario	Debolt

Northland Utilities Limited

(1) Changes in Plant Capacity

During the year the Company made small increases in the capacity of the Athabasca and Valleyview plants.

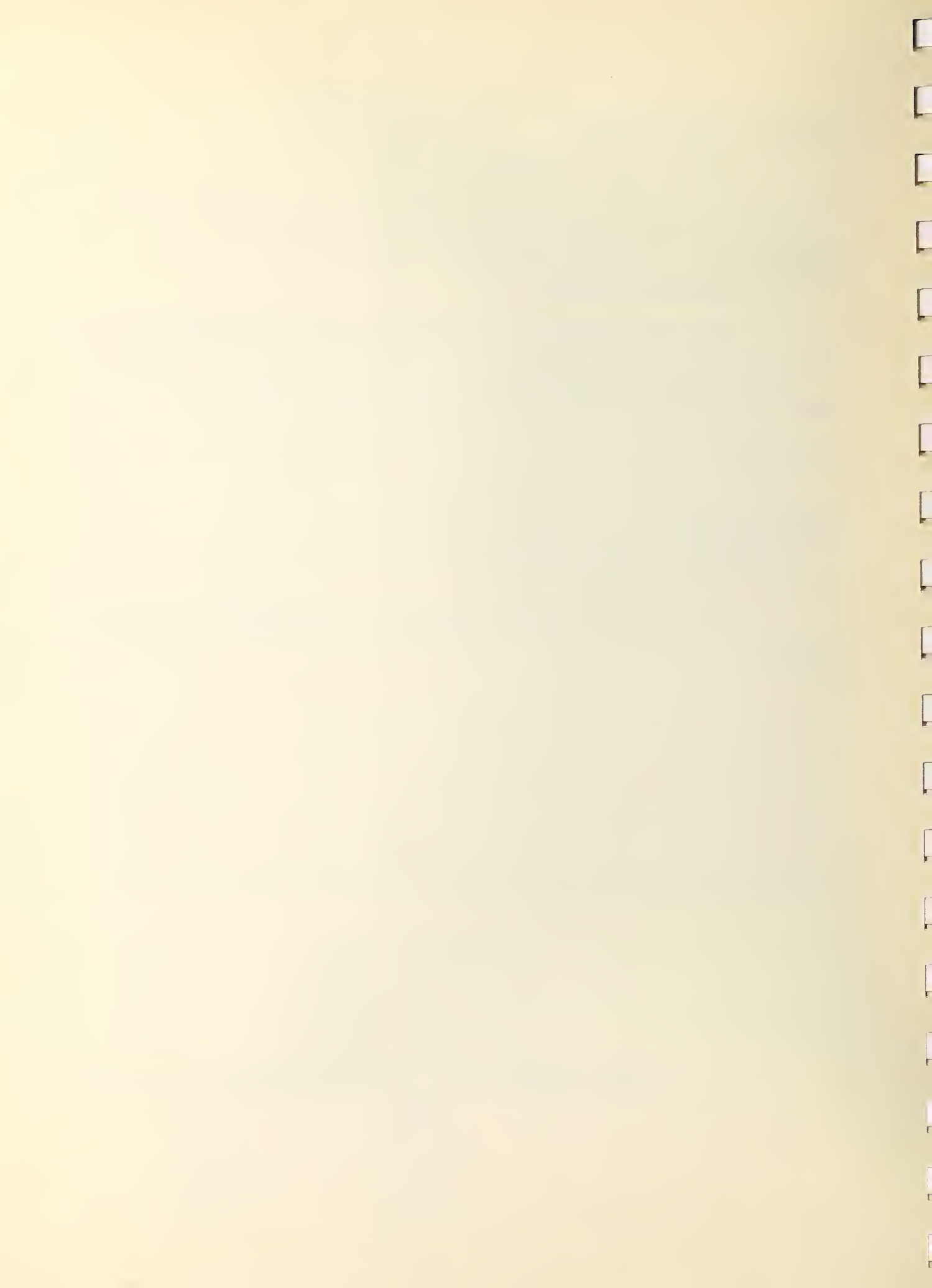
(2) Transmission Lines

The Company extended its transmission network from Grimshaw to Manning. This work was done in co-operation with the farmers along the way and provides the means of making farm electrification available to some 500 farmers between these two points.

City of Edmonton.

(1) Changes in Plant Capacity

During the year the City completed the installation of a 30,000 K.W. turbine.



FORECAST TO 1959

At December 31st, 1955, the capacity of the power plants in the Province was 462,515 K.W. At December 31st, 1945 - ten years ago - this capacity was 153,000 K.W., so that the increase during the 10-year period has been 203% - truly a phenomenal increase. While the peak load increased 22% over the previous year, this large increase was due to very severe weather in December, 1955. After making allowance for this, however, the corrected increase was about 15%. We expect that the rate of increase will continue to be high for the next few years, although it is hardly likely that the present excessively high rate will continue.

Table No. 19 shows the growth which we believe will take place in the electrical load of the Province from now until 1959. It shows the actual capacity in K.W. of the power plants in the Province as at December 31st, 1954, the increase in capacity during 1955, and the estimated peak load that occurred in 1955. It then goes on to deal with these year by year until 1959, showing our forecast of peak load and what the Companies and Municipalities are planning to do to meet that peak load.

It will be seen from a study of Table No. 19 that there was ample reserve capacity to meet the load in 1955. 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, 1955, the various power plants, by pooling their resources, could have carried the load.

It appears that if the present plans for additional units are carried out we should have ample reserve capacity until 1959. It is hard to predict what the peak load will be four years from now and it is possible that our forecast is on the high side. If, at the end of 1956, it appears that the load is increasing faster than we anticipated it may be that the Companies will have to speed up their

construction program, but this can be dealt with as we go along. It will be noted from Table No. 19 that during the forecast period it is planned to put in four gas turbines. Canadian Utilities Limited, who installed the first one in Canada at their Vermilion plant, are well satisfied with this unit. They propose to install another in the Peace River country, while Calgary Power Ltd. proposes to put one into service, and the City of Edmonton has placed orders for two of them.

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. 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.

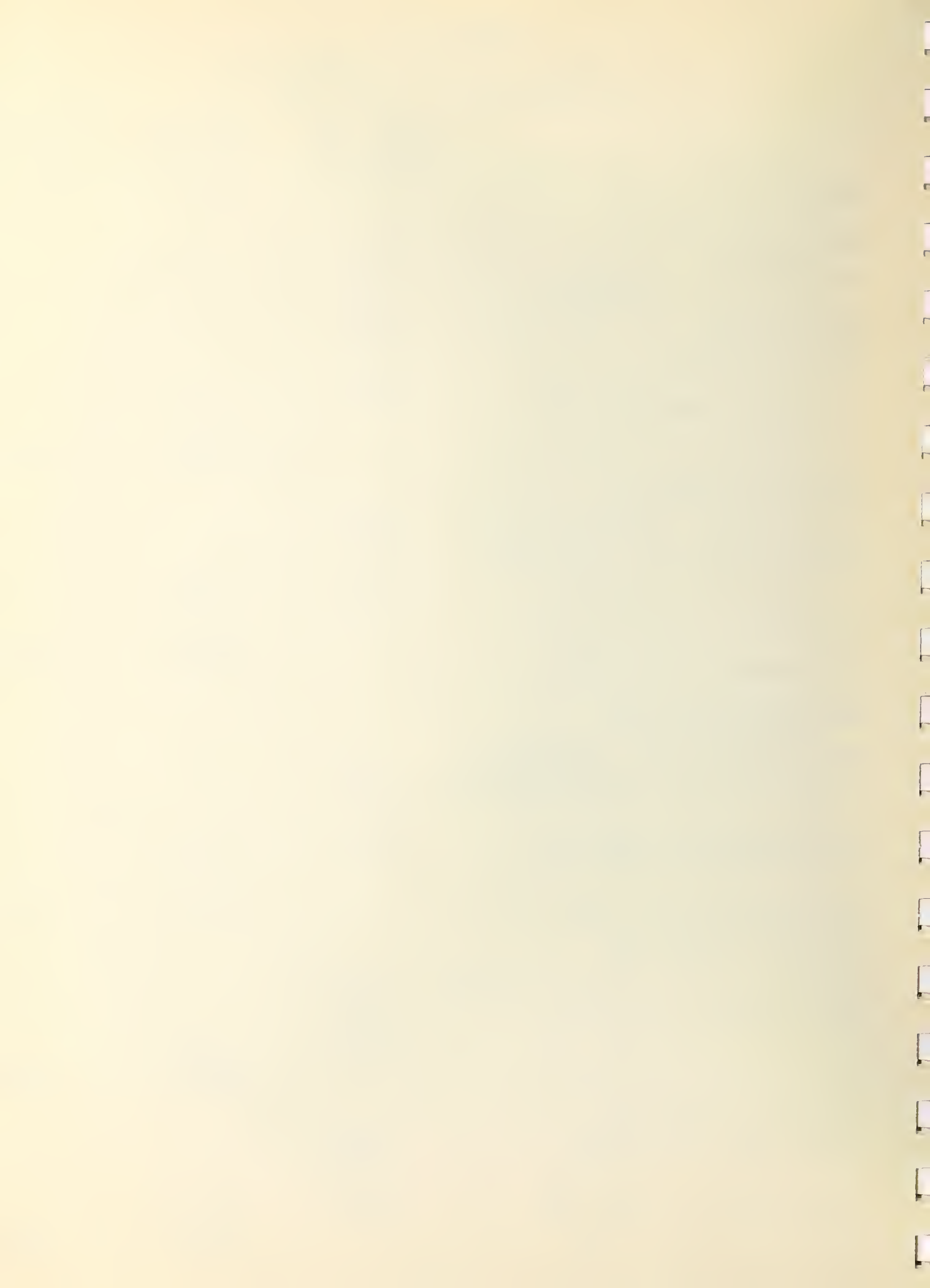


The Battle River project of Canadian Utilities, Limited, eleven miles southwest of Forestburg. The spillway is in the center foreground, while the initial construction of the plant building and pump-house can be seen up-stream. The valley which will contain the 1956 spring run-off can be plainly seen directly above the spillway. This picture was taken from an aircraft in the latter part of October 1955.

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, 1954		411,244	340,000
<u>Capacity added during 1955</u>			
Calgary Power Ltd. - Pocaterra	15,000		
- Interlakes	5,000		
Canadian Utilities Ltd. - Grande Prairie	2,500		
City of Edmonton	30,000		
Less minor revisions	- 1,299		
	<hr/>		
Total capacity added during 1955	51,271	51,271	
Total capacity Dec. 31, 1955		<hr/> 462,515	
		say, 463,000	415,000
<u>Capacity to be added 1956</u>			
Calgary Power Ltd. - Wabamun	66,000		
Canadian Utilities Ltd. - Battle River	32,000		
	<hr/>		
Total capacity to be added 1956	98,000	93,000	
		<hr/>	
Total capacity Dec. 31, 1956		561,000	475,000
<u>Capacity to be added 1957</u>			
Canadian Utilities Ltd. - Grande Prairie			
Gas Turbine	5,000		
Calgary Power Ltd. - Cascade Plant Addition	18,000		
	<hr/>		
Total capacity to be added 1957	23,000	23,000	
		<hr/>	
Total capacity Dec. 31, 1957		584,000	545,000
<u>Capacity to be added 1958</u>			
Calgary Power Ltd. - Possible gas turbine	27,000		
City of Edmonton - Gas Turbine	30,000		
	<hr/>		
Total capacity to be added 1958	57,000	57,000	
		<hr/>	
Total capacity Dec. 31, 1958		641,000	625,000
<u>Capacity to be added 1959</u>			
Calgary Power - hydro plant	70,000		
City of Edmonton - Gas Turbine	30,000		
	<hr/>		
Total capacity to be added 1959	100,000	100,000	
		<hr/>	
Total capacity Dec. 31, 1959		741,000	710,000



FARM ELECTRIFICATION

During the year 1955, 4,264 farms have been added to the number already electrified in the Province, to make a total of 34,768 bona fide farms electrified as at the end of the year. The number added during the year is less than in previous years for three reasons. The first is that most of the farms in the better soil areas of the Province have already taken service. This will be dealt with more fully later in the report. The second is that the very poor harvest in 1954 slowed down the number of applications. The third is that the early onset of winter in 1955 retarded construction.

A goal of a further 4,000 electrified farms has been set for 1956. This year again should see the expansion of farm electrification into other 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 Commission has met with a good response from the Power Companies who have always assumed a responsibility to see that these extensions are made even though in many cases they are extremely unprofitable to the companies.

Some examples of this type of extension which were made in 1955 are the lines of Canadian Utilities Limited to New Brigden to serve farmers in the Special Areas, and to Empress to provide service to the farmers in the Bindloss areas. Calgary Power's transmission line from Boyle through Grassland and on to Planondon is another example of a company-owned line which will open up a new area and provide service to some hundreds of farmers.

The following table shows the number of farms connected as of December 31st, 1955, 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, 1955

	No. Farms <u>Connected</u>	Non-Farms <u>Non-Farms</u>	Hamlet <u>Customers</u>	Total Non-Farm <u>Customers</u>	Total Served <u>off Farm Lines</u>
Experimental Areas	2,933	482	405	887	3,820
Completed R.E.A.'s	29,701	1,691	2,832	4,523	34,224
Individual Rurals	1,835				1,835
Farms supplied by Cities	299				299
Total Actually Served	34,768	2,173	3,237	5,410	40,178
		<u>UNDER CONSTRUCTION</u>			
	No. Farms <u>Under Construction</u>	Non-Farms	Hamlet <u>Customers</u>	Total Non-Farm <u>Customers</u>	Total Served <u>off Farm Lines</u>
New Areas	545	4		4	549
Additions to old areas	876	3		3	879
Total under construction	1,421	7		7	1,428

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

<u>New Areas</u>	<u>Additions to Old Areas</u>	<u>Total</u>
822	368	1,190

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>
174	318	492

* '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 34,768 bona fide farmers connected, farm electrification also served 5,410 non-farm customers who would not have obtained service otherwise. The total number benefiting by the construction of these farm electrification lines is, therefore, 40,178.

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 that the main reason is that we are now reaching out into areas of poorer soil and less wealth per farmer. We believe that it will be necessary by means of long term financing to give further assistance to the farmers not yet hooked up.

According to the 1951 census there were 84,315 farms in the Province, while only 76,004 of these were farms on which someone resided. Since that time much land has changed hands and many farms have been consolidated with others, so that it is reasonable to expect that when the census is taken in 1956 it will show that there are 70,000, or less, farms on which someone resides. At the end of 1955, 34,768, or 49% of these were electrified. The saturation of electrified farms by

census divisions is shown on the map included in this report. From experience in the United States and elsewhere, it seems reasonable to expect that before long Alberta's electrification will reach a saturation of 85%. This would set the figures for the number of farms which we might expect to become electrified at about 60,000. On this basis we may consider then that the number of farm lines in the Province is 58% completed.

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.

These zones are marked on the map showing the transmission lines in the Province. Generally speaking, the lines of an R.E.A. served by one company come within a mile or so of the lines of an R.E.A. served by some other company. The boundaries of the territories of the companies were established by drawing a line between such R.E.A.'s all over the Province.

Saturation in Areas Served by
the following three Companies only at December 31, 1955

	<u>Farm Electric Services</u>	<u>Canadian Utilities Limited</u>	<u>Northland Utilities Limited</u>	<u>Total</u>
(a) Total farm residences occupied				76,004
(b) Total of these within area served by each Company	47,021	22,878	5,080	74,979
(c) Probable ultimate saturation 85%	40,000	19,300	4,300	63,600
(d) Farms served by each Company	25,391	8,094	881	34,366
(e) Farms served by each Company as a percentage of (c)	63.5%	41.9%	20.5%	54%

The map on Page 36a shows the census divisions in the Province. The southern half of the Province consisting of Census Division 11 and Census Divisions 1 to 9, contains 45,476 farms. Of these 26,486, or 58%, have been served. In the area covered by Census Divisions 12 to 17, inclusive, and Census Division 10, there are 30,528 farms, and only 8,282 of these, or 26%, are electrified. This is the area of the Province where the majority of small farms lie. If they are to enjoy the undoubted benefits of farm electrification it appears necessary to extend long term financing to them in much the same manner as was done in the United States. In these areas there are very many progressive farmers who need farm electrification and who would go to great lengths to get it. Some of their neighbours, however, are not yet convinced of the value of this service and they are content to wait awhile. The fact that they are willing to wait makes it almost impossible for the more progressive farmers to carry the cost of the line necessary to serve the few who are willing to hook up the first year. The 1955 amendment of the Revolving Fund Act which set up what we call Part 2 of the Act, has gone some distance in assisting these more progressive farmers. Under it \$119,663.00 have been earmarked for loan to farmers

Alberta Power Commission
 Map Showing
 CENSUS DIVISIONS OF ALBERTA
 With Table Showing
 NUMBER OF ELECTRIFIED FARMS

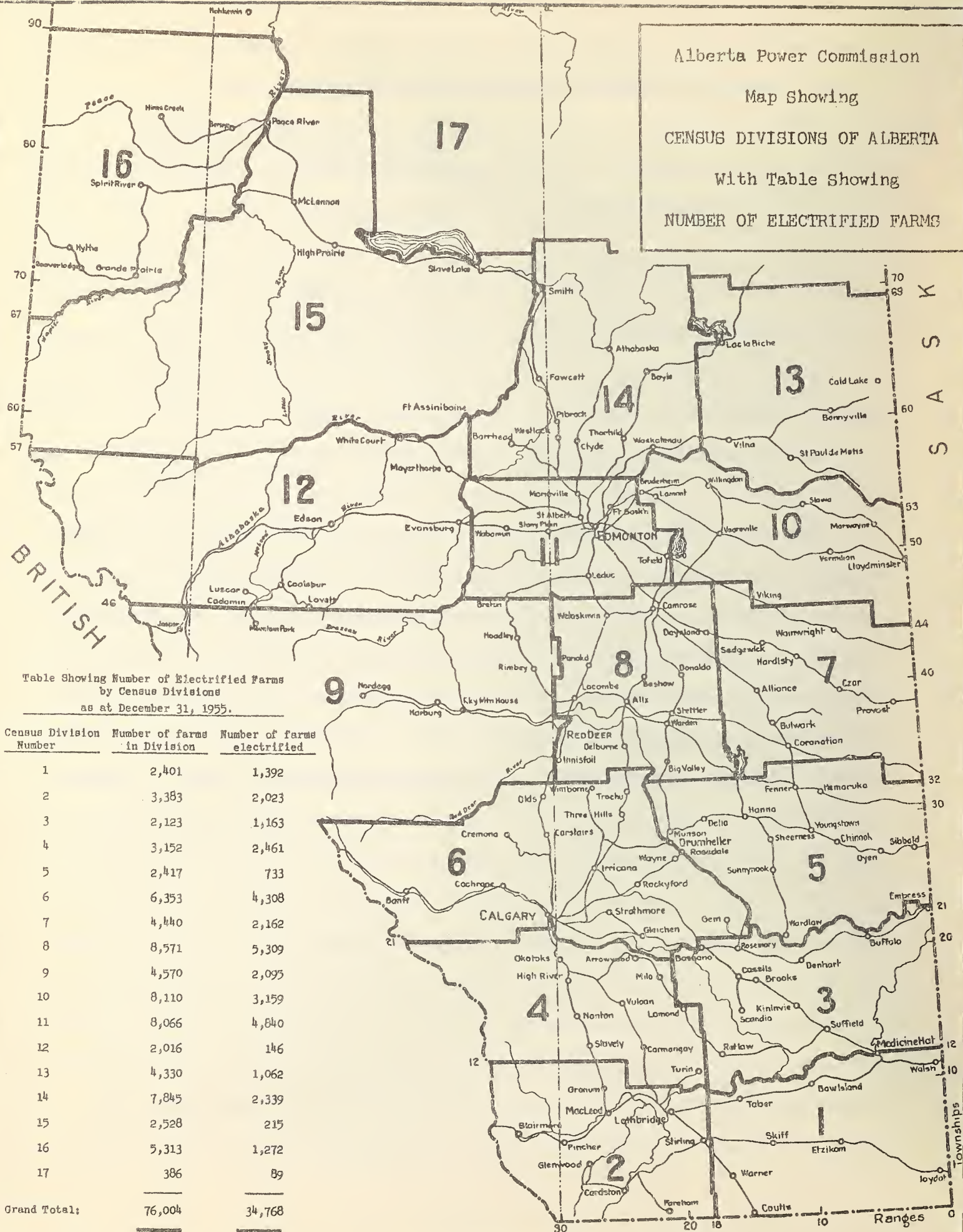


Table Showing Number of Electrified Farms
 by Census Divisions
 as at December 31, 1955.

Census Division Number	Number of farms in Division	Number of farms electrified
1	2,401	1,392
2	3,383	2,023
3	2,123	1,163
4	3,152	2,461
5	2,417	733
6	6,353	4,308
7	4,440	2,162
8	8,571	5,309
9	4,570	2,095
10	8,110	3,159
11	8,066	4,840
12	2,016	146
13	4,330	1,062
14	7,845	2,339
15	2,528	215
16	5,313	1,272
17	386	89
Grand Total:	76,004	34,768

served by Part 2 extensions. The extension of power from Grimshaw into the Manning area was made possible by Part 2 financing.

It is now proposed to extend this legislation to give further assistance. We believe that in an area not now served or in any large extension made to existing R.E.A.'s, the Power Commission and the Power Companies should map the area showing all the farmers in it. Then an estimate should be made of the cost of building a network of lines not only to serve all those farmers who immediately signify their willingness to take service but with sufficient capacity to serve all future members in the area. Having this estimate of cost, a unit cost per farmer should be calculated on the supposition that about 80% of all farmers in the area will someday come on. This unit cost based on about 80% saturation should then be the figure that will be charged to each farmer in the area that hooks up regardless of what is the initial cost of this framework of lines. The balance of the cost of the lines in this area would be carried by the Government without charging interest on it. The Government would actually have a share in the main network of the Association's lines for two or three years or until enough additional farmers connect up to these lines to enable the association to pay the Government back. For that interval the Government would not charge interest on the money tied up in its share of the lines. As soon as the additional farmers connect up to these lines they will sign lien notes and, of course, will then start paying interest on the money borrowed under these lien notes. Under this arrangement the share cost per farm would be established at the outset of organization without the wide differentiation now necessary between an estimate and the final cost.

The Government in this way will be a partner in the R.E.A. to the extent of helping to pay for part of the lines along the roads. Any money put up by the Government in this connection would not be used to pay for taps in to farms or for farm transformers. It would only pay a share in the main network of lines and in

the substation. In some cases this share would amount to as much as \$300 or \$400 per farm, but in most cases it would be considerably less than that.

This is really an extension of the scheme presently working under Part 2 of the Revolving Fund Act, with the difference that under the revised scheme once a farmer had paid all his estimated share cost he would have no further liability to assume.

The other two maps included in the report show the electrified areas of the Province as at December 31, 1955. 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 small - of the order of one or two. Townships 65 to 69 in Range 26, west of the 5th Meridien, 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. On the present maps the areas of sparse population are indicated by means of red crosshatching for areas where the number of farms per township is less than 10, and by blue crosshatching where the number of farms per township is from 10 to 14. It will be seen from the maps that power lines are within reach of all areas where the number of farms exceed 14 per township, with the exception of the area around Lac La Biche and that north and west of Hines Creek.

Withheld from Settlement



Settlements
from
Witfield

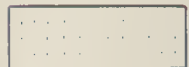
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AREAS OF SPARSE POPULATION

FARMERS per TOWNSHIP



less than 10



10 to 14

REVISED
DEC. 31, 1959
DEC. 31, 1953
DEC. 31, 1954
DEC. 31, 1955

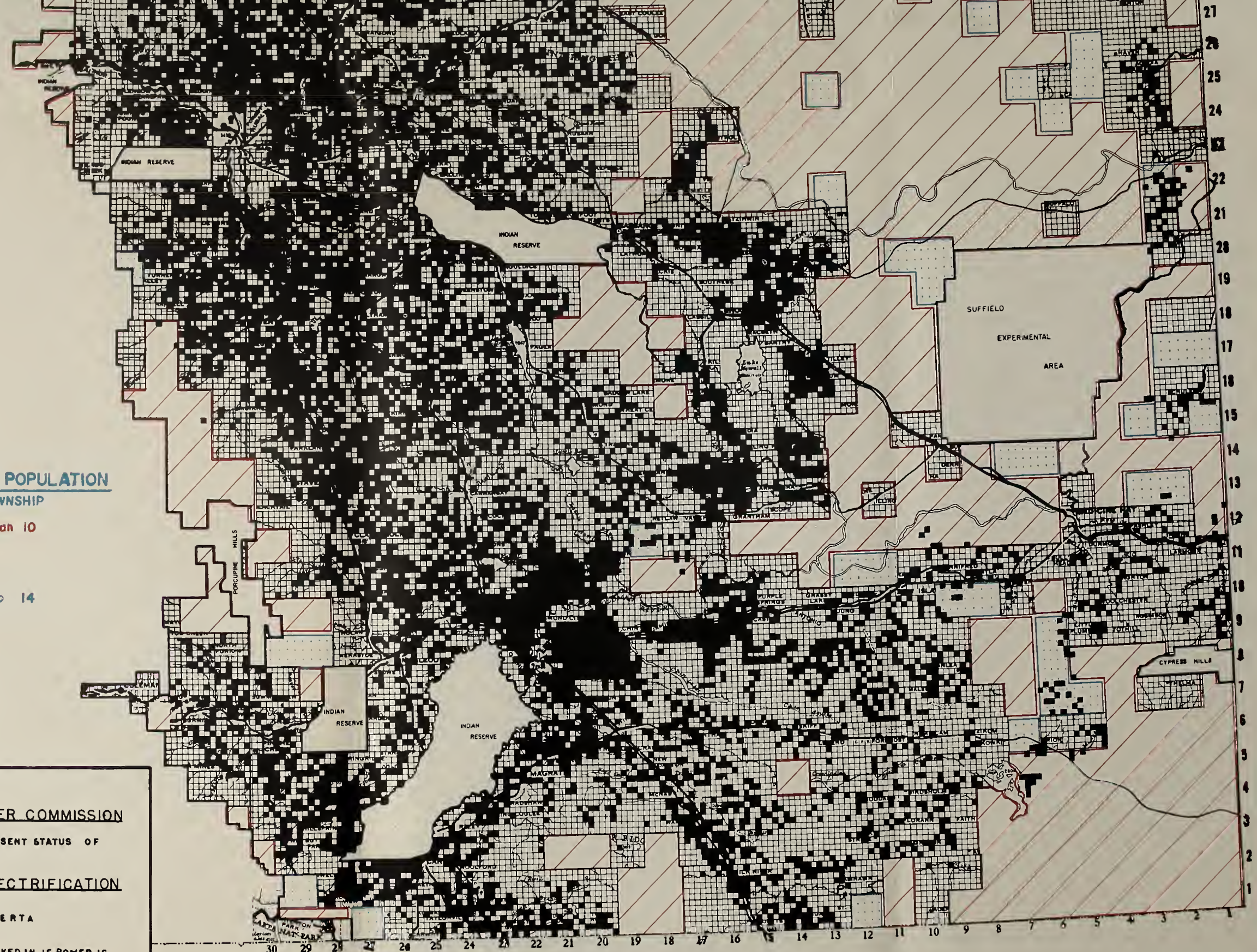
ALBERTA POWER COMMISSION

MAP SHOWING PRESENT STATUS OF

FARM ELECTRIFICATION

IN ALBERTA

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



*Compiled and drawn on the Technical Division, Department of Lands and Mines.


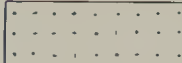
REVISED
 DEC. 31, 1952
 DEC. 31, 1953
 DEC. 31, 1954
 DEC. 31, 1955

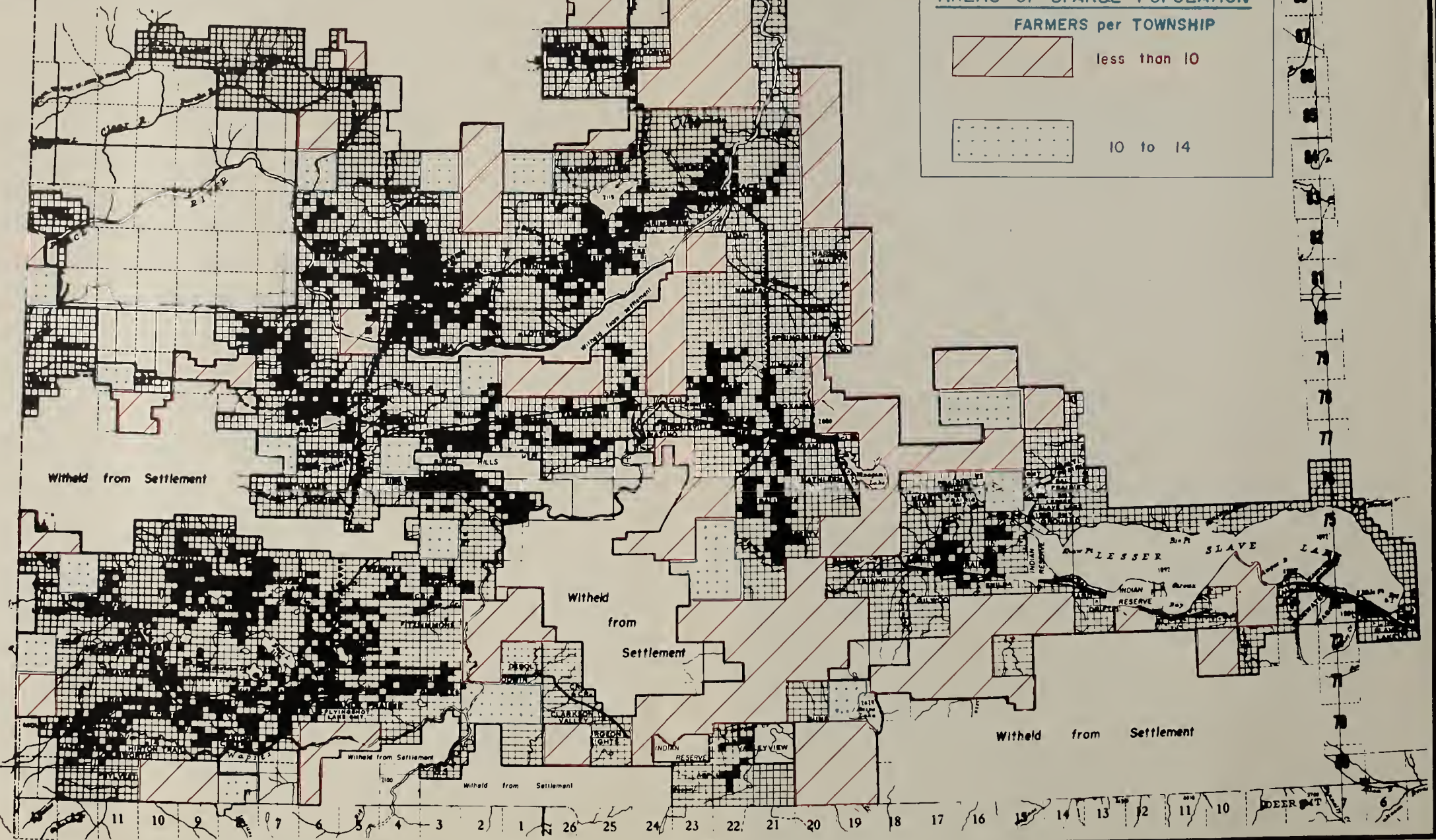
ALBERTA POWER COMMISSION
 MAP SHOWING PRESENT STATUS OF
FARM ELECTRIFICATION
 IN THE
 "PEACE RIVER AREA"
 A SECTION IS BLACKED IN IF POWER IS
 AVAILABLE TO ANY QUARTER OF IT.

Witheld from
 Settlement

Witheld from Settlement

AREAS OF SPARSE POPULATION
 FARMERS per TOWNSHIP

	less than 10
	10 to 14



Witheld from Settlement

Witheld
 from
 Settlement

Witheld from Settlement

Witheld from Settlement

11
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DEER CREEK

The farmers in the former area have already signed contracts for service and it will be extended to them next spring. It may be slightly more difficult to reach the farmers north and west of Hines Creek, but plans are under way to accomplish this and we expect these plans to work out during the coming year.

Since these maps are prepared showing the number of farms electrified as at the end of the year they do not include a number of areas which are now under construction but are not yet energized. There are two such R.E.A.'s that are of special significance because they are in the Special Areas south and east of Coronation and Hanna and when finished will make quite a showing in these areas of sparse population. These are the Lanfine and Sibbald R.E.A.'s. Two other areas which are under construction but have not been finished in time to include on the map, are the Crooked Creek area east of the Smoky River in the Grande Prairie country, and some 50 farms in the Manning area.

The Power Commission has endeavoured to make service available to farmers in many of these areas and its efforts have been successful in many cases. Similar areas which are not at the construction stage are the Baytree-Bonanza area and the area east of Rolla. Construction is expected to start in the Rolla area early in the spring. The farmers in the Grassland, Atmore, Plamondon area are expected to complete the organization of their R.E.A. within a matter of weeks.

At the end of December, 1955, there were 27,016 miles of farm lines and during the year 3,544 miles had been constructed.

Financing

At the end of December there was a total of 343 active Rural Electrification Associations. These Associations have borrowed under both the Guarantee Act and the Revolving Fund Act and the total of these borrowings has been over \$19,000,000.00. At December 31st, 1955, over \$6,235,000.00 of this had been paid back. The investment of all rural lines in the Province is approximately \$31,500,000.00.

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 1955 the Power Commission had given approval to 662 applications for loans under this Act. While all of this money may not have been borrowed by the end of December, the approvals covered 14,097 farmers at an estimated cost of over \$15,970,000.00. During 1955 very few farmers availed themselves of the Co-operative Guarantee Act to borrow money.

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 carried out a considerable amount of survey work in various areas of the Province. We expect to continue this survey work during the coming year and probably to intensify it.

The frame work of farm electrification as it is at the end of 1955 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 year the efforts to provide farmers in the Dixonville, Clear Hills and in the Manning areas with power from the interconnected system in the Peace River country met with success. Extension of power into this area is an example of what is being accomplished in the fringe areas of the Province.

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.

To supplement this work and so as to quicken the pace of farm electrification in the more remote areas, and therefore to promote efficiency of construction, and to keep down the cost of lines, the Revolving Fund Act was amended during the

1955 Session of the Legislature. This amendment resulted in a Part 2 being added to the Act. Seven R.E.A.'s availed themselves of the assistance of Part 2 of the Act, and \$119,663.00 has been earmarked for this assistance. It appears advisable to make some minor revisions to Part 2 of the Act to increase its usefulness.

In some areas of the Province service is still being given to towns and villages from small diesel plants. The extension of the transmission networks eliminated many of these plants during 1955, much to the satisfaction of the residents in these villages. It is hoped that during the coming year further extensions will eliminate more of them. These extensions will not only provide a cheaper source of supply to the inhabitants of these towns but it will also open up new fields for farm electrification.

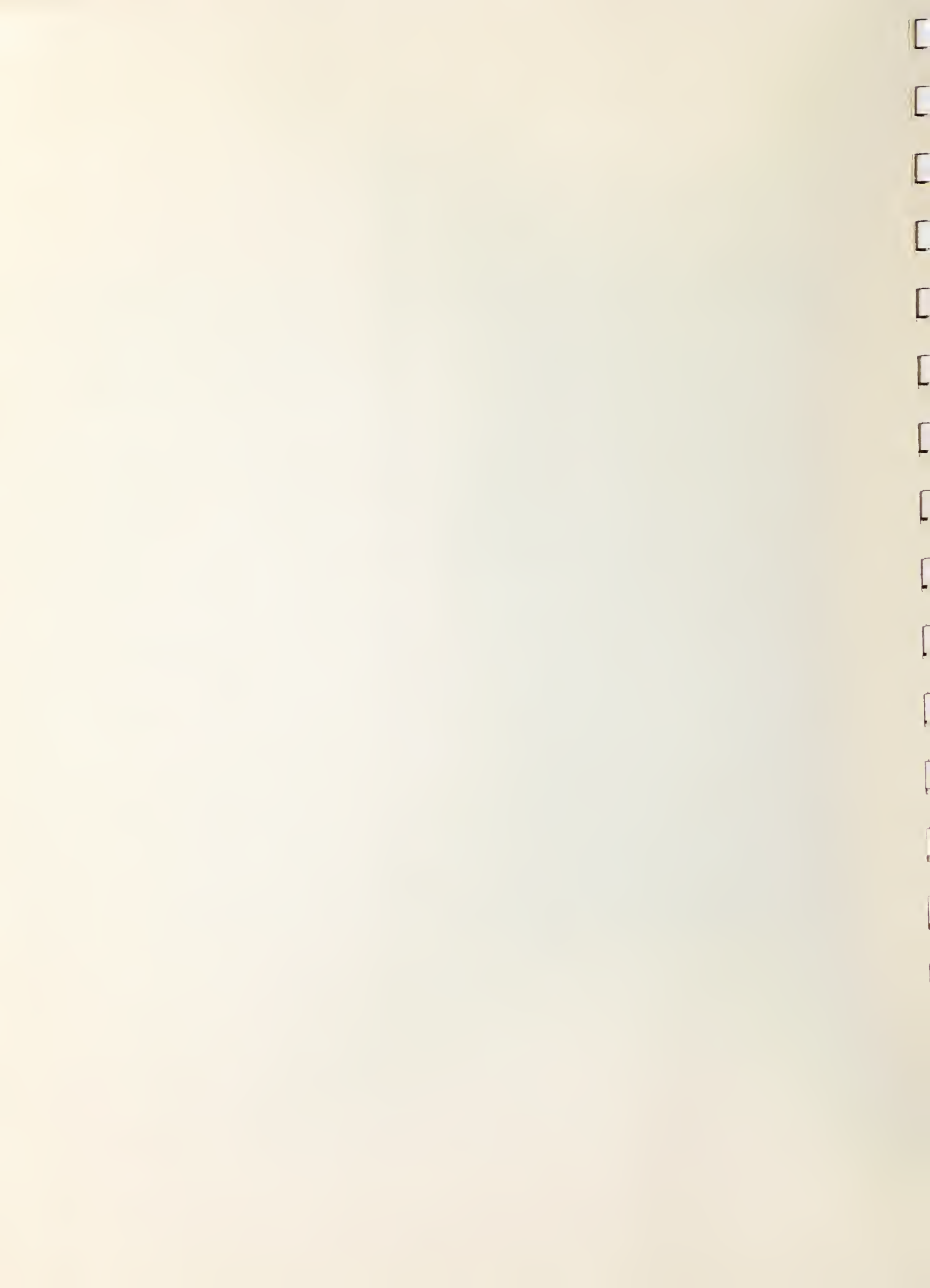
Checking Costs

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 require study. While the building of farm lines appears very simple and the operation of them is taken for granted, nevertheless there are many intricate problems to be considered if we are to keep all expenses down to the very minimum. Many questions such as monthly versus quarterly billing, card meter reading, operating charge per foot of line; accumulation, investment and use of deposit



Farm Electrification brings the people together in happy gatherings such as this banquet at Vilna celebrating the turning on of the Stry R.E.A.



reserves all merit careful and continuous study. As each of these problems is solved new ones arise to take their places. In its engineering and accounting aspects farm electrification is highly technical and the individual farmer does not have the time or the opportunity to investigate these matters. The Power Commission feels that one of its main responsibilities is to see that consideration is given to every factor that could possibly reduce the cost of electricity to the farmers. It tries to perform this service.

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. The operating charges made in Alberta appear to be reasonable and compare very favourably with those made by R.E.A.'s who are operating in similar territory in the United States. One of the advantages gained by the farmers which enables the operating charges to be kept low is the rather unique method of operating R.E.A.'s in Alberta. While in the United States the R.E.A.'s are generally larger than they are in Alberta, each R.E.A. maintains its own supervisory, office and operating staff, with the result that its overhead is apt to be high. In Alberta where the expenses of operating R.E.A. lines are pooled over all the farmers being served by any one power company, and where, for instance, Canadian Utilities Limited does the operating for some 8,000 farms, and Farm Electric Services does this work for some 25,000 farms, the overhead from a number of small offices is not added to operating expenses. In other words, these companies operate the farm lines more efficiently than would be the case if they were being operated separately by a number of small R.E.A.'s.

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 annual use of electricity per farmer in the Province in 1955 has been approximately 2,892 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 4,264 farmers were connected in 1955, 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 2,892 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 2,892 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 as rapid a pace as possible until the 60,000 farms previously mentioned are electrified.

Electricity provides more than comfort and convenience. It is the most useful 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 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. Agriculture is our largest industry. Everything should be done to make life on the farm as prosperous and as happy as possible. Electricity will be one of the biggest factors in bringing this 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 the electricity consumed by farmers accounted for less than 6% of the total electricity sold in the Province. While farmers use only 6% of the K.W.H. they are responsible for over 10% of the peak load. Even when we get all the farms electrified the percentage which the farmers will use of the K.W.H. generated in the Province will not be large. By 1960 it may be 7% of the total output.

Since the farmers were responsible for over 10% of the peak load in the Province it means that 10% of the total capacity of the power plants and the transmission lines was reserved for their use. This percentage, which amounts to over 40,000 K.W., is a large proportion of total plant capacity and consequently means that a large proportion of the companies' investment in plants and transmission lines is reserved solely for farmers. The companies' investment in this equipment which is reserved for the farmers' use will be well over \$500 for each farm served.

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.





ALBERTA



PROVINCE OF ALBERTA CANADA

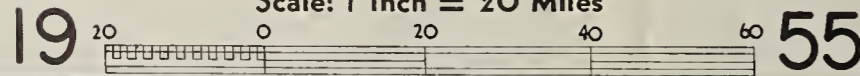
ALBERTA



PROVINCE OF ALBERTA CANADA

ALBERTA POWER COMMISSION MAP OF TRANSMISSION LINES IN PROVINCE OF ALBERTA

Scale: 1 Inch = 20 Miles



LEGEND

- | | | | |
|------------------------------------|--|--------------------------|--------|
| TRANSMISSION LINES 132 K.V. & OVER | | CALGARY POWER CO. | C.P. |
| " " 33 K.V. TO 72 K.V. | | CANADIAN UTILITIES LTD. | C.U. |
| " " UNDER 33 K.V. | | NORTHLAND UTILITIES LTD. | NU. |
| BOUNDARY BETWEEN COMPANIES | | EAST KOOTENAY POWER CO. | E.K.P. |
| POWER PLANTS - STEAM | | POWER PLANTS - HYDRO | |
| POWER PLANTS - INTERNAL COMBUSTION | | | |

