

THE CLIFFS POWER AND LIGHT CO.  
ANNUAL REPORT  
YEAR 1946

Due to the strike in the iron ore mines which existed from February 8th until May 22nd, 1946 total output and sales of energy were reduced below the previous year. The total generated and purchased for the year 1946 amounted to 96,432,920 Kwh, which was 4.5% less than was generated and purchased in 1945. Kilowatt-hours sold were correspondingly reduced by 3.5% and revenues were reduced by 8.5% to a total of \$1,166,494.53. The revenue decrease is greater than the decrease in Kwh figures mainly because of the fact that we liquidated, during the mine strike, 1,169,000 Kwh which we owed to the Munising Paper Company under a previous agreement and 1,148,000 Kwh which we delivered to the Paper Mill during our flood water period, which enabled us to obtain from them at a later date 574,000 Kwh in return.

We entered the year 1946 with an estimated 20,502,000 Kwh in storage, which constituted 46.1% of our storage capacity. Precipitation during the year was the lowest that has been experienced in the past 16 years and run-off was considerably less than had been experienced in the past years, with the result that our plants were able to produce only 75,914,200 Kwh and it was necessary for us to purchase 20,518,720 Kwh to supply our customers. In spite of these heavy purchases, which were begun in July, we entered the year 1947 with only 10,526,000 Kwh in storage, which represents 24.1% of our storage capacity. The energy generated by our own plants during the year of maximum production, namely 1943, was 32% more than that generated during 1946 and the 1945 generation was 24% greater.

On January 11th the National Labor Relations Board held an election of the company's employees to determine whether or not these employees would accept the United Steelworkers-CIO as their sole bargaining agent. This election was carried by the union 25 votes for and 16 votes against the bargaining unit. All employees eligible to vote at the election cast ballots. Due to the union being very busy with the strike we heard nothing from the union officials in regard to the drafting of a labor contract until June. However, immediately after the granting of the 10¢ per hour increase by the mining companies in March we had a conference with Messrs. Grenfell, Zhulkie and Krieg, who represented the local union of the United Steelworkers, at which time we offered and they accepted a 10¢ per hour increase for hourly employees and its equivalent to monthly employees effective at the same time that the iron company had made its wage changes. This offer was accepted and that change was made in conformity with the conference. In June negotiations were opened for a labor contract by the national representatives of the union and this contract was finally signed by both parties on July 30th, to be effective August 1st. This agreement carried an additional wage increase to the equivalent of 8½¢ per hour, or a total of 18½¢ per hour, retroactive to May 22nd, at which time the mining company wage controversy was settled.

In the early part of January, due to an acute power shortage in the city of Marquette, a study was made by a firm of consulting engineers who recommended that the city purchase a 2000 KW unit to be installed as soon as practical. After discussion our company decided that we were in no position to furnish this power and that no bid should be made for the sale of it to the city of Marquette. The city has gone forward with the construction of the new plant, but delivery of materials and construction difficulties have delayed the installation considerably with the result that several times during the year the city has been forced to call on our company to keep them from suffering acute power shortages. A verbal agreement was made with the city in which we agreed to supply such emergency power at a rate of 1.25¢ per Kwh, and we have been able to avoid any serious power shortage in the city by that agreement. This arrangement, of course, will be terminated as soon as the city can get its machine installed.

During the strike and while the demands on our power system were comparatively low we took the opportunity to repair some of our electric units which could be spared from service at that time. The foundation of the Republic Plant was reconstructed where serious deterioration in concrete had taken place by spalling. The #1 unit at that plant was completely overhauled and both gate valves at the McClure Plant were rebuilt. These and several other minor repairs placed our power generating facilities in good condition to give practically continuous operation during the remainder of the year whenever water was available for them.

During March Mr. Keeton of the Alger County Taxpayers Association called our attention to the fact that the power situation in the township owned power plant at Grand Marais was serious and that either some transmission line facilities must be brought into the town or a heavy expenditure must be made for the purpose of acquiring additional power facilities. After much discussion within our own organization and with other power companies, it was decided that this extension could not be profitably made by any private organization and accordingly, the Alger-Delta Co-operative Association, an REA organization, was called in by Mr. Keeton to consider the project. This Co-operative met with the supervisors of Burt Township several times and made them a definite proposition for the construction of the line from Seney. At the close of the year, however, no agreement had been made by that organization and our company for the purchase of power nor had any definite promise been made as to when the proposed line into Grand Marais would be constructed. During the month of August this same Co-operative discussed with us the construction of an extension from our present Forest Lake-AuTrain line north and west to serve the villages of Rock River, Onota and Deerton. This line has been discussed several times with the Co-operative also, but no actual contract arrangements had been made with them up until the end of 1946.

The work welding the steel pipe line at the Carp Plant started the first week in July and was carried forward until the first day of November. During that time a total of 2,891 feet of the pipe was welded. This, added to the work done in 1945, which consisted of 1,427 feet, gives 4,318 feet of pipe line welded and leaves approximately 4,200 feet still to be completed. This means it will necessitate work during the year of 1947 and a portion of the summer of 1948 to complete the work.

During September we received notice that the Penn Iron Mining Company was anticipating sale of their Sturgeon Falls Plant on the Menominee River. Investigation of this plant and study of our own system indicated that we could not profitably purchase the plant and connect it to our transmission system, and at the same time we discovered that the Penn Company had previously given an option on the plant to the city of Norway. An election was held during November to determine whether the city of Norway would exercise this option on the plant and the election was carried in favor of the purchase of the plant by a substantial majority.

In the latter part of September a study was made with various concrete repair firms of the numerous methods which could be utilized in repairing the up-stream face of power dams where they have deteriorated excessively due to spalling. It was decided that extensive repairs to the Hoist Dam should be attempted during this year while the water level in the reservoir was low and in the early part of November preparation for the work was started. Little was accomplished during November other than construction of the necessary housing for equipment, scaffolds and other facilities. Actual patching of the up-stream face of the dam was begun during the month of December. This work proved to be very tedious and expensive, but it is felt necessary for the preservation of the structures and will be carried forward on this dam until all of the present portions which have been destroyed by spalling have been replaced.

THE CLIFFS POWER & LIGHT COMPANY

STATISTICAL DATA -- 1946

KILOWATT HOURS GENERATED & PURCHASED

	<u>KILOWATT HOURS GENERATED &amp; PURCHASED</u>										<u>STATION DELIVERED</u>		<u>TRANSMISSION</u>	
	<u>McCLURE</u>	<u>CARP</u>	<u>HOIST</u>	<u>AUTRAIN</u>	<u>REPUBLIC</u>	<u>ESCANABA</u>	<u>PURCHASED</u>	<u>TOTAL</u>	<u>USE</u>	<u>TO LINES</u>	<u>KWH SOLD</u>	<u>KWH</u>	<u>LOSSES</u>	<u>&amp;</u>
Jan.	3,853,000	1,376,000	1,358,000	353,400	150,000	366,000	109,000	7,565,400	20,020	7,545,380	6,958,429	586,951	7.77	
Feb.	3,502,000	1,200,000	1,282,000	494,600	152,600	329,000	411,000	7,371,200	20,050	7,351,150	6,612,798	738,352	10.04	
Mar.	2,525,000	1,607,000	807,000	607,400	162,200	438,000	0	6,146,600	17,230	6,129,370	5,595,462	533,908	8.71	
Apr.	2,254,000	1,089,000	767,000	614,400	306,500	1,006,000	0	6,036,900	16,890	6,030,010	5,463,076	556,934	9.25	
May	2,646,000	714,000	904,000	615,300	252,300	484,000	0	5,615,600	14,210	5,601,390	5,164,508	436,882	7.79	
June	3,686,000	1,087,000	1,333,000	600,300	310,400	616,000	88,000	7,720,700	17,470	7,703,230	7,162,931	540,299	7.01	
July	4,420,000	1,022,000	1,542,000	517,000	247,200	397,000	625,000	8,770,200	18,440	8,751,760	8,009,905	741,855	8.47	
Aug.	3,563,000	1,235,000	1,239,000	224,200	109,700	266,000	2,684,000	9,320,900	18,760	9,302,140	8,351,204	950,936	10.22	
Sept.	3,252,000	1,004,000	1,171,000	196,000	64,400	254,000	3,505,600	9,447,000	17,260	9,429,740	8,747,837	681,903	7.23	
Oct.	3,176,000	1,049,000	1,124,000	197,600	57,900	232,000	3,756,640	9,593,140	17,150	9,575,990	8,773,452	802,538	8.38	
Nov.	2,139,000	1,156,000	730,000	178,300	82,000	457,000	4,672,600	9,414,900	17,030	9,397,870	8,502,841	895,029	9.52	
Dec.	2,454,000	822,000	835,000	225,200	91,300	336,000	4,666,880	9,430,380	16,420	9,413,960	8,738,611	675,349	7.1	
	37,470,000	13,361,000	13,092,000	4,823,700	1,986,500	5,181,000	20,518,720	96,432,920	210,930	96,221,990	88,081,054	8,140,936	8.45	

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STATISTICAL DATA - 1946

Month	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Precipitation -	1.76	0.92	1.26	0.98	2.80	3.07	1.32	5.46	2.29	2.52	2.30	1.44
Total Precipitation at Ishpeming during 1946	- 26.12" (2.176 ft.)											
Average " " Marquette	- 32.80" (46 year record)											

CARP RIVER PLANT:

Drainage area above Intake Dam													66.66 sq. miles
Cubic feet precipitation in 1946													4,043,822,000
Kilowatt hours generated in 1946													13,361,000
Cubic feet water utilized (90 cu. ft. - 1 Kwh)													1,226,790,000
" " " in Carp Storage Basin Dec. 21, 1945													288,543,000
" " " " " " " Dec. 23, 1946													185,986,000
" " " taken from storage in 1946													102,557,000
" " " wasted over Intake Dam													58,176,000
Total run-off for year 1946 (cubic feet)													1,182,409,000
Run-off per sq. mile of drainage area (cubic feet)													17,737,908
Second-feet of run-off													0.5624
Total precip.	<u>1913</u>	<u>1914</u>	<u>1915</u>	<u>1916</u>	<u>1917</u>	<u>1918</u>	<u>1919</u>	<u>1920</u>	<u>1921</u>	<u>1922</u>	<u>1923</u>	<u>1924</u>	<u>1925</u>
Sec.ft. run-off	30.11	26.53	38.40	36.83	25.46	31.05	29.50	27.40	30.38	33.67	21.90	22.95	20.71
	1.03	0.67	0.93	1.29	0.70	0.79	0.83	0.73	0.68	1.06	0.59	0.50	0.25
Total Precip.	<u>1926</u>	<u>1927</u>	<u>1928</u>	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>	<u>1934</u>	<u>1935</u>	<u>1936</u>	<u>1937</u>	<u>1938</u>
Sec. ft. run-off	35.69	29.86	36.06	32.28	23.14	36.70	31.20	32.72	32.87	27.10	30.23	30.10	35.32
	0.85	0.98	1.11	0.67	1.10	0.83	1.13	1.14	1.00	0.79	0.89	0.86	1.33
Total precip.	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>					
Sec. ft. run-off	33.58	30.34	32.20	34.26	32.04	32.77	30.81	26.12					
	1.47	1.05	0.83	0.84	1.17	0.70	0.81	0.56					

McCLURE PLANT:

Drainage area above Intake Dam													140.52 sq. miles
Cubic feet precipitation in 1946 (Hoist Plant 31.91"-2.659")													10,420,477,000
Kilowatt hours generated at McClure Plant in 1946													37,470,000
Cubic feet water utilized (125 cu. ft. - 1 Kwh)													4,683,750,000
" " " wasted over Intake Dam													0
" " " in Hoist Storage Basin Dec. 21, 1945													1,587,952,000
" " " " " " " Dec. 23, 1946													818,921,000
" " " taken from Hoist Storage Basin in 1946													769,031,000
" " " in Silver Lake Dec. 21, 1945													91,408,000
" " " " " " " Dec. 23, 1946													0
" " " taken from Silver Lake in 1946													91,408,000
Total run-off for year 1946 (cubic feet)													3,823,311,000
Run-off per sq. mile of drainage area (cubic feet)													27,227,208,304
Second-feet of run-off													0.862
Total Precip.	<u>1921</u>	<u>1922</u>	<u>1923</u>	<u>1924</u>	<u>1925</u>	<u>1926</u>	<u>1927</u>	<u>1928</u>	<u>1929</u>	<u>1930</u>	<u>1931</u>	<u>1932</u>	<u>1933</u>
Sec. ft. run-off	35.10	42.03	26.60	30.49	24.06	43.95	35.51	43.80	38.75	30.81	37.02	32.54	35.07
	1.02	1.54	0.85	0.92	0.52	1.52	1.80	2.22	1.36	1.45	1.10	1.23	1.30
Total Precip.	<u>1934</u>	<u>1935</u>	<u>1936</u>	<u>1937</u>	<u>1938</u>	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>
Sec. ft. run-off	35.02	29.96	32.16	38.18	40.93	41.22	36.59	38.15	40.20	35.64	37.62	37.94	31.91
	1.16	0.90	1.05	1.19	1.75	1.69	1.47	1.28	1.15	1.43	1.17	1.36	0.86

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SUBSTATION TRANSFORMERS:

Substation transformers installed as of December 31, 1946.

<u>66,000/2300 Volts</u>	<u>Phase</u>	<u>No.</u>	<u>K.V.A.</u>	<u>Total K.V.A.</u>	
Munising Substation	1	3	667	2,001	
Seney "	1	1	25	25	
Inland #1 "	1	3	500	1 500	
Inland #2 "	1	3	500	<u>1 500</u>	5,026 KVA
 <u>2300/66,000 Volts</u>					
AuTrain Substation	1	3	333-1/3	1 000	
Gwinn "	1	3	590	<u>1 770</u>	2 770
 <u>33,000/66,000 Volts</u>					
Gwinn Substation	1	3	1,250	<u>3,750</u>	3 760
 <u>33,000/12,000 Volts</u>					
Clarksburg Substation	1	2	150	300	
Princeton "	1	1	37½	<u>37½</u>	337½
 <u>33,000/2300 Volts</u>					
Gwinn Substation	3	1	1,250	1,250	
" "	1	3	75	225	
Cliffs Shaft Substation	1	3	500	1 500	
" " " (MG&ECo.Service)	1	3	150	450	
Morris-Lloyd "	1	3	590	1 770	
Cambria-Jackson "	1	3	400	1 200	
Maas "	1	6	590	3 540	
Brownstone "	1	3	625	1 875	
Palmer "	1	2	625	1 250	
Greenwood "	1	2	400	800	
Princeton "	1	1	25	25	
Tilden "	1	1	400	400	
Palmer Rural "	1	4	15	60	
Negaunee-Athens "	1	3	1 000	3 000	
Mather "	1	3	2 000	<u>6 000</u>	23 345
 <u>2300/33,000 Volts</u>					
Republic "	1	3	250	750	
Hoist Plant "	3	1	2 500	2 500	
Escanaba " "	1	3	500	1 500	
McClure Plant "	3	2	5 000	10 000	
Carp " "	1	3	1 900	5 700	
Hoist " "	1	3	667	2 000	
" " "	1	3	200	<u>600</u>	23 050
 <u>12,000/440-220 Volts</u>					
Piqua-Marquette Substation	1	3	100	300	
<u>12,000/2300 to 2300/440-220</u>	(1	3	185	555	
Piqua-Marquette Substation	(1	3	100	<u>300</u>	1 155
 <u>12,000/220-110 Volts</u>					
D.S.S.&A.Ry. at Clarksburg	1	1	2½	<u>2½</u>	2½
 <u>12,000/2300 Volts</u>					
McClure Plant (Furnace Lines)	3	2	1 250	2 500	
AuTrain Substation	1	3	185	555	
Chatham "	1	3	25	75	
Eben "	1	1	25	25	
Rumely "	1	2	15	30	
Inland #1 (Wis.Mich. Line)	1	3	50	150	
Rumely Substation	1	1	25	<u>25</u>	3 360

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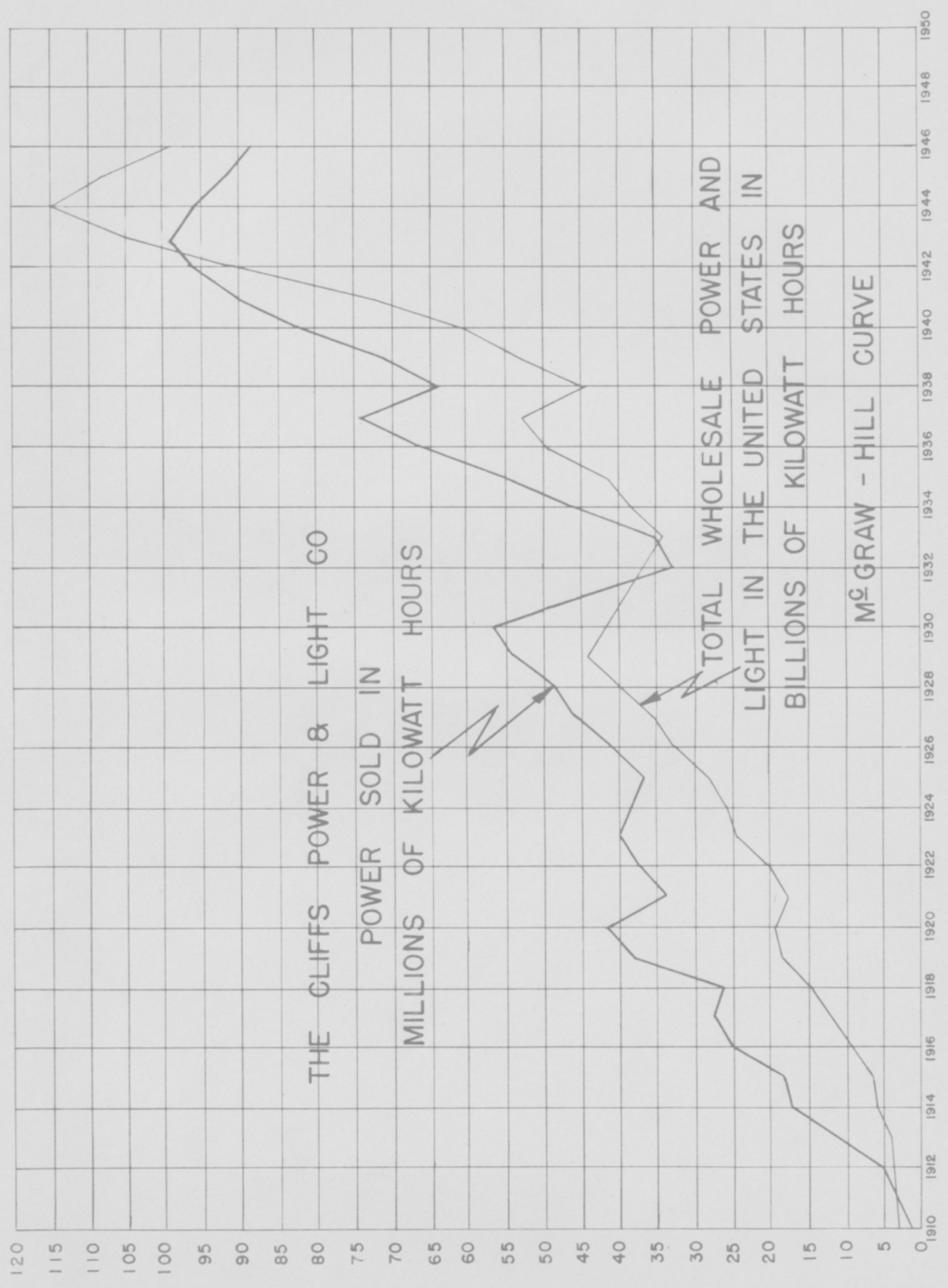
SUBSTATION TRANSFORMERS: (Continued)

	<u>Phase</u>	<u>No.</u>	<u>K.V.A.</u>	<u>Brought Fwd.</u>	<u>62,796</u>
				<u>Total KVA</u>	
<u>6600/2300 Volts</u>					
Inland #1 Substation	1	3	25	75	
Blaney Park "	1	2	25	50	
" " "	1	1	15	15	
AuTrain Lake "	1	1	25	25	
Gwinn "	1	1	50	50	
Princeton "	1	1	50	50	265
<u>6600/115-230 Volts</u>					
Furnace Substation Lighting	1	1	1½	1½	1½
				Grand Total.....63,062½	

DISTRIBUTION TRANSFORMERS:

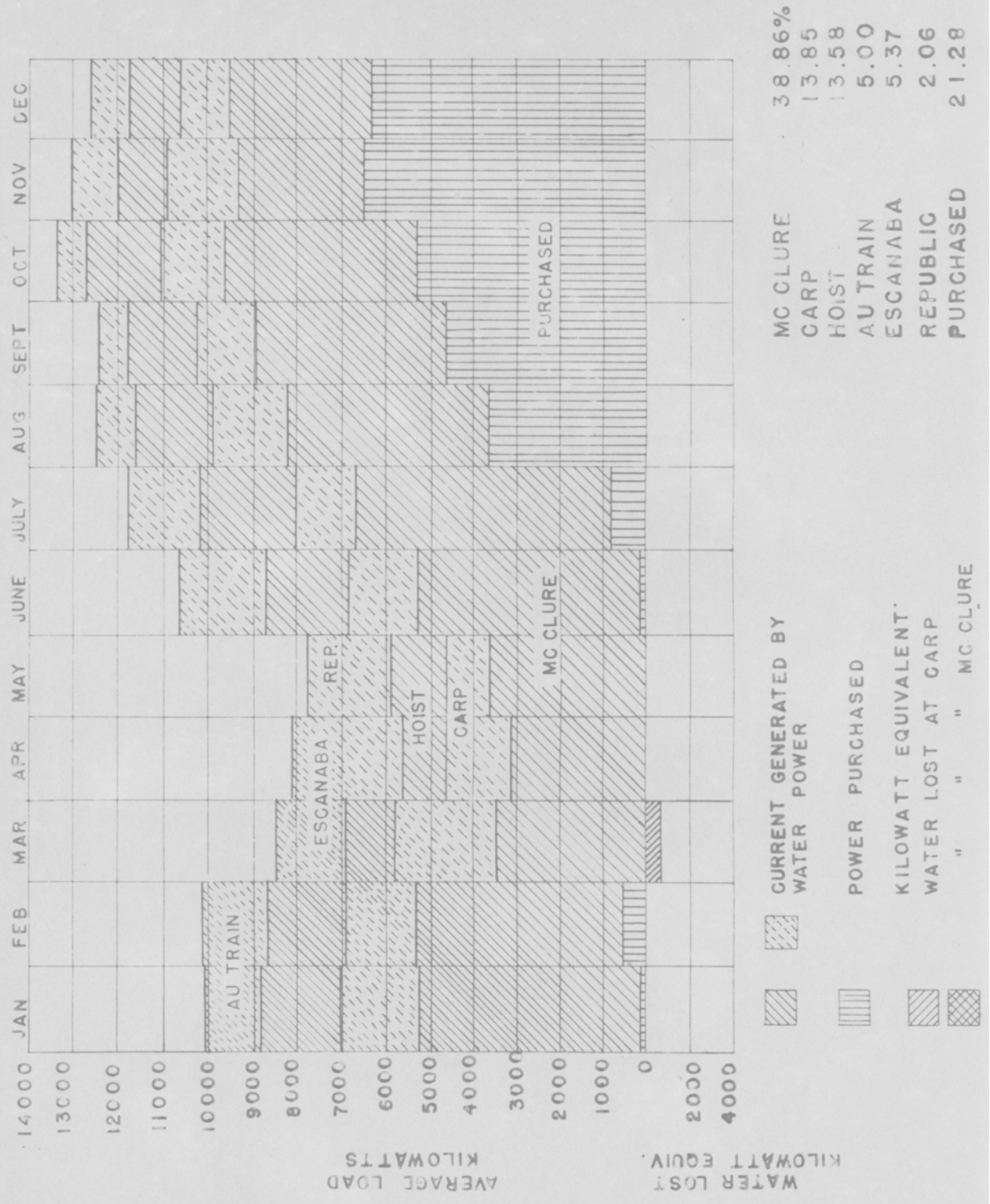
	<u>Number</u>	<u>Capacity</u>
Total at first of year	396	2,476 KVA
" purchased during year	52	205
" installed " "	51	226½
" sold " "	13	73
" at close of year	435	2 608
In stock at close of year	20	76½ Kva
" service at " " "	377	2,152½
C.P.&L.Co. Plants & Auxiliaries	38	379
	<u>435</u>	<u>2,608 KVA</u>







# 1946



# PRECIPITATION BY YEARS

