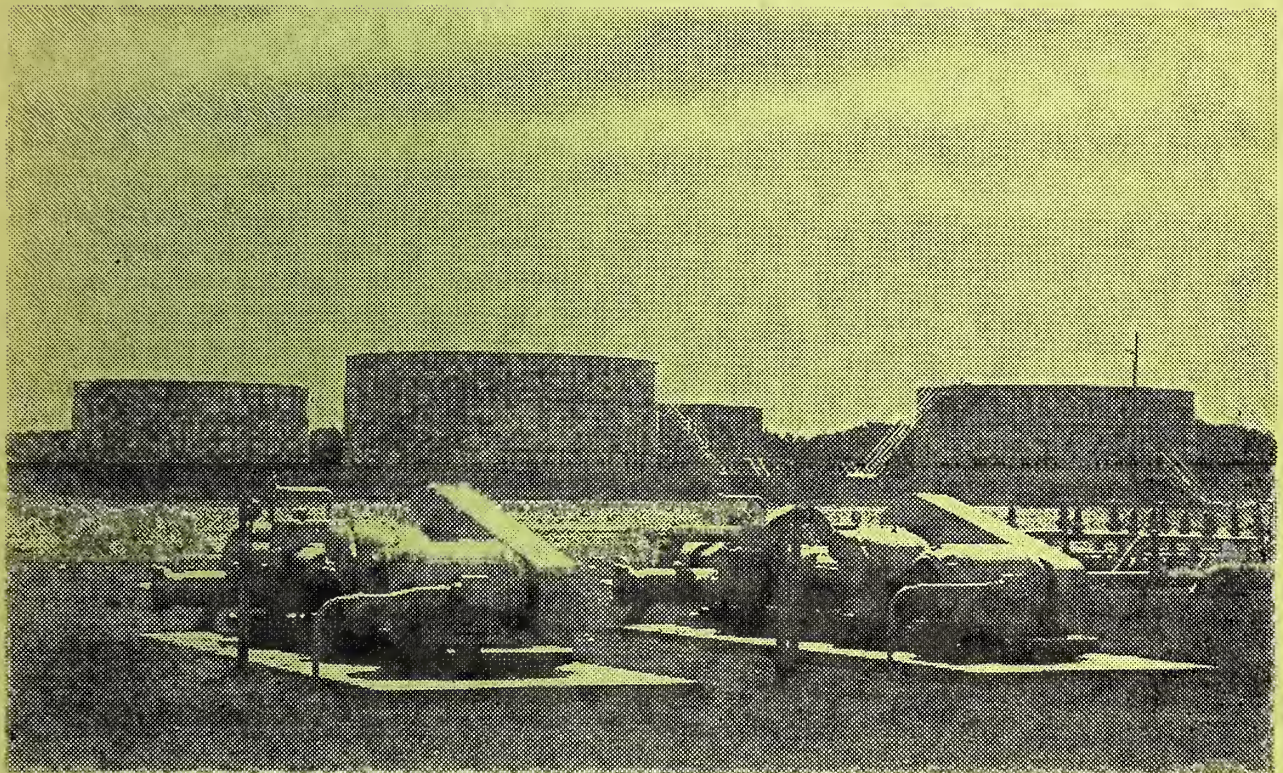


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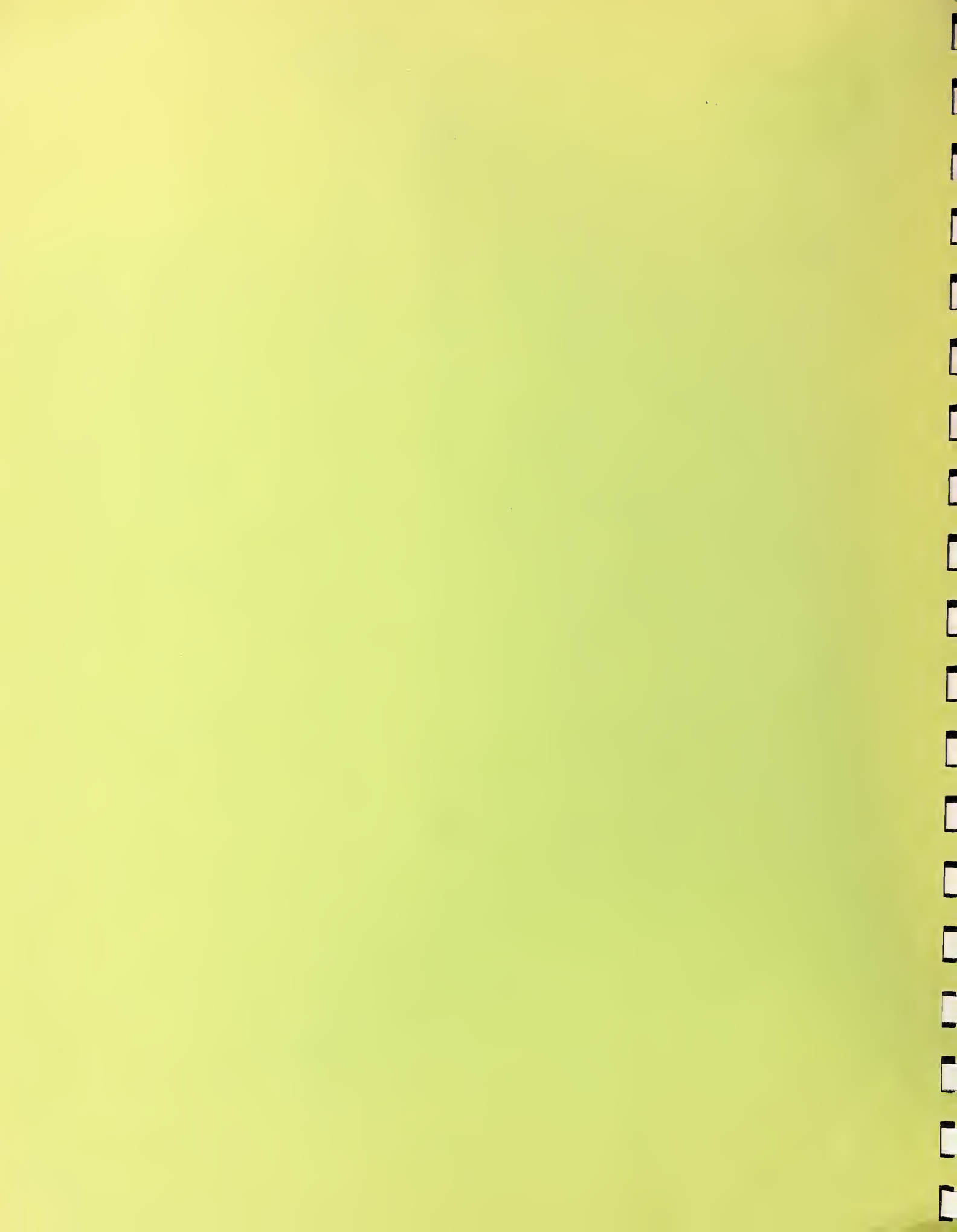


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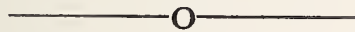


*Alberta Power Commission  
Annual Report  
1956*





GOVERNMENT OF THE PROVINCE OF ALBERTA



# ANNUAL REPORT

OF THE

# ALBERTA POWER COMMISSION

FOR THE YEAR ENDING

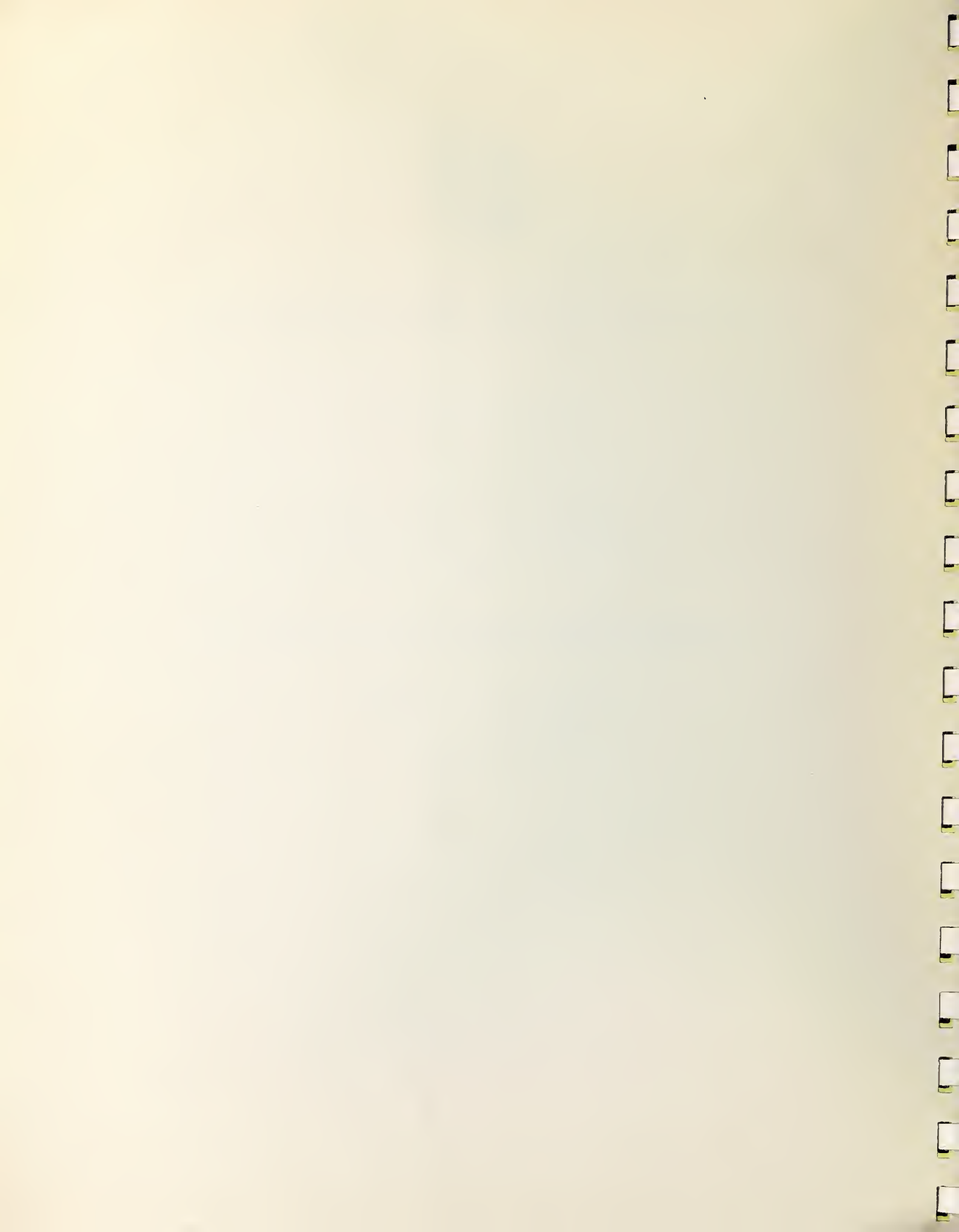
**DECEMBER 31, 1956**

EDMONTON



J. G. MacGREGOR

CHAIRMAN



January 31st, 1957.

The Honorable R. Reiersen,  
Minister of Industries and Labour,  
Administration Building,  
Edmonton, Alberta.

Sir:

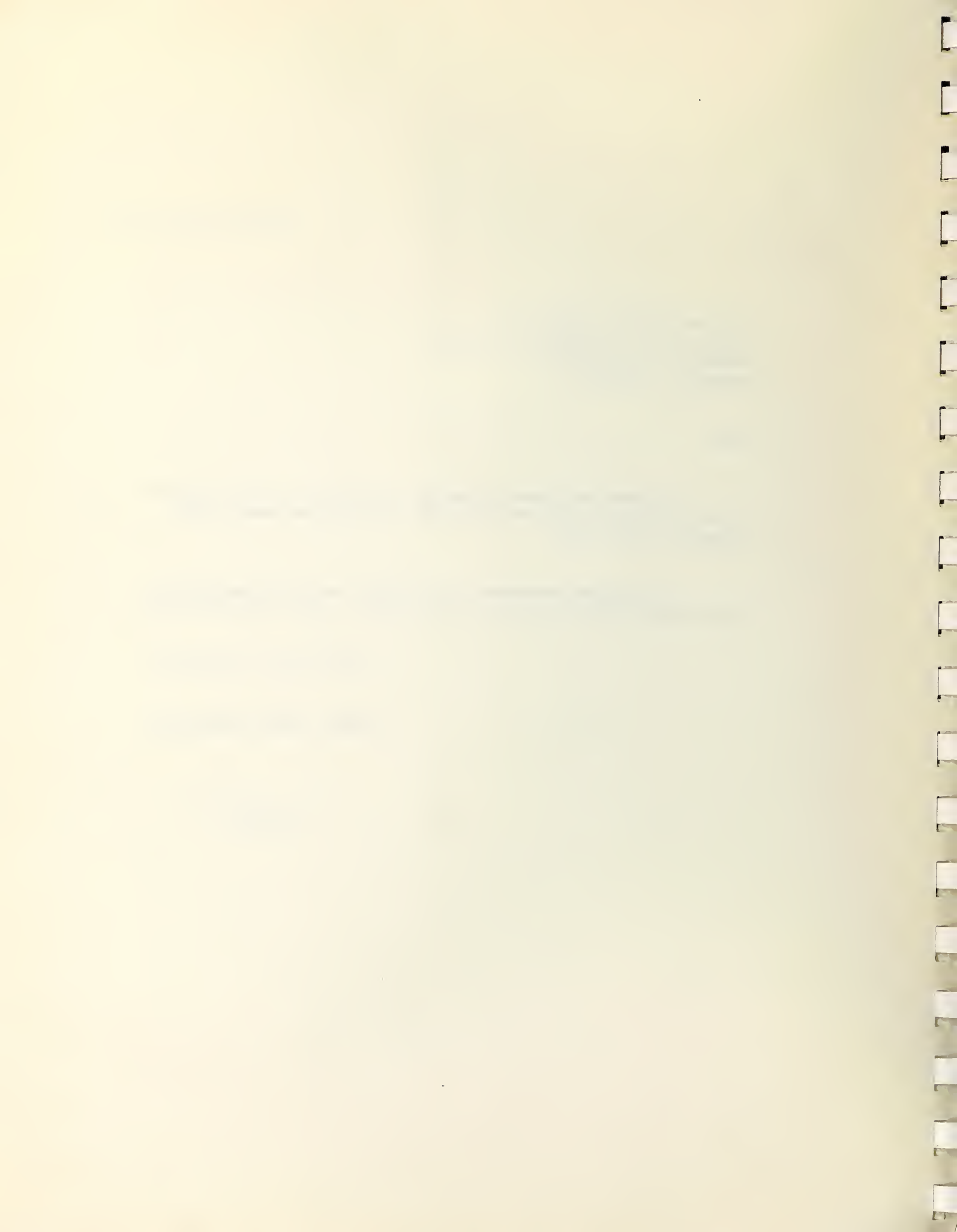
I have the honor to submit herewith the Annual Report of the Alberta Power Commission for the calendar year ended December 31st, 1956.

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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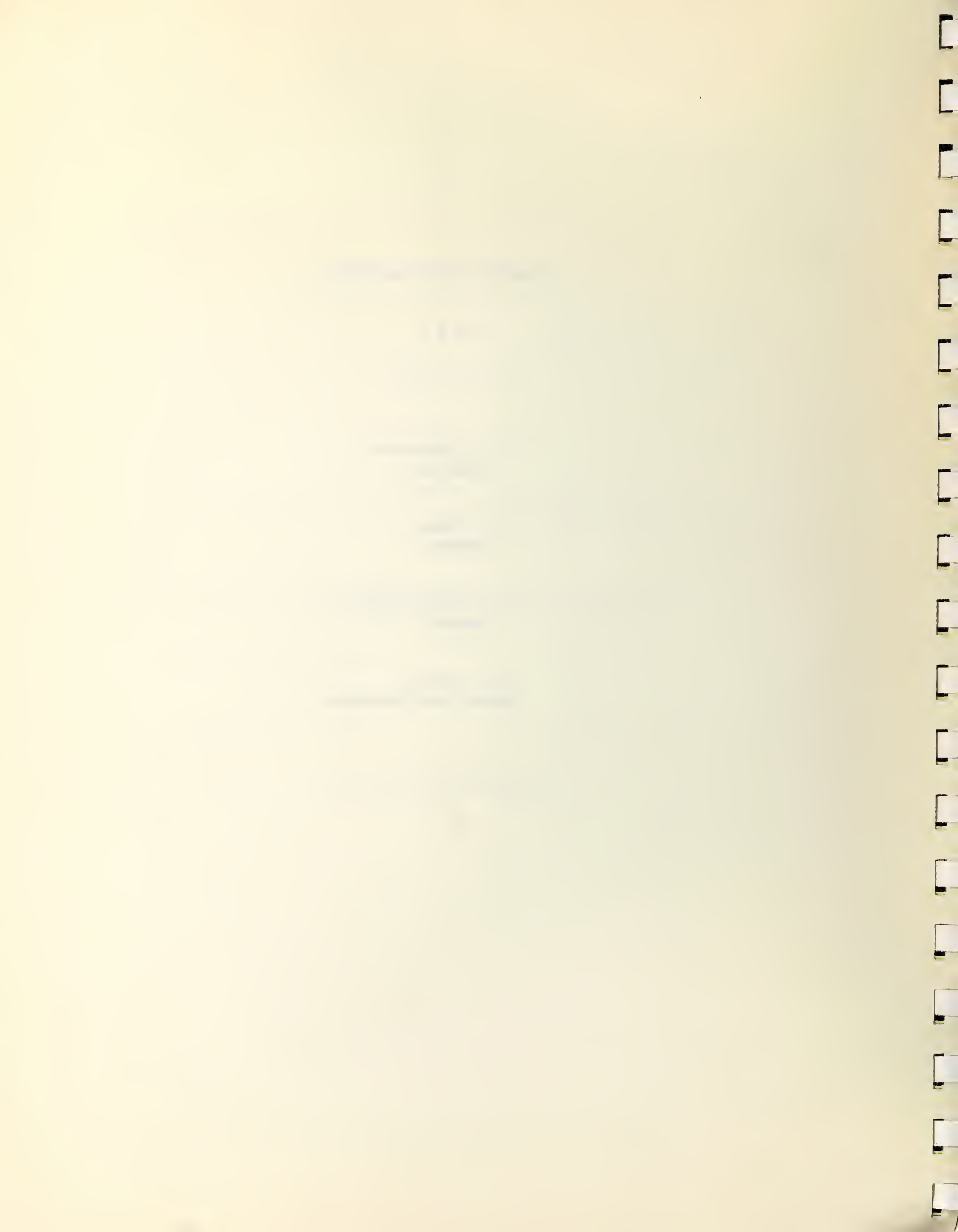
J. G. MacGregor,  
Chairman

W. J. Dick,  
Member

J. E. Oberholtzer,  
Member

J. L. Reid,  
Member and Secretary

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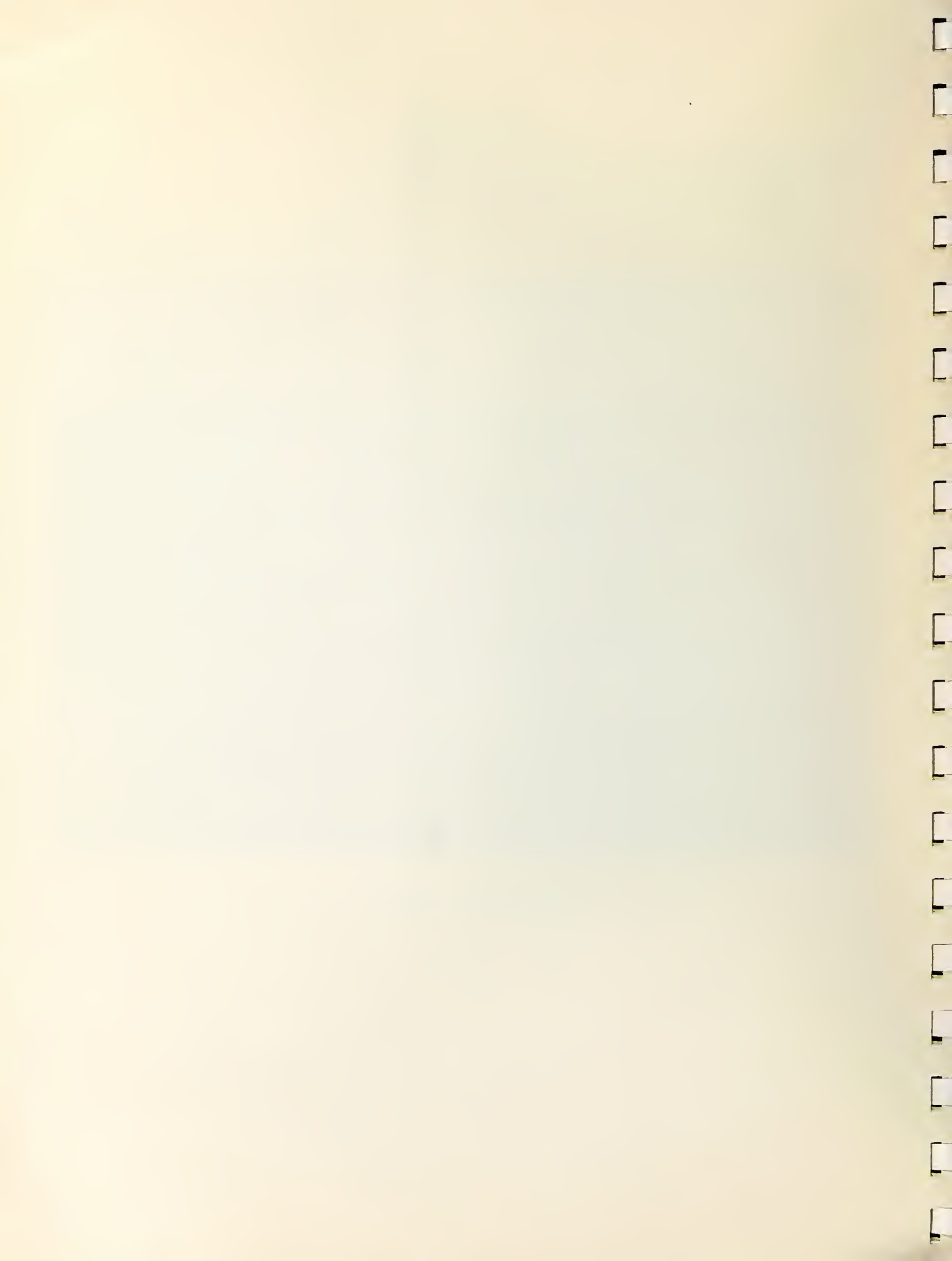






*"Battle River Station of Canadian Utilities Limited—First unit  
52,000 K.W., coal fired."*

*Courtesy Alfred Blyth Studios.*



ALBERTA POWER COMMISSION

ANNUAL REPORT

For Year Ending December 31st, 1956.

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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 of 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 which includes Athabasca and Lac La Biche; the territory south of Hanna; the Valleyview-Slave Lake area and Fort Assiniboine. The question of the extension of a transmission system west to Hinton has been under consideration.
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 industrial expansion continues at an exceptionally high rate. This is reflected in the demand for electric power. The year 1956 has again shown the phenomenal increase of 17% 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. Alberta's power plant capacity has doubled in the four years since 1952, and more than trebled since 1948.

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>
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	542,179	16,722,000	476,706	752,250
1955	* 618,000	17,986,000	528,432	866,390
1956	* 765,000			

\* Figures thus marked 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 1955

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1955	618,000	17,986,000	528,432	866,390
1945	203,837	9,666,947	259,253	421,814
Increase:	414,163	8,319,053	269,179	444,576
Percent Increase:	203%	86%	104%	105%

\* Increase Alberta: 1946 to 1956 - 286%

\*\*\* 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>
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	997	54,852	979	2,565
1952	1,174	59,409	1,079	2,699
1953	1,340	62,860	1,174	2,754
1954	1,498	65,936	1,292	3,011
1955	* 1,729	72,911	1,482	3,104
1956	* 2,019			

\* 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 1955

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>*** Saskatchewan</u>	<u>*** Manitoba</u>
1955	1,729	72,911	1,482	3,104
1945	567	40,130	650	1,884
Increase:	1,162	32,781	832	1,220
Percent Increase	205%	82%	128%	65%
Increase Alberta:	1946 to 1956	-	235%	

\*\*\* 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>
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
1954	1,865	3,271	2,072	5,229
1955	1,975	3,500	2,483	5,420

These are Dominion Bureau of Statistics figures.

Increase during the 10 year period ended 1955

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1955	1,975	3,500	2,483	5,420
1945	735	1,693	953	4,399
Increase:	1,240	1,807	1,530	1,021
Percent Increase:	169%	107%	161%	23%

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 figures 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 and towns 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>
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
1954	2.75	1.69	3.39	1.25
1955	2.64	1.66	2.93	1.18

These are Dominion Bureau of Statistics figures.

Decrease during the 10 year period ending 1955

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1945	4.59	1.66	4.39	1.02
1955	2.64	1.66	2.93	1.18
Decrease:	<u>1.95</u>	<u>0</u>	<u>1.46</u>	Increase: <u>.16</u>
Percent Decrease	43%	0%	33%	Increase: 16%



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>
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	239	4,002	170	234
1955	267	4,225	185	243
1956	* 275			

Increase during the 10 year period ending 1955

<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1955	267	4,225	185	243
1945	112	2,333	82	121
<hr/>				
Increase:	155	1,892	103	122
Percent Increase:	138%	81%	126%	101%

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>
1947	2,275	169,518	739	2,496
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	5,594	23,777
1952	* 18,055	359,870	8,591	29,623
1953	* 24,181	384,389	13,850	33,601
1954	* 30,504	411,134	21,287	37,422
1955	* 34,768	441,694	31,619	38,277
1956	* 37,658		* 39,000	* 40,000
** Percentage:	49%	78%	41%	84%

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

\*\* Percentage that is electrified of farms on which someone lived according to the 1951 Census.

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>
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	2,461	2,085	1,266	2,475
1952	2,747	2,228	1,527	2,666
1953	2,604	2,420	1,915	2,943
1954	2,958	2,672	2,053	3,541
1955	* 2,892	2,803	2,054	3,564
1956	* 3,040			

TABLE NO. 8

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

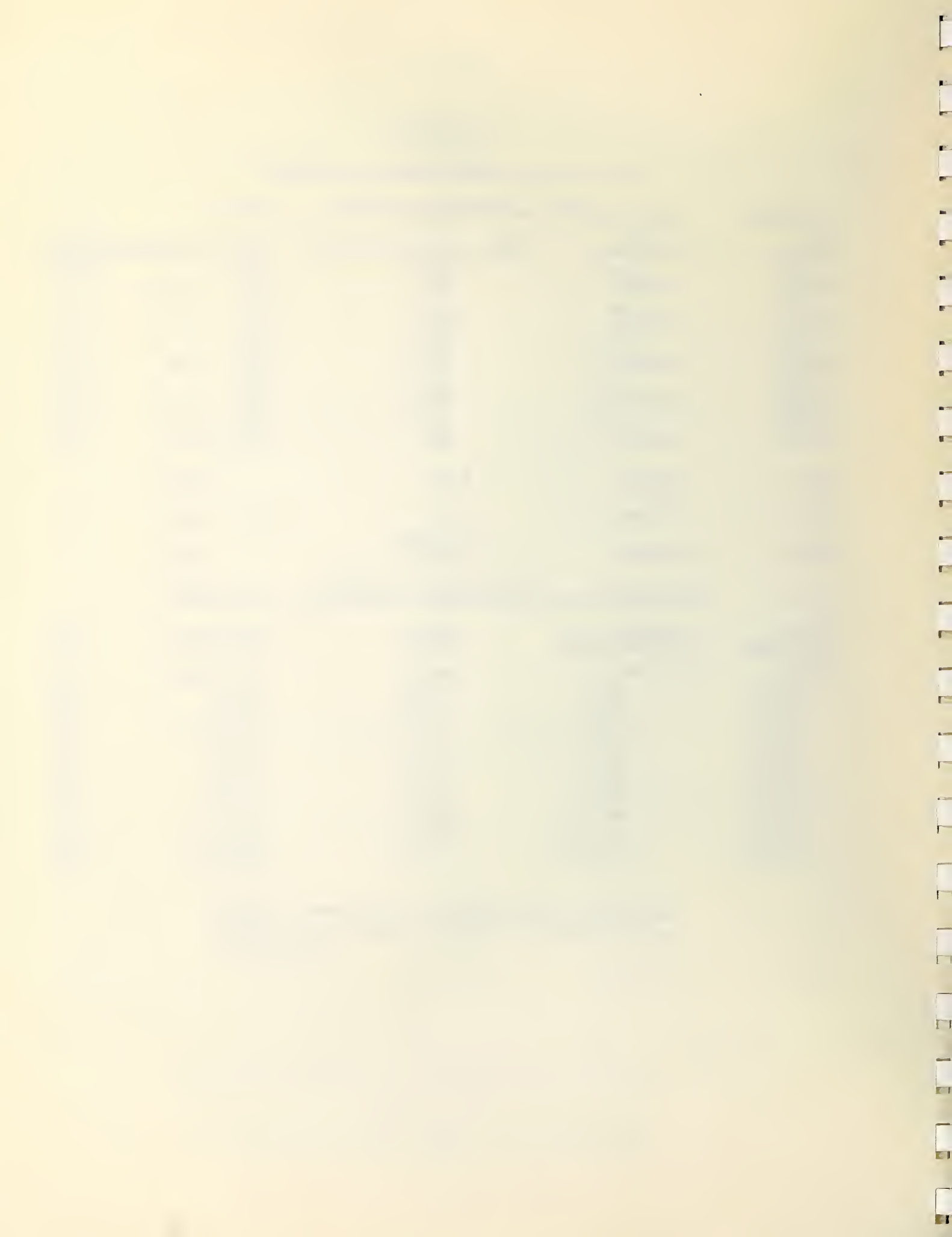
<u>Year</u>	<u>Alberta</u>	<u>Canada</u>	<u>Saskatchewan</u>	<u>Manitoba</u>
1946	5,450	89,231	4,920	5,739
1947	6,271	98,530	4,353	8,262
1948	7,552	113,411	5,009	11,564
1949	10,103	135,329	5,371	16,785
1950	12,108	151,726	5,712	20,472
1951	15,125	170,582	9,574	24,439
1952	20,188	190,316	13,858	28,514
1953	26,211	213,176	20,899	32,237
1954	* 31,736	228,158	26,177	33,615
1955	* 36,233	243,773	33,755	33,219
1956	* 39,430			

\* 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 10<sup>6</sup></u>	<u>K.W.H. Generated/Capita</u>
1946	803,000	602	750
1947	825,000	641	777
1948	854,000	724	848
1949	885,000	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
1956	1,100,000	2,019	1,836



PRESENT STATUS OF THE INDUSTRY

The Statistics for the Central Station Industry for the year 1956 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. These minor estimates will not 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 Edmonton, 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>	
	H.P.	K.W.
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
	286,350	222,000

Group B. takes in the Peace River country and includes the territory served by Canadian Utilities Limited and Northland Utilities Limited. The systems of these companies are tied together by a transmission line from Fairview to Rycroft, so that now the whole of the Peace River country is one interconnected system.

Group C. 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 network of transmission lines is rapidly reaching out and bringing service to these smaller places from the interconnected system.

In a very few 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 1956, 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.

In 1956 the interconnected system shown as Group A. had a combined capacity of 555,900 K.W., and generated 1,975,988,000 K.W.H. It served 261,616 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.

The interconnected system shown as Group B. (Peace River country), had a combined capacity of 11,588 K.W. and generated 31,902,000 K.W.H. and served 10,146 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 1956.

Privately Owned

<u>Name of Company</u>	<u>Plant Capacity Dec. 31/56 K.W.</u>	<u>Peak Load (KW) on plants during 1956</u>	<u>K.W.H. Gen. Net - 1956 (thousands)</u>
1. Calgary Power Ltd.	292,000	260,300	1,062,145
Canadian Utilities Ltd.	76,525 (1)	50,750	162,944 (2)
Northland Utilities Ltd.	8,350	6,520	21,275
East Kootenay Power Co. Ltd. (3)	12,500	6,100	1,402
Misc. Plants	700	300	500
1. Total:	<u>390,075</u>		<u>1,248,266</u>

Publicly Owned

<u>Name of Municipality</u>			
2. City of Edmonton	125,000	114,000	435,690
City of Lethbridge	13,500	11,200	46,331
City of Medicine Hat	43,400	42,100	285,905 (4)
Town of Edson	1,189	700	2,633
2. Total:	<u>183,089</u>		<u>770,559</u>
Plus 1. Total:	<u>390,075</u>		<u>1,248,266</u>
GRAND TOTAL:	<u><u>573,164</u></u>		<u><u>2,018,825</u></u>

- (1) Includes one 1,200 K.W. unit at Fairview and unit at Faust-Kinuso.
- (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 236,281,765 K.W.H. sold to Calgary Power Ltd.

TABLE NO. 11

It is interesting to rearrange the figures of Table No. 10 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. 31/56 K.W.</u>	<u>Peak Load (KW) on plants during 1956</u>	<u>K.W.H. Gen. Net - 1956 (thousands)</u>
Calgary Power Ltd.	222,000	217,800	975,357
Northland Utilities Ltd.	1,600	730	3,873
<hr/>			
Total Hydro:	223,600		979,230

STEAM

Calgary Power Ltd.	70,000	70,000	86,504
Canadian Utilities Ltd. (1)	69,500	44,200	144,514
East Kootenay Power Co. Ltd. (2)	12,500	6,100	1,402
City of Edmonton	125,000	114,000	435,691
City of Lethbridge	13,500	11,200	46,331
City of Medicine Hat	43,400	42,100	285,905 (3)
<hr/>			
Total Steam:	333,900		1,000,347

INTERNAL COMBUSTION

Calgary Power Ltd.			284
Canadian Utilities Ltd.	7,025 (4)	6,550	18,430 (5)
Northland Utilities Ltd.	6,750	5,788	17,401
Town of Edson	1,189	700	2,633
Misc. Plants	700	300	500
<hr/>			
Total Internal Combustion:	15,664		39,248
<hr/>			
GRAND TOTAL:	<u>573,164</u>		<u>2,018,825</u>

(1) Includes 8,500 K.W. Gas Turbine.

(2) See footnote (3) on Table No. 10.

(3) Includes 236,281,765 K.W.H. sold to Calgary Power Ltd.

(4) Includes Kinuso-Faust and 1,200 K.W. unit at Fairview.

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



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, 1956.

<u>Method of Generation</u>	<u>% of Power Generated</u>	<u>% of Capacity</u>
Hydro	48.5	39.0
Steam	49.6	58.3
Internal Combustion	1.9	2.7
	-----	-----
	100	100
Publicly owned	38.2	31.9
Privately owned	61.8	68.1
	-----	-----
	100	100

TABLE NO. 13  
SUMMARY OF GENERATING PLANTS IN ALBERTA  
AS AT DECEMBER 31, 1956

Owner	Hydro		Steam		Internal Combustion	
	K.W. Rating	K.W.H. generated, 1956 (thousands)	K.W. Rating	K.W.H. generated, 1956 (thousands)	K.W. Rating	K.W.H. generated, 1956 (thousands)
<b>A. Within the interconnected system</b>						
Calgary Power Ltd. (only)	222,000	975,357	70,000	86,504		284
Canadian Utilities Ltd.			69,500	144,514		
East Kootenay Power Co. Ltd.			12,500	1,402		
City of Edmonton			125,000	435,691		
City of Lethbridge			13,500	46,331		
City of Medicine Hat			43,400	285,905		
<b>TOTAL GROUP A</b>	<b>222,000</b>	<b>975,357</b>	<b>333,900</b>	<b>1,000,347</b>		<b>284</b>
<b>B. Peace River Interconnected System</b>						
Canadian Utilities Ltd.					7,025	13,430
Northland Utilities Ltd.					4,563	13,472
<b>TOTAL GROUP B</b>					<b>11,588</b>	<b>31,902</b>
<b>C. Isolated Areas Served by Northland Utilities Ltd.</b>						
Athabasca System					922	1,792
Jasper	1,600	3,873			975	1,342
Lac La Biche					290	795
<b>TOTAL GROUP C</b>	<b>1,600</b>	<b>3,873</b>			<b>2,187</b>	<b>3,929</b>
<b>D. Other Isolated Towns</b>						
Town of Edson					1,189	2,633
Misc. Plants					700 (Est.)	500 (Est.)
<b>TOTAL GROUP D</b>					<b>1,889</b>	<b>3,133</b>
<b>TOTAL ALL GROUPS</b>	<b>223,600</b>	<b>979,230</b>	<b>333,900</b>	<b>1,000,347</b>	<b>15,664</b>	<b>39,248</b>
<b>GRAND TOTAL:</b>	<b>573,164</b>	<b>2,018,825</b>				

The following comments deal with the Province as a whole.

K.W.H. Generated. The increase in K.W.H. generated was 17%. The generation by the hydro plants increased only 5%, while that of the steam plants increased 31%. 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 and near the end of the year the Wabamun steam plant came on the line.

Internal combustion plants increased their output by 24%. 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 over 14%. The weather in December, 1956, was mild, whereas December, 1955, was a very cold month. The increase of over 14% in peak load in 1956 is smaller than it would have been if the weather in December had been severe. After making allowance for the difference in weather we believe it would be safe to assume that the effective peak load increased possibly 16%. The following figures show an estimate of the actual coincident peak for the Province.

TABLE NO. 14

<u>System</u>	<u>Estimated Peak Load K.W., 1956</u>
Interconnected system, less East Kootenay Power Co. Ltd.	454,500
East Kootenay Power Co. Ltd.	6,100
Canadian Utilities Ltd. (Peace River country)	6,550
Northland Utilities Ltd.	6,520
Edson	700
Miscellaneous plants	300
	<hr/>
	474,670
	say - 475,000

Transmission lines in the Province increased by 968 miles to a total of 9,936, which includes 2,906 miles of Company-owned farm lines. Distribution line mileage increased by 272 miles to 3,486. The total mileage of all farm lines increased by 1,898 miles, so that the total farm mileage at the end of 1956 was 28,914. The total mileage of all power lines in the Province at the end of December, 1956, was 39,430.

TABLE NO. 15

Total Circuit Miles of Transmission Lines in the Province by Regional Groups as at December 31, 1956.  
This includes Company-owned Farm Lines, but does not include the Co-Operative-owned Farm Lines

	<u>VOLTAGE</u>							<u>Total</u>	
	<u>2,300 to 4,600 V.</u>	<u>6,900 to 12,000 V.</u>	<u>13,800 V.</u>	<u>22,000 V.</u>	<u>33,000 V.</u>	<u>50,000 V.</u>	<u>66,000 V.</u>		<u>132,000 V.</u>
<u>A. Within the Interconnected System</u>									
Calgary Power Ltd.	15	1,207	67	3,582	59	51	815	948	6,744
Canadian Utilities Ltd.	59	368	18	1,239	232		360	78	2,354
City of Medicine Hat			30						30
East Kootenay Power Co. Ltd.	6	26					48		80
Total Group A.	80	1,601	115	4,821	291	51	1,223	1,026	9,208
<u>B. Systems Within the Peace River Country</u>									
Canadian Utilities Ltd.	6	32	5	187	30		107		367
Northland Utilities Ltd.	23	54		193					270
Total Group B.	29	86	5	380	30		107		637
<u>C. Isolated Towns of Northland Utilities Ltd., etc.</u>									
Jasper			23						23
Athabasca - Collinton		8		45					53
Lac La Biche		5							5
Slave Lake Utilities	10								10
Total Group C.	10	13	23	45					91
TOTAL ALL GROUPS	119	1,700	143	5,246	321	51	1,330	1,026	9,936

TABLE NO. 16

## SUMMARY OF DISTRIBUTION SYSTEMS IN ALBERTA

As at December 31, 1956

	Total Number of Customers Served <u>(Includes Rurals)</u>	K.W.H. Sold (Less Sales to other Co.s) (thousands) <u>(Includes Rurals)</u>	Circuit Miles of Line <u>(Excludes Rurals)</u>
<b>A. <u>Within the Interconnected System</u></b>			
Calgary Power Ltd.	83,935	772,164	1,186
Canadian Utilities Ltd.	30,416	119,676	384
East Kootenay Power Co. Ltd. (1)	1,035	10,384	17
City of Edmonton	64,884	347,234	640
City of Calgary	59,340	360,249	655
City of Lethbridge	9,000 (Est.)	38,000 (Est.)	108
City of Medicine Hat	6,251	49,624	117
City of Red Deer	3,988	16,283	44
Town of Cardston	880	2,523	33
Town of Fort Macleod	687	2,050 (Est.)	12 (Est.)
Town of Ponoka	1,200 (Est.)	3,400 (Est.)	23
	<hr/>	<hr/>	<hr/>
TOTAL GROUP A.	261,616	1,721,587	3,219
<b>B. <u>Systems Within the Peace River</u></b>			
Canadian Utilities Ltd.	5,226	14,027	69
Northland Utilities Ltd., including High Prairie, McLennan, Valleyview and Manning	4,920	10,677	112
	<hr/>	<hr/>	<hr/>
TOTAL GROUP B.	10,146	24,704	181
<b>C. <u>Isolated Towns Served by North- land Utilities Ltd.</u></b>			
Athabasca System	845	1,631	32
Jasper	626	4,481	22
Lac La Biche	307	727	8
	<hr/>	<hr/>	<hr/>
TOTAL GROUP C.	1,778	6,839	62
<b>D. <u>Other Isolated Towns</u></b>			
Town of Edson	937	2,291	14
Miscellaneous	500	450	10
	<hr/>	<hr/>	<hr/>
TOTAL GROUP D.	1,437	2,741	24
	<hr/>	<hr/>	<hr/>
<b>GRAND TOTAL:</b>	<b>274,977</b>	<b>1,755,871</b>	<b>3,486</b>

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

TABLE NO. 17

SUMMARY OF RURAL ELECTRIFICATION SYSTEMS IN ALBERTA

As at December 31, 1956

	Number Farmers Served	Number Non-Farmers Served	Total Number Customers	Circuit Miles of Line
<u>A. Calgary Power Ltd.</u>				
<u>Experimental Areas and Individual Rurals (1)</u>	3,907	783	4,690	2,353
R.E.A.'s.	23,189	4,708	27,897	17,656
<u>Canadian Utilities Ltd.</u>				
<u>Experimental Areas and Individual Rurals (1)</u>	769	110	879	348
R.E.A.'s.	7,234	637	7,871	6,635
<u>East Kootenay Power Co. Ltd.</u>	108	50	158	136
R.E.A.'s and Lundbreck Co-op.	306		306	153
<u>Adjacent to Cities, etc.</u>				
Total Group A.	<u>35,513</u>	<u>6,288</u>	<u>41,801</u>	<u>27,281</u>
<u>B. Peace River Country</u>				
<u>Canadian Utilities Limited</u>	70	99	169	30
<u>Experimental Areas and Individual Rurals (1)</u>	996	47	1,043	792
R.E.A.'s.				
<u>Northland Utilities Limited</u>	41	18	41	19
<u>Experimental Areas and Individual Rurals (1)</u>	874		892	571
R.E.A.'s.				
Total Group B.	<u>1,981</u>	<u>164</u>	<u>2,145</u>	<u>1,412</u>
<u>C. Isolated Towns Served by Northland Utilities Limited</u>				
<u>Company-owned Rurals (1)</u>	4	26	4	3
R.E.A.'s.	160		186	218
Total Group C.	<u>164</u>	<u>26</u>	<u>190</u>	<u>221</u>
GRAND TOTAL	<u>37,658</u>	<u>6,478</u>	<u>44,136</u>	<u>28,914</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, 1956

	<u>Plants</u>				<u>Total</u>
	<u>Group A</u>	<u>Group B</u>	<u>Group C</u>	<u>Group D</u>	
K.W. Rating	555,900	11,588	3,787	1,889	573,164
K.W.H. Generated (thousands)	1,975,988	31,902	7,802	3,133	2,018,825
<u>Transmission</u>					
Miles of line	9,208	637	91		9,936
<u>Distribution</u>					
Number of customers	261,616	10,146	1,778	1,437	274,977
K.W.H. sold (thousands)	1,721,587	24,704	6,839	2,741	1,755,871
Miles of line	3,219	181	62	24	3,486
<u>Rural</u>					
Number of farms (1)	35,513	1,981	164		37,658
Number of non-farms (1)	6,288	164	26		6,478
Miles of farm line (2)	27,281	1,412	221		28,914
Miles of R.E.A. line (3)	24,427	1,363	218		26,008

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

(2) Partly included in Number 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 additions to generating capacity, transmission line facilities, etc., during the year 1956.

Calgary Power Ltd.

(1) Changes in Plant Capacity

Calgary Power's steam plant at Wabamun was commissioned in the fall of 1956 and is operating at full capacity. The machine, although rated at 66,000 kilowatts has a capability of 70,000 kilowatts.

A duplicate of the first unit is now on order for commissioning in 1958 and all the foundation work for this unit was completed during the summer of 1956.

During 1956 work was commenced on the installation of a second unit at the Company's Cascade plant, which job is proceeding on schedule so that an additional 18,000 kilowatts will be available for the fall of 1957.

Extensions to Spray and Rundle plants are being actively studied with the object of having their capacities more than doubled for 1959.

Further investigations by the Company on the North Saskatchewan River have indicated that the prospects for power development on this stream are not as good as once suspected and interest has been switched to the Brazeau River where very preliminary investigations were carried on this year to see if it has power possibilities.

(2) Additional Transmission Lines

During the year 1956, the Company built the following transmission lines:

Ghost to Calgary	138 KV Insulated for 230 KV
Wabamun to E. Edmonton Sub	138 KV Insulated for 230 KV
Wildwood to Bickerdike	138 KV
E. Edmonton Sub to Calder	66 KV
Brocket to B.A. Plant near Pincher Creek	66 KV
Rochfort Bridge to Whitecourt	22 KV
Boyle to Plamondon	22 KV
Drayton Valley to Lodgepole	22 KV
Blackfalds to Bentley	22 KV
Evansburg to Gainford (circuit only)	22 KV
Breton to Winfield	22 KV
Irvine to Hilda	22 KV
24 Miles in Cremona Oil Field	22 KV
5 Miles in Gilbey Oil Field	22 KV
26 Miles in Pembina Oil Field	22 KV

It will be noted that the line from Ghost to Calgary and the line from Wabamun to E. Edmonton Sub are both insulated for 230 KV but are at the present time operating at 138 KV.

A new 5,000 KVA 69/13 KV substation was established in the northeast section of the City of Calgary.

A 5,000 KVA 69/13 KV transformer was added at the City of Calgary southwest substation.

A 40,000 KVA 53/33 KV transformer has been added to the West Calgary substation on 9th Avenue.

A 50,000 KVA throughput 138/72 KV auto transformer and a 12,000 KVA 138/23.9 KV transformer have been added to the East Edmonton substation. The 50 MVA auto transformer replaced a 25 MVA auto transformer which has been moved to the new Wabamun substation.

A new substation has been established at the Wabamun Steam Plant. This consists of a step-up transformer 60/80 MVA 13.8/138 KV and a 25 MVA 138/72 KV auto transformer (formerly at East Edmonton).

The capacity of the Calder substation outside Edmonton has been increased by the installation of two 7,500 KVA 72/23.9 KV transformers which replace a 6,000 KVA transformer of similar voltage ratio. Additional switching has also been installed at this point.

The capacity of the Fort Saskatchewan substation has been doubled by the installation of the 6,000 KVA transformer released from Calder.

At Pincher Creek a new substation containing a 3,000 KVA 69/4.16 KV transformer to supply the B.A. Oil (Canadian Gulf) was established.

A 120 MVA throughput regulating transformer 138 KV nominal rating has been installed at the Ghost substation.

A new substation has been built at Gainford to serve Trans-Mountain Pipelines. A 3,000 KVA 69/2.4 KV transformer has been installed. This transformer was



*"Wabamun Station of Calgary Power Ltd.—First unit 70,000  
K.W., gas fired."*

*Courtesy David Miller.*



transferred from Nordegg.

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

New Towns :	Old Hinton	
	Lodgepole	
Villages:	Itaska Beach	
	Seba Beach	
Hamlets:	Atmore	Grandview Subdivion (Pigeon Lake)
	Battle Lake	Grassland
	Bodo	Hilda
	Campion Corner	North Pigeon Lake
	Gainford	South Seba Beach
		Winfield

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

During the year 1956, Calgary Power Ltd. received applications for an additional 1,150 oil well pumping services and 150 additional battery pumping services, bringing total applications to some 3,500 oil pumps to date. Service has been extended during the year to some 700 oil wells and 120 battery pumps, with the bulk of the services being added in the Pembina and Joffre oil fields. Main line extensions have been provided to the Bentley, Burbank, Conrad, Elkton, Harmatton, Red Deer and Sundre oil fields in addition to those fields already being served. In addition to oil well and battery pumping services, electric power is being supplied to some large oil pipe line pumps.

A number of relatively large industrial loads were connected during the year including two cement plants, steel pipe and tube mill, gas scrubbing plant, plywood plant, gravel plant, and others. There were also some increases in existing industrial loads, in particular metals refining at Fort Saskatchewan.

Canadian Utilities Limited

(1) Changes in Plant Capacity

In November, 1956, Canadian Utilities Limited' 32,000 K.W. coal fired steam unit in their Battle River plant came on the line. This plant is capable of

further extension as the need arises. Coal from two nearby strip mining operations will be used as fuel.

Foundations have been poured for a new generating station near Valleyview. This plant is expected to come on the line in the fall of 1957, and, for the present at any rate, will contain one 10,000 K.W. gas turbine.

(2) Transmission Lines

During the year the Company built the following transmission lines:

83 miles	138 KV line - Battle River Plant to Vermilion
14 miles	69 KV line - Battle River Plant to Halkirk
39 miles	69 KV line - Vermilion Plant to Lloydminster
32 miles	23.9 KV line - Sheerness to Cessford Oilfield
10 miles	23.9 KV line - Faust to Kinuso
24 miles	23.9 KV line - New Brigden to Oyen

New and growing loads in all districts required the erection of additional substations and made it necessary to increase the capacity of existing substations as follows:

Battle River Substation - a 33,333 KVA step-up transformer, two 3,000 KVA station service transformers and four 69 KV oil circuit breakers.

Lloydminster Substation: a 5,500 KVA, 69 KW step-down substation terminating the new Vermilion-Lloydminster 69 KV transmission line.

The following substations were enlarged because of natural load growth:

Fenn - installed 5,000 KVA and removed 3,000 KVA

South Stettler - installed 5,000 KVA and removed 2,500 KVA.

Grande Prairie - installed 3,000 KVA and removed 750 KVA.

Vermilion - installed 6,000 KVA.

New regulating stations installed:

Derwent - 375 KVA.

(3) Towns and Villages added to the Company's system in 1956

Faust	Kirriemuir
Kinuso	Bindloss
Debolt	Cessford
Crooked Creek	Pollockville
Codessa	Esther
La Corey	Beynon
Onion Lake	

During the year the Company purchased the systems serving the Villages of Faust and Kinuso and built a transmission line between these two. It is proposed to connect these towns with the interconnected system in the Peace River country during 1957.

Northland Utilities Limited

(1) Changes in Plant Capacity

During the year this Company increased the capacity of its Jasper plant by the installation of a 750 KW hydro unit which was placed in service on Astoria Creek. The increased load brought about by the installation of additional pumping capacity in the Trans-Mountain Oil Line Company's Jasper station will make it necessary to increase the capacity of the Jasper diesel plant next year.

Northland Utilities Limited installed a temporary plant in the Hamlet of Jousard. It is planned to tie this in to the Company's transmission system during 1957.

(2) Transmission Lines

Minor changes only were made in the Company's system of transmission lines during the year. It is expected that a line will be built in 1957 from Valleyview north to tie in with the Company's system from McLennan to High Prairie.

(3) Towns and Villages added to the Company's system in 1956

Jousard  
Dixonville

Arrangements have been made for the Company to take over the plant and distribution system in the Village of Hines Creek during 1957.

City of Edmonton

Changes in Plant Capacity

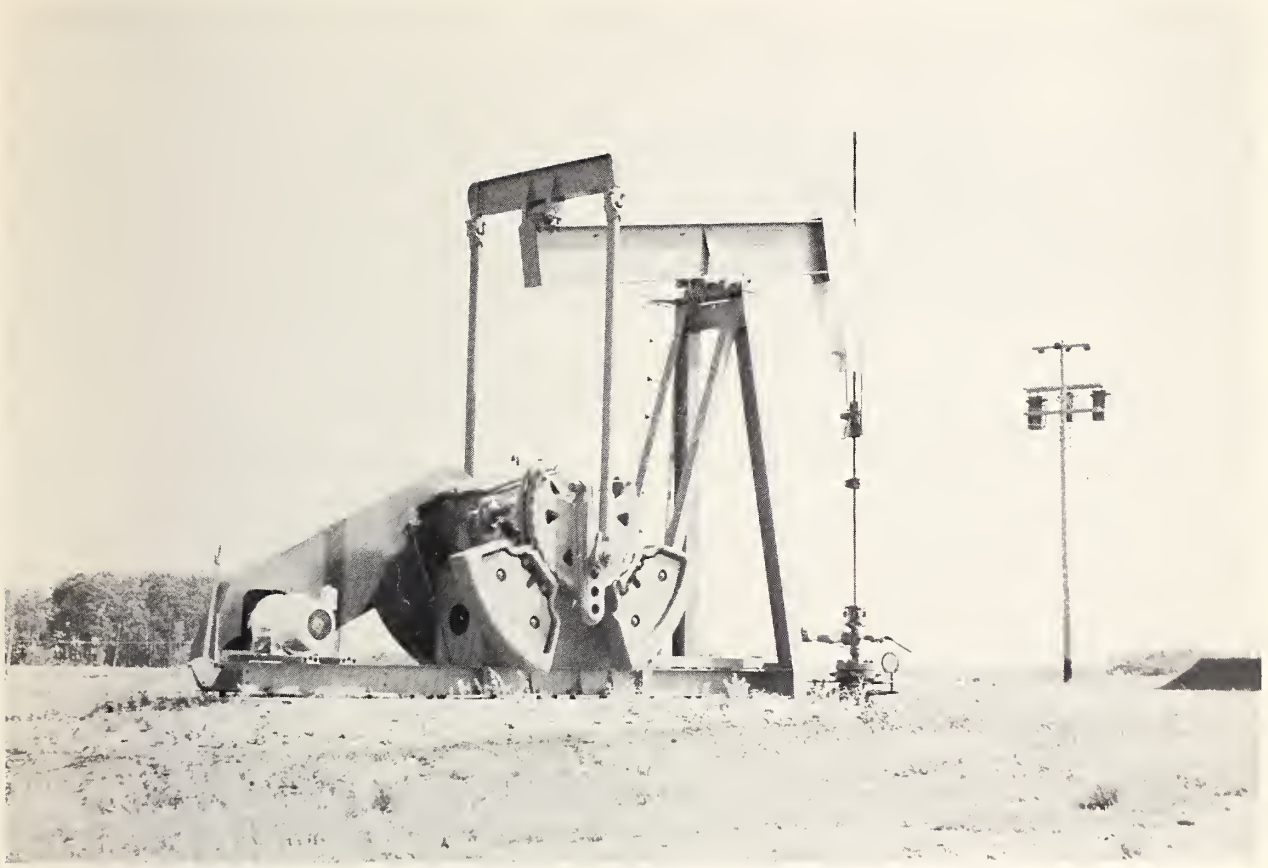
Work has been under way in preparation for the installation of a 30,000 KW gas turbine which is expected to be commissioned during 1957. A similar unit is scheduled for completion during 1958.

City of Lethbridge

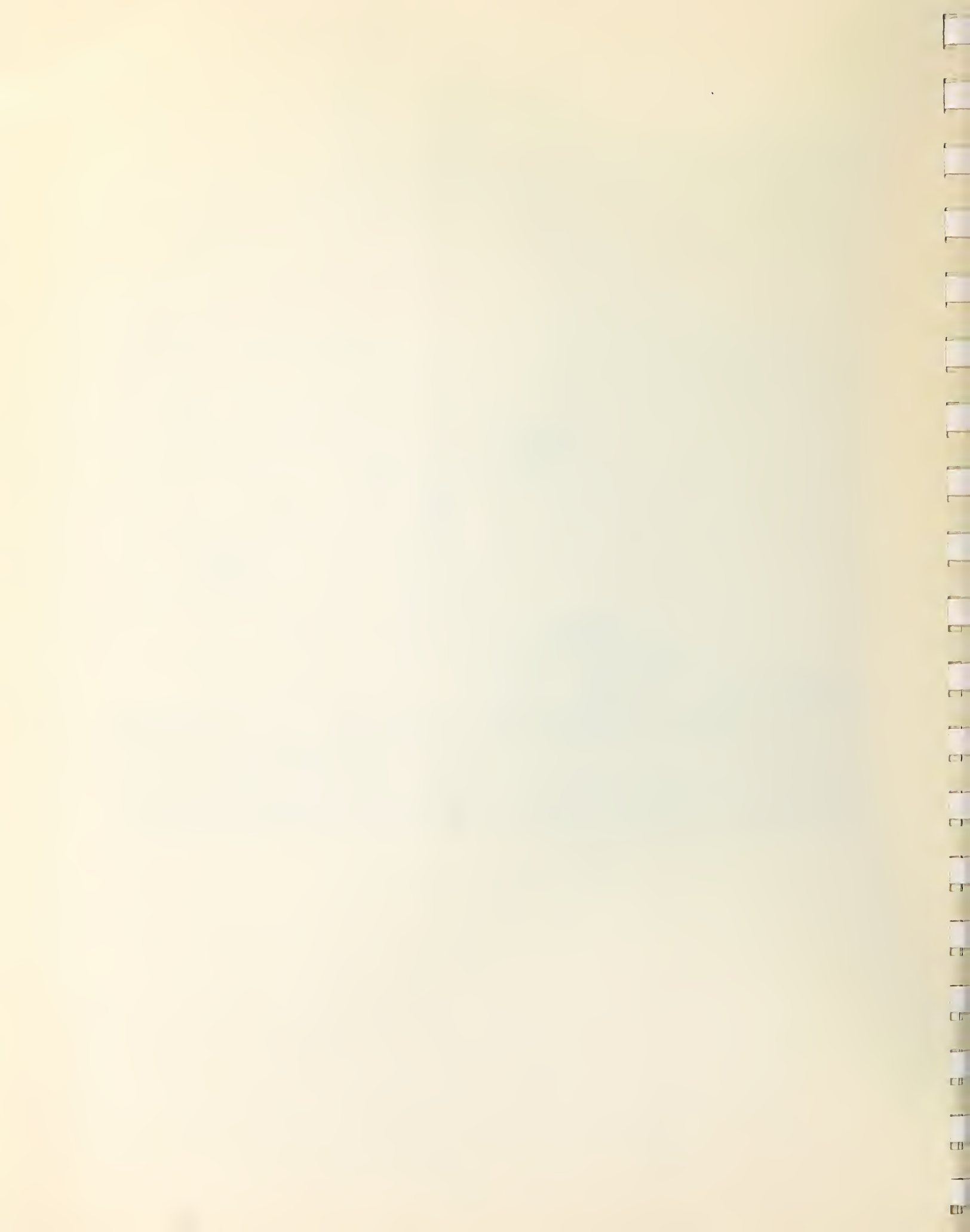
Changes in Plant Capacity

Preparations are being made for the installation of a 10,000 KW gas turbine which is expected to be brought on the line during 1957.





*"Electricity pumps Alberta Oil Wells."*



## FORECAST TO 1961

At December 31, 1956, the capacity of the power plants in the Province was 573,164 KW. At December 31, 1946, - ten years ago - this capacity was 148,000 KW., so that the increase during the 10-year period has been 290% - a truly phenomenal increase. The peak load increased 14% over that of 1955, in spite of the fact that the weather was mild in December, 1956, while we experienced very severe weather in December, 1955. After making allowance for the difference in weather, it might be safe to assume that the actual peak load increased possibly 16%. This is in line with the general growth of the Province, and although this rate of increase has been very high for the last four or five years, it does not show any sign of slackening off. This excessively high rate of increase cannot continue indefinitely but may do so for the next three or four years.

Table No. 19 shows the growth which we believe will take place in the electrical load of the Province from now until 1961. It shows the actual capacity in K.W. of the power plants in the Province as at December 31st, 1956, the increase in capacity during 1956, and the estimated peak load that occurred in 1956. It then goes on to deal with these year by year until 1961, 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 1956. 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 70,000 K.W. generator in the Wabamun plant. If this had broken down during the peak load in December, 1956, 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 1961. It is hard to predict what the

peak load will be five years from now and it is possible that our forecast is on the high side. It will be noted from Table No. 19 that during the forecast period it is planned to put in three 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 the City of Edmonton has placed orders for two of them. While gas turbines are not as economical as either diesel engines or gas fired steam plants in the cubic feet of gas used to produce a K.W.H., they do have a definite place in the production of power in Alberta. For one thing, they can use "sour" gas, which could not be used in diesel engines without scrubbing. Another advantage is that their installed cost per H.P. is considerably less than other prime movers. For this reason it is more economical to install them to handle peak loads where the load factor on the turbine will not be very high.

During 1956 the Calgary Power Ltd.'s Wabamun unit of 70,000 K.W. came on the lines. This is the largest unit in Alberta. From now on it will be necessary to have 70,000 K.W. of spare capacity at all times. As the electrical load in the Province grows we may expect the size of these units to increase and by 1960 we expect to 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 more remote areas of the Province not now served by Central Station Power. The Commission, along with the Companies,

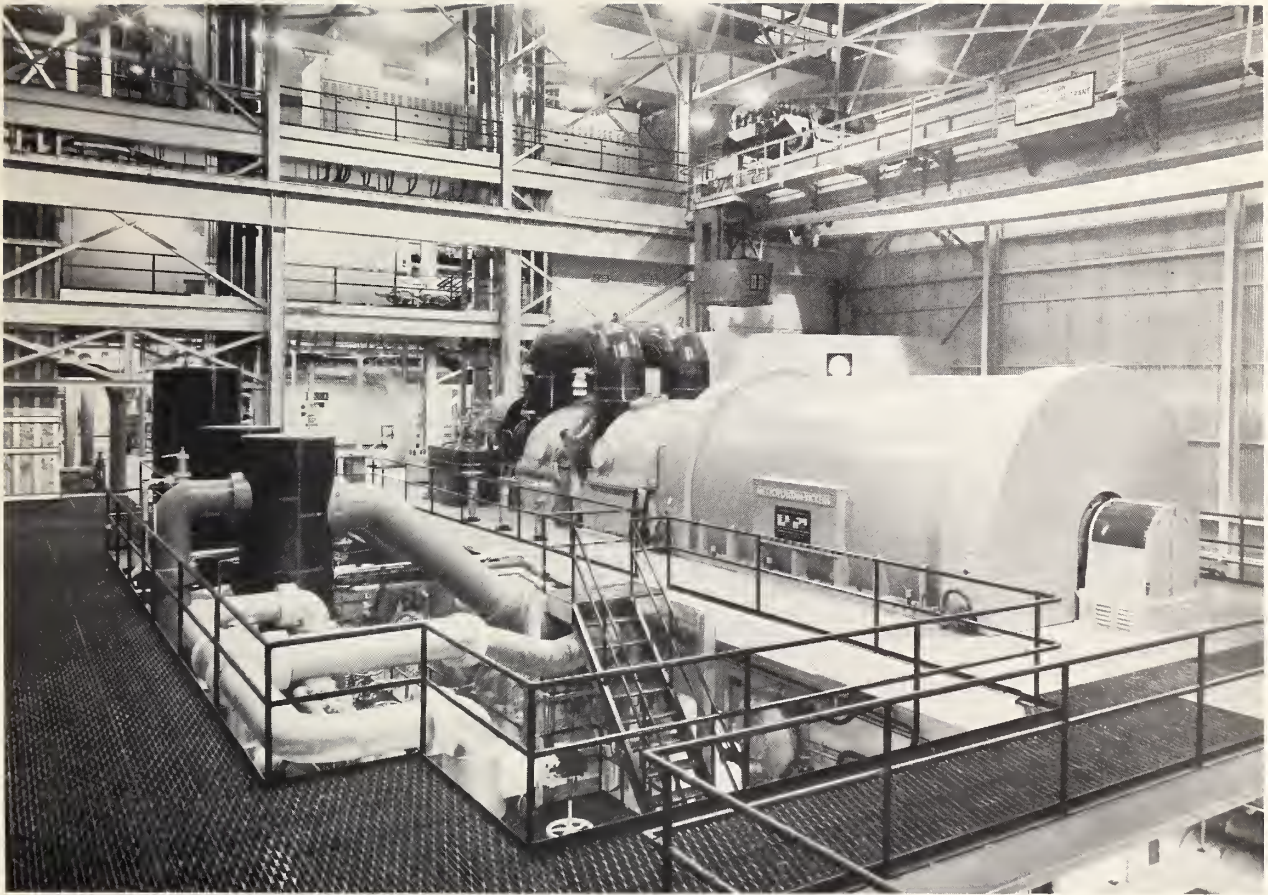
has been making a study of this problem and hopes to continue this study next year. Ultimately the transmission network must be extended until there is no area of any reasonable population which is not served either by the main interconnected system or by that in the Peace River country, and it may not be too long before that country will be connected in to the remainder of the Province.

At the end of 1956, 39% of the power plant capacity in the Province was hydro, while fuel burning plants provided 61%. During 1956 two new steam plants were commissioned - Canadian Utilities Limited' Battle River plant which burns coal, and the Wabamun plant of Calgary Power Ltd., which is using natural gas as fuel. Both of these stations are planned so that additional units may be installed in them when the increased load in the Province makes new generating capacity necessary. In the case of the Wabamun plant another 70,000 K.W. unit is on order and another unit of 100,000 K.W., or larger, is planned for 1960.

Between now and the end of 1961 we expect that 147,000 K.W. of additional hydro capacity will be developed, as well as 368,000 K.W. of fuel burning generating equipment. At the end of this period the relative amounts of hydro and steam capacity will be 34% and 66% respectively. Beyond 1961 other hydro plants will be built, but the trend towards steam will continue with power from hydro becoming relatively less important.

The increase of 368,000 K.W. in fuel burning power plants will require a great increase in the amount of fuel used. Until about 1961 much of this increase will be supplied by natural gas with coal still playing a minor role. By that time, however, we expect that some of the plants burning natural gas, - Wabamun for instance, may convert to the use of coal or cease to add other gas burning units. With a plant of the size that Wabamun will then be (240,000 K.W.), we believe that it will be more economical to switch over to coal, even if there should be no increase in the cost of gathering and delivering large amounts of natural gas. From 1961 on we expect that nearly all fuel burning power plants will be designed for

burning coal. While Alberta has about one-half of all the mineable coal in Canada and therefore unlimited supplies of coal are available, the question of our coal deposits may require further study. Power plants of the size which we expect to see in Alberta ten years from now will have to make sure that they have a reserve of the order of 100,000,000 tons. This coal will have to be concentrated in a relatively small area so that the cost of delivering it to the boilers can be kept at a minimum. It must be such that the cost of stripping it is not too great. The site of such a proposed power plant will have to be adjacent to a large supply of cooling water or at such a place that a large water reservoir can be created artificially. This whole question of large reserves of coal for future power plants is one that will bear further study.



*"First 70,000 K.W. unit installed at Wabamun, 1956."*

*Courtesy David Miller.*

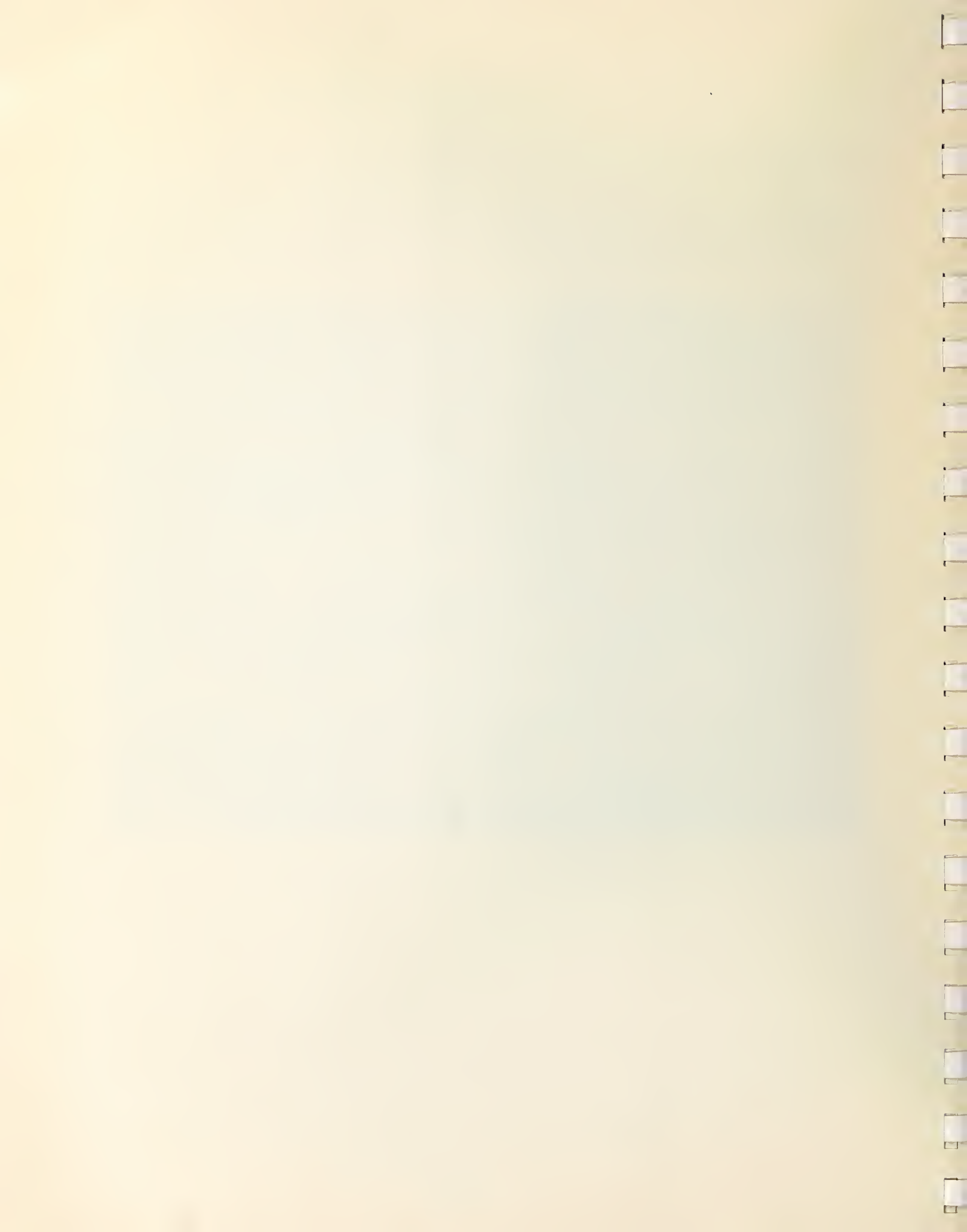




TABLE NO. 19

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, 1955		462,515	415,000
<u>Capacity added during 1956</u>			
Calgary Power Ltd. - Wabamun	70,000		
Canadian Utilities Ltd. - Battle River	34,000		
Plus minor revisions in rating	6,649		
	<hr/>		
Total capacity added during 1956	110,649	110,649	
Total capacity Dec. 31, 1956		<hr/> 573,164	
		say, 573,000	475,000
<u>Capacity to be added 1957</u>			
Calgary Power Ltd. - Cascade	18,000		
Canadian Utilities Ltd. - Gas Turbine	10,000		
Northland Utilities Ltd.	4,000		
City of Edmonton - Gas Turbine	30,000		
City of Lethbridge - Gas Turbine	10,000		
	<hr/>		
Total capacity to be added 1957	72,000	72,000	
Total capacity Dec. 31, 1957		<hr/> 645,000	555,000
<u>Capacity to be added 1958</u>			
Calgary Power Ltd. - Wabamun	70,000		
Northland Utilities Ltd. - Jasper	1,200		
City of Edmonton - Gas Turbine	30,000		
	<hr/>		
Total capacity to be added 1958	101,200	say, 101,000	
Total capacity Dec. 31, 1958		<hr/> 746,000	640,000
<u>Capacity to be added 1959</u>			
Calgary Power Ltd. - Spray, etc.	79,000		
City of Lethbridge	10,000		
	<hr/>		
Total capacity to be added 1959	89,000	89,000	
Total capacity Dec. 31, 1959		<hr/> 835,000	730,000

- carried forward -

TABLE NO. 19  
continued

Totals brought forward		835,000	730,000
<u>Capacity to be added 1960</u>			
Calgary Power Ltd. - Wabamun	100,000		
Northland Utilities Ltd. - Peace River	5,000		
City of Edmonton	66,000		
	<hr/>		
Total capacity to be added 1960	171,000	171,000	
Total capacity Dec. 31, 1960		<u>1,006,000</u>	850,000
<u>Capacity to be added 1961</u>			
Calgary Power Ltd. - hydro	50,000		
Canadian Utilities Ltd.	32,000		
	<hr/>		
Total capacity to be added 1961	82,000	82,000	
Total capacity Dec. 31, 1961		<u>1,088,000</u>	980,000

## FARM ELECTRIFICATION

During 1956, 2,890 farms have been added to the number already electrified in the Province, to make a total of 37,658 bona fide farms electrified as at the end of the year. For several reasons the number of farms hooked up this year is considerably less than last year. Most of the farms in the better soil areas of the Province have already taken service. From here on the extension of farm electrification into the more marginal areas will take place at a slower pace. The legislation passed in the spring of 1956 extending the term of financing from 10 to 25 years has been of considerable assistance to the farmers in these more marginal areas. Although the changes made in Part II of the Revolving Fund Act went a long way towards helping these farms get service, its full effect will not be felt until 1957. By the time the farmers in most of these areas decided to take advantage of the Part II legislation and then got organized, the season was too far advanced to permit construction of their lines to be carried out during 1956. By that time the shortage of labourers and linemen made it impossible for the Companies to construct many of the jobs which they had hoped to do. For this reason some of these had to be postponed to the spring of 1957 and other areas could not be promised construction until well into the summer or fall of 1957. If there had been enough labour available it is possible that another 1,000 more farms could have been electrified. In spite of this, many areas in the more remote parts of the Province have had their lines built, or were under construction at the end of the year.

There has been a remarkable development of farm electrification in the special areas. Many R.E.A.'s have been organized and completed the construction of their lines in these areas where the average distance between farms has been approximately 1 3/4 miles. At least three more R.E.A.'s in this part of the country are slated for construction in the spring of 1957.

It is hard to say how many farms will be hooked up in 1957. There should

certainly be as many as in 1956. If labour is available we expect to hook up over 3,000 more farms, making a total of nearly 41,000 electrified farms by the end of 1957.

During 1956 several Rural Electrification Associations were organized in the more marginal areas of the Province and at present are at various stages of sign-up. These areas could not have gone ahead without the help of the Part II legislation. Most of their lines will be completed during 1957, or else will be under construction when winter comes on. In the area south and west of Edmonton the Alder Flats R.E.A. is expected to go ahead and this will provide farm electrification out to the edge of settlement in that part of the country. Straight west of Edmonton between Wabamun Lake and Edson, four R.E.A.'s have been organized. These are Entwistle-Magnolia, Wildwood, Carrot Creek and Edson-Fulham. Of these the Entwistle-Magnolia R.E.A. is scheduled for construction first thing next spring, and we expect that the other three will get at least some construction done during 1957. An R.E.A. has been organized in the Ft. Assiniboine area which we hope will carry farm electrification to the edge of settlement beyond the Athabasca River. During 1956, something over 100 farmers in the Grassland R.E.A. have received service. We expect to see their framework of lines expanded considerably in 1957. An R.E.A. has been organized in Wandering River and we expect to see construction started there in 1957. Two relatively small R.E.A.'s between Bonnyville and Cold Lake have been organized. One of these is under construction at the moment and the other is expected to go ahead first thing in the spring. There are now no other areas in the Province south of the Peace River country where, as far as we can see, it will be necessary to create a new R.E.A. With the completion of the lines of the R.E.A.'s mentioned above, farm electrification lines will be within reasonable reach of all areas of the Province south of the Peace River country.

In the Peace River country a similar network of lines exists, so that, with the exception of the Baytree-Bonanza country and the Worsley-Eureka River country,

no group of farmers is beyond reach of the lines of existing R.E.A.'s. There is a great deal of land in the Peace River country which has not yet been homesteaded, but generally speaking, except for the two areas mentioned, all the better farming areas are receiving electrical service at the moment, or else construction is under way in them. The Judah and the Reno R.E.A.'s were under construction at the end of the year. When the lines of these two R.E.A.'s have been built farm electrification will be practically continuous from Peace River town to McLennan. South of Rycroft and Spirit River the Woking R.E.A. has been organized and construction should commence there next spring. It is expected that service will be extended to a group of farmers east of Valleyview in the Sunset House country in 1957. When construction is completed in these R.E.A.'s there will be very little of the Peace River country which is not served, except the Baytree-Bonanza country and the area north and west of Hines Creek, - that is, towards Worsley and Eureka River. The farmers in the Worsley area have had some discussions on the subject and we expect to see work started there during 1957. An R.E.A. was organized in the Baytree-Bonanza area near the B.C. border but it does not appear to be making much progress.

The following table shows the number of farms connected as of December 31st, 1956, as well as those still under construction. It also shows the number of non-farm customers served off farm lines.

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.

TABLE NO. 20

ALBERTA POWER COMMISSION

Combined Figures for Alberta

Farm Electrification as at December 31, 1956

	No. Farms Connected		Hamlet Customers	Total Non-Farm Customers		Total Served off Farm Lines
	Experimental Areas Completed R.E.A.'s Individual Rurals	Farms Supplied by Cities		Non-Farms	Total Non-Farm Customers	
Total Actually Served	2,962	1,917	461	992	3,954	
	32,480	1,917	3,551	5,486	37,966	
	299	—	—	—	299	
	37,658	2,466	4,012	6,478	44,136	
UNDER CONSTRUCTION *						
	No. Farms Under Construction		Hamlet Customers	Total Non-Farm Customers	Total Served off Farm Lines	
New Areas	365	2	10	12	377	
Additions to old areas	835	—	—	2	837	
Total under construction	1,200	4	10	14	1,214	

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 --

	New Areas	Additions to Old Areas	Total
	962	435	1,397
	New Areas	Additions to Old Areas	Total
	306	588	894

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

While there are 37,658 bona fide farmers connected, farm electrification also served 6,478 non-farm customers who would not have obtained service otherwise. The total number benefiting by the construction of these farm electrification lines is, therefore, 44,136.

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.

There are 1,925 townships in Alberta in which there are 15 or more farms. Farm Electrification lines have been built in 1,767 of these, leaving 158 such townships which at the end of 1956 did not have any farm electrification. Of these 158 townships 112 are in the main part of the Province and 46 are in the Peace River country.

Dealing again with these 158 townships, we expect to see service extended to 82 of these during 1957 because in these townships construction is either under way at the moment or has had to be postponed until the coming spring, or because R.E.A.'s have definitely been organized and are at such a stage in their financing program that we expect construction to start in these areas during the summer. This leaves 76 townships in which farmers have made no immediate plans for bringing about farm electrification, although it is quite likely that before the end of 1957 plans will be under way in several of them. According to the 1951 census, the total number of farms in these 76 townships is 2,100.

In connection with the 76 townships having more than 15 farmers each which are not served at the moment, or have no prospect of being served in 1957, many of these townships are quite close to existing farm electrification lines, as will be

seen from the table below which shows the number of townships which are only the following distances from existing lines:

<u>Distance from Existing Lines to Nearest Point of Township</u>				
<u>1 mile</u>	<u>2 to 3 miles</u>	<u>4 to 5 miles</u>	<u>6 to 10 miles</u>	<u>Over 10 miles</u>
16	22	18	8	12

Thirty-eight of these townships are within three miles of existing lines, and another 18 are within five miles, so that if the farmers in them were to take active steps towards getting farm electrification it would not be very difficult to obtain it. In other words, when seeking the reason why there is no service in these 76 townships, the answer does not lie in the fact that they are too remote from the network of lines. It lies in the fact that, generally speaking, the farms in these townships are in (1) new areas which have not been settled long, or else are (2) in marginal areas which in some cases have been settled for forty or fifty years but in which the farmers are deserting their farms for the higher incomes they can obtain in the cities.

1. The new areas that have not been settled long are in the Peace River country. In these areas land is being broken up at a fairly rapid rate, but in many cases the owners have concentrated on breaking more land and, for the time being, have left their families in the nearby town so that they have not yet established a worthwhile home on their land. There does not seem to be much doubt that as fast as these farmers can do so they will build homes and will go out to their farms to live. In such areas we may expect prosperous farming communities to develop within the next few years. Even now there is a demand for farm electrification in such areas but there are not yet enough resident farmers to make the extension of the lines feasible at the moment. These areas, such as that along the east side of the Smoky River for instance, that around Worsley and Eureka River, and that near Fort Vermilion, and some others, may expect to get farm electrification within the next few years.



2. In the marginal areas, which in some cases have been settled for forty or fifty years, the picture is not so clear. In many of these townships there are people classed as farmers who in reality farm on a very limited scale and depend on fishing, trapping or lumbering for enough additional income to eke out a living. While these people call themselves farmers, in reality they live on poor soil and from one year's end to another do little or nothing to improve the status of their farms. It is not clear when farm electrification may be extended to such townships.

There are other townships, however, in this same area north of the North Saskatchewan River, in which the majority of the inhabitants do farm on rather poor soil but in which they receive the bulk of their income from farming. In nearly all such townships there are some prosperous farms and these are an indication that farming can be carried out successfully in these areas, and, of course, will be so carried out when the day comes that there is a greater demand for farm products, - particularly hogs, cattle and forage crops. Many farmers in such a township are anxious to obtain farm electrification and will go to great lengths to do so. For these farmers the recent Part II legislation has been and will be a great help. The remainder of the farmers in the township are uncertain of their future on the land they occupy at present. We believe that these areas have not yet reached their minimum farming population. While many farms have either been wholly abandoned or are farmed on a rental basis by the better farmers who remain in the area, this process of farmers moving away has not yet reached its limit, so that in these areas still more farmers will move to the cities. We may expect, however, that within the next few years that process will reach a limit and that we will be left with farmers who either own or rent enough land which they farm properly that they will make a reasonable income. These farmers who remain will need farm electrification in their operations but may be so scattered that supplying them will present some problems which may be beyond the ability of the Part II legislation to solve. This, however, is a question with which we can deal when and if it arises.

When in the spring of 1957 we obtain the figures of the 1956 census, we may have a clearer picture of this development. We expect that these figures will show that in many of the townships which we now regard as having fifteen or more farmers per township, the number of farmers will have dropped below that. According to the 1941 census there were 99,732 occupied farms in Alberta, while in 1951 the census showed that this number had been reduced to 84,305 occupied farms, of which only 76,004 were farms on which someone lived. When the 1956 figures become available we believe that they will show a decrease of at least another 10% in the number of occupied farms and a similar decrease in the number of farms on which someone lives. In our opinion the new census figures will show that there were less than 70,000 farms on which someone resides.

By the end of 1957 the network of farm electrification lines will have entered nearly every township in the Province which has more than fourteen farmers living in it and many townships having less than that number. When we have reached that point some 41,000 farmers will have the benefits of farm electrification. From then on farmers hooking up will be those who are adjacent to or very close to the lines of an existing R.E.A., and who can get service from these lines. At what rate these will wish to hook up remains to be seen but we believe that some 2,500 may do so each year for a few more years. While we believe that ultimately farm electrification will be extended to 85% of the farms that remain occupied, it is hard to predict how many that will be and therefore hard to predict what is the maximum number of electrified farms we may expect.

The saturation of electrified farms by census divisions is shown on the map included in this report. If, as we expect, Alberta's ultimate saturation reaches 85% this would set the figure for the number of farms which we might expect to become electrified at about 60,000. On this basis we may consider then that farm electrification in the Province is 62% completed.

The figures in the following table show the progress of farm electrification

in another way. In preparing the table 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.

Saturation in Areas Served by  
the following three Companies only at December 31, 1956

	<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	27,096	9,069	1,079	37,244
(e) Farms served by each Company as a percentage of (c)	67.7%	47.0%	25.1%	58.6%

The map on Page 45 shows the census divisions in the Province and the number of farms in each according to the 1951 census. The southern half of the Province consisting of Census Division 11 and Census Divisions 1 to 9, contains 45,476 farms. Of these 28,339, or 62%, 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 9,319 of these, or 31%, are electrified. This is the area of the Province where the majority of small farms lie.

Part II of the Revolving Fund Act is being of great assistance in these areas. Under it \$558,255.00 have been earmarked for loans to R.E.A.'s in these areas. Extending the term of financing to 25 years has also helped them. To the end of the year 108 farmers financed on the 25 year basis.

The other two maps included in the report show the electrified areas of the Province as at December 31, 1956. This is on the same basis as the map in

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

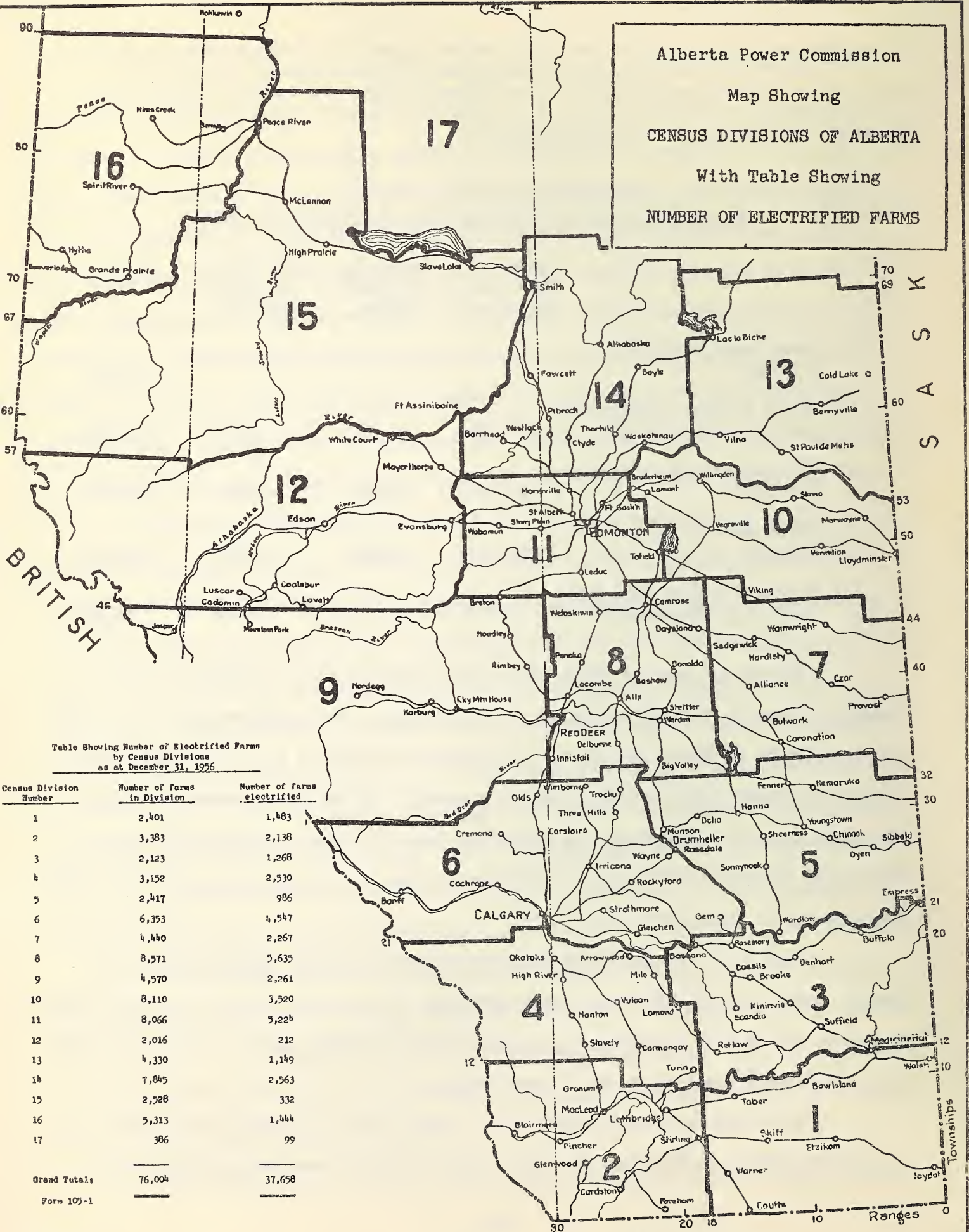


Table Showing Number of Electrified Farms by Census Divisions as at December 31, 1956

Census Division Number	Number of farms in Division	Number of farms electrified
1	2,401	1,483
2	3,383	2,138
3	2,123	1,268
4	3,152	2,530
5	2,417	986
6	6,353	4,547
7	4,440	2,267
8	8,571	5,635
9	4,570	2,261
10	8,110	3,520
11	8,066	5,224
12	2,016	212
13	4,330	1,149
14	7,845	2,563
15	2,528	332
16	5,313	1,444
17	386	99
<b>Grand Totals</b>	<b>76,004</b>	<b>37,658</b>

Form 105-1

the last Annual Report in that a section of land is blacked in if farm electrification is installed on any quarter of that section. All areas which at present have no prospect of being settled 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 25, 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 16, inclusive, and others, where a similar density of farmers prevails, and into which it will be almost impossible to introduce farm electrification. The areas in which the number of farms per township is less than 10 are indicated by means of red crosshatching and by blue crosshatching where the number of farms per township is from 10 to 14.

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. Four such areas which are under construction but have not been finished in time to include on the map, are the Sion, Reno, Judah and Plain Lake R.E.A.'s, and there are others.

At the end of December, 1956, there were 28,914 miles of farm lines and during the year 1,898 miles had been constructed.

### Financing

At the end of December there was a total of 362 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

\$21,000,000.00. At December 31, 1956, over \$7,970,000.00 of this had been paid back. The investment in all rural lines in the Province is approximately \$35,000,000.00.

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 three years. By the end of 1956 the Power Commission had given approval to 958 applications for loans under Part I of this Act. While all of this money had not been borrowed by the end of December, the approvals covered 16,063 farmers at an estimated cost of nearly \$18,000,000.00.

During 1956 the Power Commission gave approval to 296 applications for loans under Part I of the Revolving Fund Act for an amount of \$3,157,196.41, to give service to 3,214 farms. Of this amount \$1,781,697.41 was loaned where no Part II loan was necessary. Of the 3,214 farmers signing contracts under the Revolving Fund Act, 1,090 of them were in areas that needed the assistance of Part II loans. In such areas Part I loans totalling \$1,375,499.00 were approved in conjunction with Part II loans totalling \$558,255.00. The framework of lines in these Part II areas will make it possible for an additional 1,862 farmers to connect to them whenever they are ready. The following table shows the position of Part II loans at the end of December, 1956.

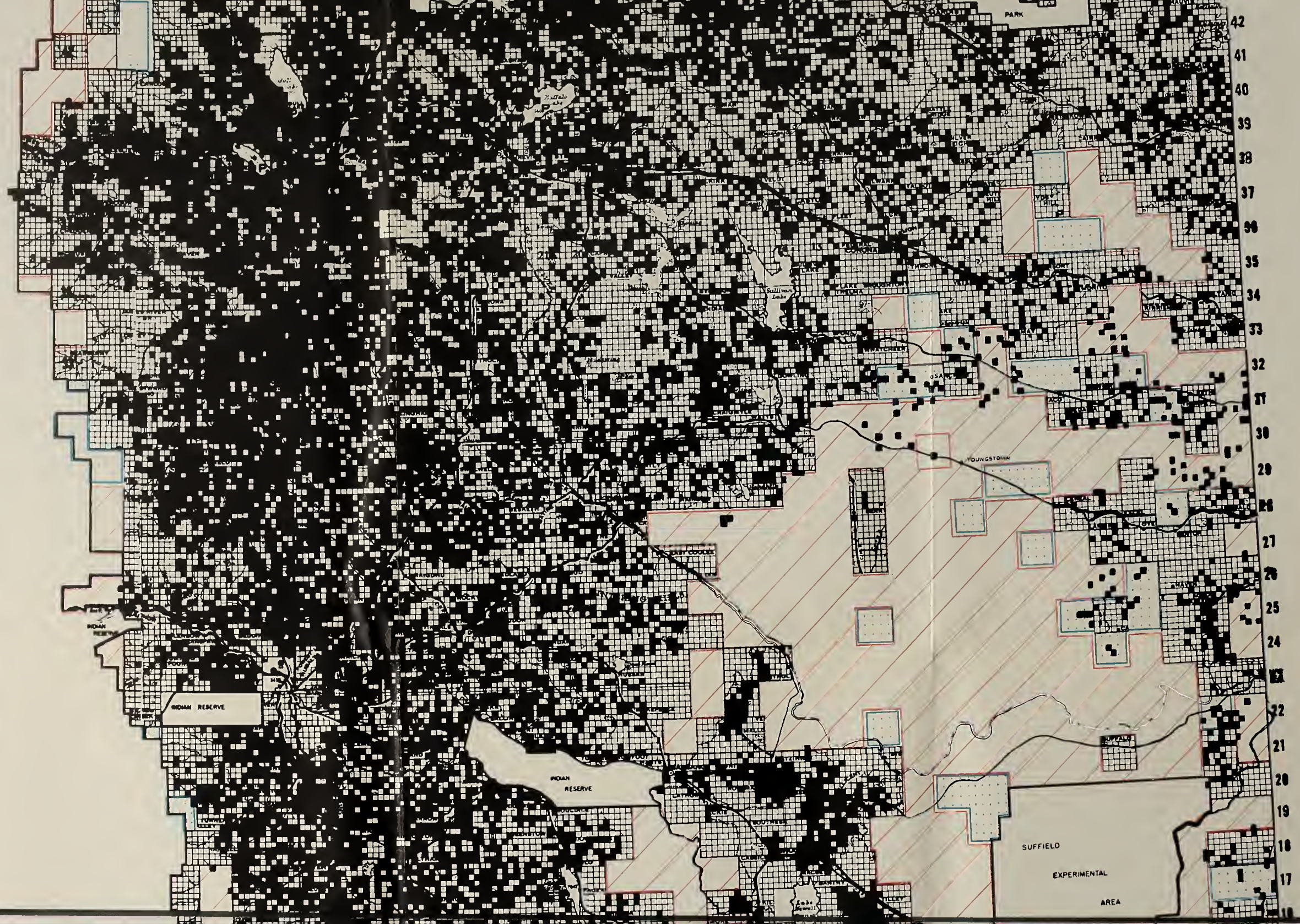
Standing of Part II Loans to December 31, 1956

Amount of Part I loans approved in conjunction with Part II loans	- \$1,375,499.00
Amount of Part II loans	558,255.00
Number of farmers in these areas	- 2,952
Number taking service	- 1,090
Amount of Part II loans requisitioned at December 31, 1956	- \$ 273,626.00

While the Power Commission approved Part II loans totalling \$558,255.00, in some cases the construction of the lines approved for these loans has not been



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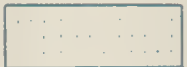
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**AREAS OF SPARSE POPULATION**

FARMERS per TOWNSHIP



less than 10

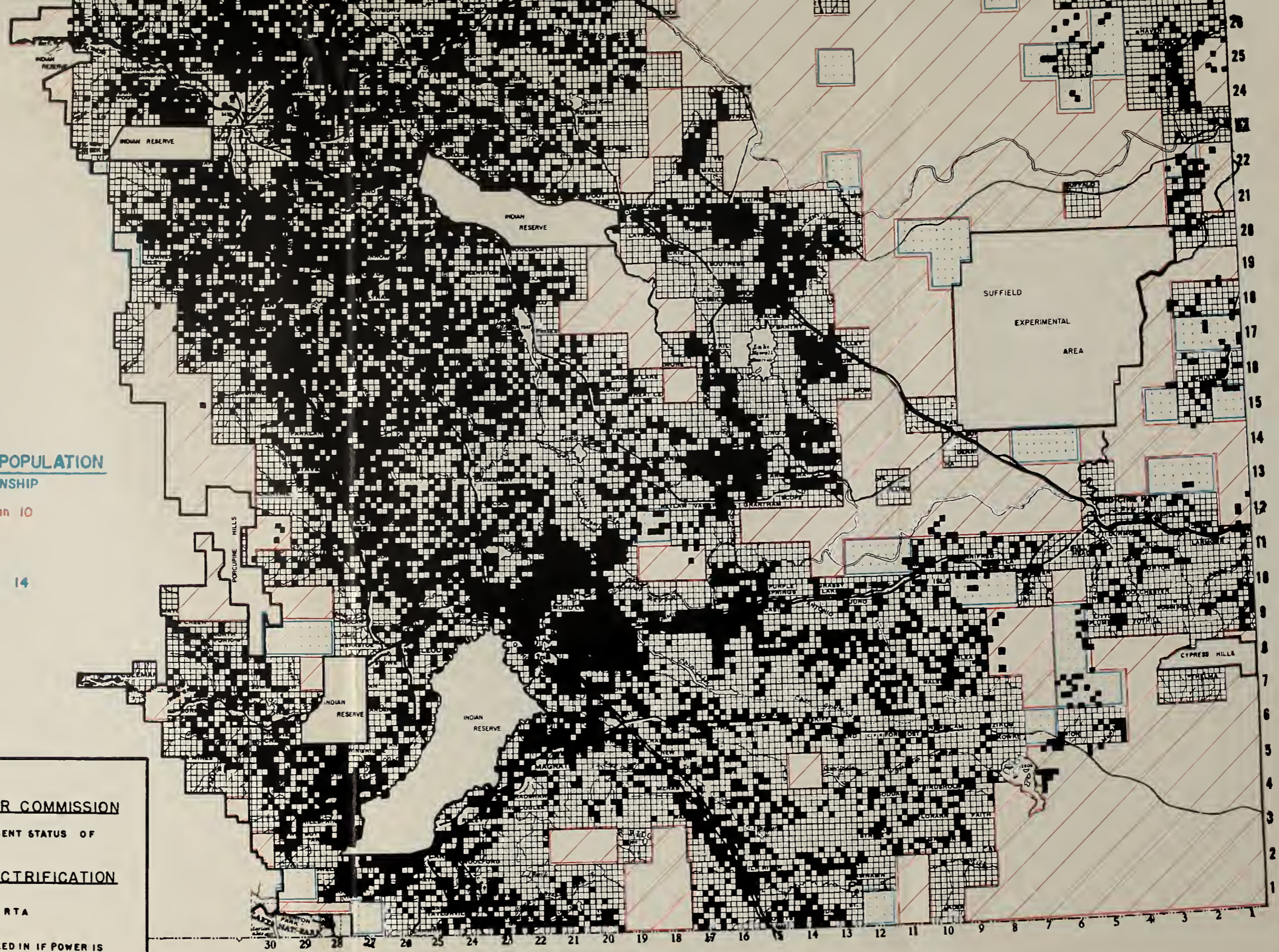


10 to 14

REVISED
DEC. 31, 1952
DEC. 31, 1953
DEC. 31, 1954
DEC. 31, 1955
DEC. 31, 1956

**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.



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REVISED

DEC. 31, 1956

# ALBERTA POWER COMMISSION

MAP SHOWING PRESENT STATUS OF

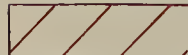
## FARM ELECTRIFICATION

IN THE  
"PEACE RIVER AREA"

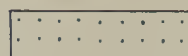
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AVAILABLE TO ANY QUARTER OF IT.

### AREAS OF SPARSE POPULATION

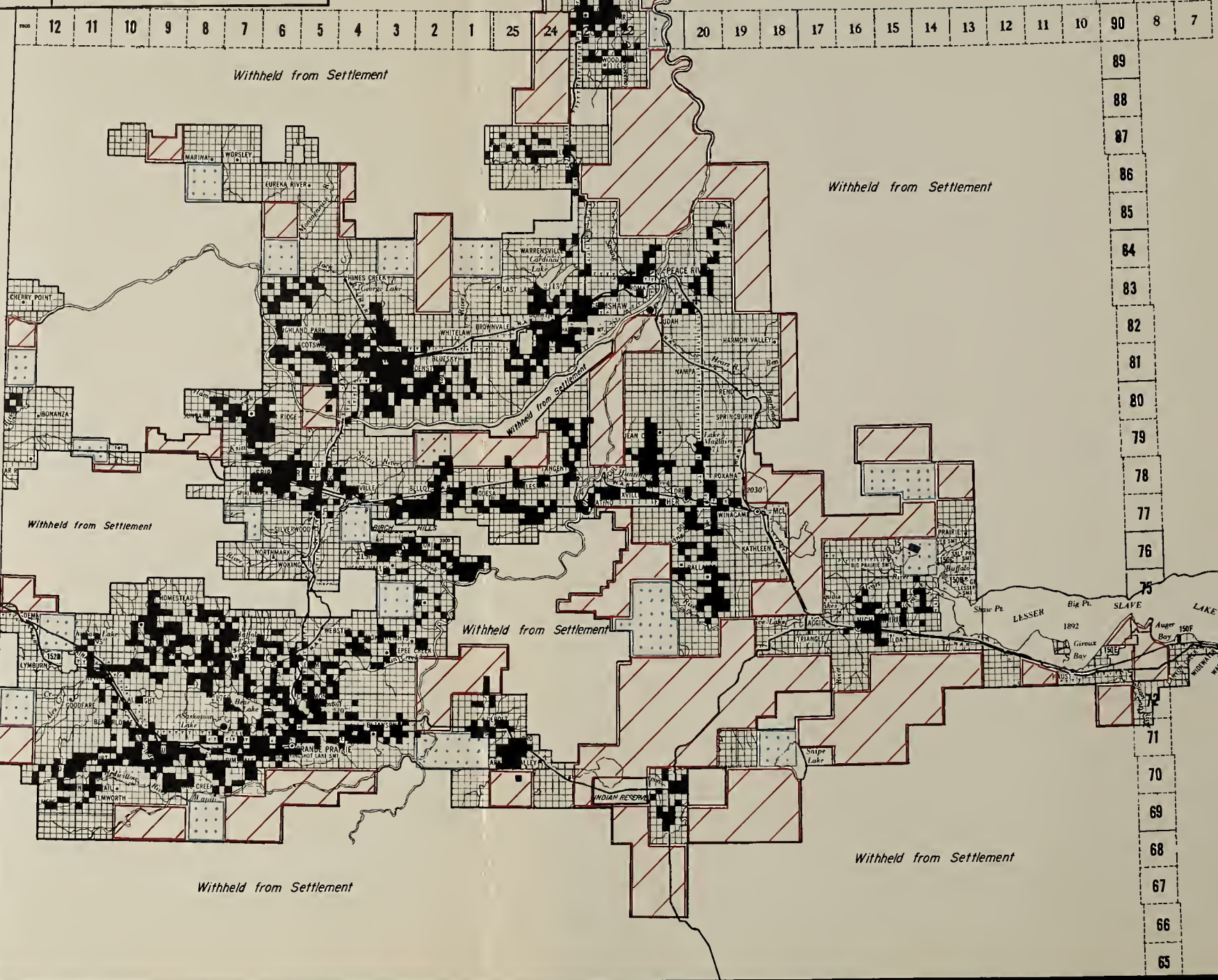
FARMERS PER TOWNSHIP



less than 10



10 to 14





started and in others is not advanced to the point where the money has to be paid out. For this reason the money requisitioned is about one-half of that approved although the remainder of the money will be needed early in 1957.

In an R.E.A. which has financed by means of a Part II loan it is expected that once the lines are built many more farmers will seek to be connected to them. Within a year after the lines are built we may expect applications from several such farmers, and consequently we may expect repayment of the Part II loan to commence then. By the end of 1957, therefore, the process of repayment of Part II loans should be well under way. As a matter of fact, once farmers see that the lines are really going to be built many of them indicate desire to be connected to the lines as soon as possible. If it is possible to add these farmers to the lines during the initial construction the profit which the Rural Electrification Association will make by hooking them up will be available to be credited to the Part II loan at that stage. For this reason in many cases the full amount of the Part II loan which the Power Commission authorizes originally is seldom required and the requisition can be made for less than the authorized amount. While very few of the areas in which we have authorized Part II loans have had their construction completed to date, nevertheless there has been time for a small amount of refund to begin to trickle back.

#### 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 during the coming year and probably to intensify it.

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, however, 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 not only experienced the utmost co-operation on the part of the Power Companies but at times they have suggested certain areas into which they were prepared to build such lines. Discussions of this nature are taking place all the time with gratifying results.

## 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 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 reserves all merit careful and continuous study. As each of these problems is solved a new one arises to take its place. In its engineering and accounting aspects farm electrification is highly technical and the individual farmer does not have the time nor 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 remarkable 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 9,000 farms, and Farm Electric Services does this work for some 27,000 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 1956 has been 3,040 K.W.H. The K.W.H. used per farm per month is low when the farmer is first connected, but increases rapidly during the first year or so. The consumption of the 2,890 farmers who were connected in 1956 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 3,040 K.W.H. per farm per year, we should realize that the average farm that has been connected for three years, will use more than this.

Nevertheless, when we consider this figure of 3,040 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. 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. 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.

During 1956 the electricity consumed by farmers accounted for  $6\frac{1}{2}\%$  of the total electricity sold in the Province. While farmers use only  $6\frac{1}{2}\%$  of the K.W.H. they are responsible for about 12% 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 about 12% of the peak load in the Province it means that 12% of the total capacity of the power plants and the transmission lines, or about 56,000 K.W., was reserved for their use. This 56,000 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 solely for the farmers' use will be well over \$500 for each farm served.





