

CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD COMPANY

Annual Report
Electrical Department
Year 1929.

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CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD COMPANY

Highwood, Illinois,
January 16, 1930.

Mr. J. R. Blackhall,
General Manager.

SUBJECT: Annual Report.

Attached is a detail of the work performed by the Electrical Department during the year of 1929. The outstanding work performed, and economies made are as follows:

Under the new power contract and leases entered into with the Public Service Company of Northern Illinois, we were able to effect economies of approximately \$200,000.00 annually.

The installation of 5½ miles of feeder cable has improved voltage conditions in the Four Mile Road Substation area, and has helped to keep the trains on schedule time.

The electrification of 3.9 miles of industrial track has added considerable to our freight facilities.

The installation of floodlights at the Harrison Street Yards has materially improved working conditions at this location.

The installation of cut-out switches and the insulating of track circuits at Industrial Sidings where gasoline cars are unloaded will materially safeguard this unloading operation.

Electrical Engineer.

EN: MJ

POWER STATISTICS FOR YEAR 1929.

Power Distribution

In Wisconsin exclusive of Milwaukee City	A.C.	11,540,613
In Milwaukee City	D.C. 1,818,530	A.C. <u>1,816,149</u>
In Wisconsin including Milwaukee City	A.C.	13,356,762
In Milwaukee D.C. furnished by T.M.E.R. & L.Co.	D.C.	1,264,669
In Wisconsin D.C. furnished from Win.Harbor	D.C.	<u>514,257</u>
In Wisconsin Total	A.C. & D.C.	15,135,688
In Illinois Total	D.C.	<u>29,773,275</u>
Total purchased	A.C. & D.C.	44,908,963

Average monthly K.W. maximum demand for year	9,025
A.C. and D.C. K.W.H. purchased on demand charge basis	41,999,145
Load factor for year	.531

CHICAGO NORTH SHORE AND MILWAUKEE RAILROAD CO.

Cost of Electrical Energy Per Car Mile

K.W.H. for Year 1929.

C.N.S. & M.R.R. and C. & M.E.Ry.

January	3,998,475
February	3,571,184
March	3,764,786
April	3,467,846
May	3,665,387
June	3,756,278
July	3,649,808
August	3,713,863
September	3,616,041
October	3,882,498
November	3,789,869
December	4,030,928
	<u>44,908,963</u>

Car Miles Operated for Year 1929.

January	929,752
February	897,331
March	973,067
April	953,526
May	996,499
June	1,031,250
July	1,057,232
August	1,076,255
September	1,031,351
October	1,007,441
November	931,773
December	939,098
	<u>11,824,575</u>

Total C.N.S. & M.R.R.Co. & C. & M.E.Ry.Co. car miles

11,824,575

Cost of power for year 1929

565,900.23

565,900.23 ÷ 44,908,963 = \$.0126 Per K.W.H.

44,908,963 ÷ 11,824,575 = 3.798 K.W.H. per Car Mile

3.798 × .0126 = \$.0478548

Net cost of electric energy per car mile at Substation

4.785¢

Net cost of electric energy per car mile at Car

5.123¢

Note: Above costs do not include interest on investment,
insurance, depreciation and taxes.

POWER SUMMARY FOR YEAR 1929.

2,554,149	Niles Center Substation	D.C.
776,254	No. 1 Substation	D.C.
682,211	No. 2 Substation	D.C.
1,058,189	No. 3 Substation	D.C.
705,200	No. 4 Substation	D.C.
1,278,970	No. 5 Substation	D.C.
1,093,890	Liberty Lake	D.C.
1,212,616	Central Street Substation	D.C.
3,634,066	Winnetka Substation	D.C.
2,482,625	Ravinia Substation	D.C.
3,373,810	Fort Sheridan Substation	D.C.
2,064,631	Lake Bluff Substation	D.C.
4,235,770	North Chicago Substation	D.C.
1,763,334	Beach Substation	D.C.
1,542,770	Winthrop Harbor Substation	D.C.
44,579	North Chicago Signals	D.C.
98,919	Oakton Street Shop	D.C.
40,200	Highwood Office	D.C.
28,642,383	Public Service Co.	D.C.
1,645,149	Chicago Rapid Transit N.C.Line	D.C.
20,287,532	Illinois Total	D.C.
514,257	Winthrop Harbor to Wisconsin	D.C.
29,772,275	Total Illinois	D.C.
5,916,827	Public Service	A.C.
25,690,102	Total Illinois	A.C. & D.C.
7,439,935	T.M.E.R. & L.Co.	A.C.
1,264,669	T.M.E.R. & L.Co.	D.C.
514,257	Winthrop Harbor to Wisconsin	D.C.
44,908,963	Total Purchased	A.C. & D.C.
592,800	McKeown Substation	D.C.
1,676,070	Kenosha Substation	D.C.
410,180	Ease Road Substation	D.C.
949,700	Racine Substation	D.C.
367,200	Quarry Substation	D.C.
1,118,080	Four Mile Substation	D.C.
945,550	Carrollville Substation	D.C.
1,279,600	College Substation	D.C.
2,341,400	Milwaukee Substation	D.C.
9,700,580	Converted in Wisconsin	D.C.
514,257	Winthrop Harbor to Wisconsin	D.C.
1,264,669	T.M.E.R. & L.Co.	D.C.
11,479,536	Total to Wisconsin	D.C.
13,356,762	K.W.H. A.C. to Wisconsin	
1,816,149	Milwaukee City A.C. 1,318,530	D.C.
11,540,613	K.W.H. A.C. to Wisconsin exclusive of Milwaukee City	
514,257	K.W.H. D.C. to Wisconsin	
12,054,870	K.W.H. to Wisconsin exclusive of Milwaukee City.	

POWER STATISTICS FOR YEAR 1929.

Illinois Substation D.C.
Output.

	<u>Calvary.</u>	<u>M.C.</u>	<u>#1.</u>	<u>#2.</u>
January	148,650	216,250	57,120	35,224
February	122,524	198,800	58,240	61,550
March	149,910	200,880	59,220	108,783
April	136,859	203,560	44,970	51,959
May	137,160	227,470	45,500	40,355
June	138,291	236,174	64,100	26,480
July	139,510	211,290	70,700	44,020
August	138,460	203,720	62,070	106,120
September	132,412	191,880	84,700	51,060
October	128,030	208,374	89,920	48,990
November	129,223	214,060	68,994	42,100
December	134,120	242,120	70,700	56,560
	<u>1,645,149</u>	<u>2,554,578</u>	<u>776,254</u>	<u>683,211</u>
1930	1,462,787	2,231,942	855,050	846,870

	<u>#3.</u>	<u>#4.</u>	<u>#5.</u>	<u>L.Lake.</u>
January	94,000	67,330	73,490	90,070
February	35,500	76,020	100,960	95,360
March	-	101,740	143,620	100,390
April	104,500	46,250	122,140	89,540
May	108,499	61,200	111,980	98,940
June	115,900	60,640	109,010	106,980
July	106,700	57,870	129,780	96,290
August	70,100	55,770	118,390	86,780
September	105,400	48,370	95,200	94,170
October	113,090	43,860	111,300	90,070
November	111,700	37,600	68,700	70,210
December	92,800	48,540	94,390	70,570
	<u>1,058,189</u>	<u>705,200</u>	<u>1,278,970</u>	<u>1,093,390</u>
	776,600	1,092,460	924,950	736,220

POWER STATISTICS FOR YEAR 1929.

Illinois Substation D.C. Output

	<u>Central St.</u>	<u>Winnetka.</u>	<u>Ravinia.</u>	<u>Ft. Sheridan</u>
January	94,340	236,100	258,190	321,700
February	97,520	292,900	215,880	272,900
March	114,070	315,800	183,910	301,100
April	113,710	272,800	181,660	276,100
May	119,852	273,000	200,920	261,800
June	112,176	268,400	209,750	296,490
July	100,700	279,900	224,520	281,610
August	91,530	297,300	196,010	265,500
September	71,870	299,000	170,120	257,200
October	86,398	329,800	194,490	273,610
November	105,540	320,200	215,895	272,300
December	104,910	348,866	231,280	293,500
	<u>1,212,616</u>	<u>3,624,066</u>	<u>2,482,625</u>	<u>3,373,610</u>
	1,106,286	3,737,400	2,735,130	3,500,900

	<u>L. Bluff.</u>	<u>No. Chicago</u>	<u>Beach</u>	<u>W. Harbor.</u>
January	255,980	287,290	112,250	210,800
February	188,680	280,160	95,470	190,300
March	170,220	301,910	123,590	174,300
April	149,670	296,250	148,010	105,600
May	172,920	382,300	152,480	116,100
June	150,880	379,300	156,820	113,700
July	120,680	354,900	147,550	87,500
August	116,180	398,400	171,776	98,200
September	151,220	359,100	166,288	94,650
October	181,096	396,860	182,540	94,120
November	241,025	378,700	145,650	125,200
December	196,080	420,600	158,600	132,300
	<u>2,064,631</u>	<u>4,235,770</u>	<u>1,763,084</u>	<u>1,542,770</u>
	2,041,220	4,589,500	1,372,797	1,165,300

15 best
grandeur
229,690

POWER STATISTICS FOR YEAR 1929.

Auxiliary Power Furnished Under Power Contract.

	<u>Oakton Shop</u>	<u>No. Chi. Signals.</u>	<u>Highwood Lights</u>
January		2,720	
February		4,280	
March		3,520	
April		3,400	
May	800	2,219	
June	3,000	5,040	
July	11,158	3,280	3,780
August	12,528	2,200	6,540
September	13,472	2,800	6,780
October	17,061	4,000	7,620
November	19,400	4,000	7,620
December	21,500	4,120	7,860
	<u>98,919</u>	<u>44,579</u>	<u>40,200</u>
	163,100 ac	32,920 ac	82,260 ac

No. Chi. Garage 57,338 ac.

POWER STATISTICS FOR YEAR 1929.

Wisconsin Substation D. C. Output.

	<u>McKeown.</u>	<u>Kenosha.</u>	<u>Rose.</u>	<u>Racine.</u>	<u>Quarry.</u>
January	31,700	149,710	34,810	79,400	60,000
February	32,000	129,510	29,590	77,400	48,900
March	30,000	147,280	30,260	82,900	37,400
April	35,800	149,050	25,100	72,000	33,500
May	28,450	138,850	40,530	75,800	29,200
June	29,950	142,790	38,890	82,000	30,500
July	32,000	147,430	38,210	77,900	24,900
August	66,500	142,870	29,910	81,000	37,200
September	82,700	123,460	32,660	82,900	24,500
October	86,700	130,870	44,180	83,300	19,000
November	65,200	136,540	35,150	75,700	18,100
December	69,800	135,710	29,780	79,400	29,000
	<u>592,800</u>	<u>1,676,070</u>	<u>410,180</u>	<u>949,700</u>	<u>387,200</u>
	856,900	1,379,980	417,040	989,600	325,300

	<u>4 Mile.</u>	<u>Carrollville</u>	<u>College</u>	<u>Milwaukee</u>	<u>T.M.E.R. & L.Co.</u>
January	100,040	78,100	123,500	250,200	112,506
February	90,550	68,850	111,450	214,200	111,935
March	95,090	75,500	110,300	199,900	115,505
April	92,170	71,900	98,450	188,900	117,309
May	92,460	66,350	101,350	181,900	106,165
June	93,470	72,600	96,300	178,500	105,473
July	90,560	74,050	97,350	172,900	102,458
August	82,890	69,350	99,000	181,500	90,055
September	95,550	84,240	98,650	189,900	81,471
October	100,260	92,610	112,450	191,300	76,455
November	91,710	90,800	114,250	185,200	121,357
December	92,320	99,200	115,550	207,000	122,980
	<u>1,115,380</u>	<u>945,550</u>	<u>1,279,500</u>	<u>2,341,400</u>	<u>1,264,669</u>
	897,070	1,112,830	1,038,720	1,780,600	1,092,720

POWER STATISTICS FOR YEAR 1929.

A. C. Power Furnished to Wisconsin.

	<u>W. Harbor.</u>	<u>Beach.</u>	<u>Milwaukee.</u>
January	184,642	413,090	626,052
February	163,782	382,947	544,446
March	184,359	319,943	592,006
April	172,624	229,103	600,822
May	174,450	228,477	640,900
June	188,700	289,500	609,464
July	175,100	271,400	630,112
August	191,400	295,100	636,724
September	168,600	317,300	651,978
October	182,900	365,200	654,704
November	182,600	301,000	605,795
December	178,700	351,900	646,922
	<u>2,150,867</u>	<u>3,755,960</u>	<u>7,429,935</u>

Input A.C. K.W.H.	13,356,762
Output D.C. K.W.H.	9,700,580
Efficiency	.726

POWER STATISTICS FOR YEAR 1929.

Maximum Demand.

	<u>P.S.D.C.</u>	<u>P.S. A.C.</u>	<u>Milw. A.C.</u>	<u>Total.</u>
January	5,706	1,461	1,500	8,667
February	5,885	1,576	1,500	8,961
March	5,693	1,168	1,500	8,361
April	6,335	1,091	1,500	8,926
May	6,215	1,118	1,500	8,833
June	6,147	1,208	1,500	8,855
July	5,982	1,261	1,500	8,743
August	5,810	1,420	1,500	8,730
September	5,787	1,432	1,500	8,719
October	6,490	1,490	1,500	9,480
November	6,807	1,535	1,500	9,842
December	7,213	1,473	1,500	10,186
	<u>74,070</u>	<u>16,233</u>	<u>18,000</u>	<u>108,303</u>

Average Monthly K.W. Demand for Year.

Public Service	D.C.	74,070	÷ 12	=	6172.5	K.W.
Public Service	A.C.	16,233	÷ 12	=	1352.7	K.W.
T.M.E.R. & L.	A.C.	18,000	÷ 12	=	1500.	K.W.
System	A.C. & D.C.	108,303	÷ 12	=	9025.2	K.W.

POWER STATISTICS FOR YEAR 1929.

Substation Equipment.

<u>Substation.</u>	<u>Installed Capacity</u>	<u>Number of Units.</u>
Miles Center	2000	1
#1	1500	1
#2	1500	1
#3	1000	1
#4	1500	1
#5	1000	2
Liberty Lake	1000	1
Winnetka	1500	1
Ravinia	1000	1
Fort Sheridan	1500	1
Lake Bluff	1500	1
North Chicago	1800	3
Beach	1000	1
Winthrop Harbor	1200	1
Total Illinois	19000	17
McKeown	1000	2
Kenosha	1000	1
Rose	1000	1
Racine	1000	2
Quarry	500	1
Four Mile	500	1
Carrolville	1000	2
College	500	1
Milwaukee	2000	2
Total Wisconsin	8500	13
Total System	27500	30

Note: All substations are rotary converter stations, except #5, which is a mercury arc rectifier station.

ELECTRICAL DEPARTMENT ANNUAL REPORT
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Automatic Crossing Signals.

Maintained	29
Installed	0

Crossing Annunciator Bells.

Maintained	11
Installed	0

Crossing Warning Bell, Electric.

Maintained	28
Installed	1

Electric Lighted Crossings.

Maintained	79
Installed	3

Poles & Fixtures, Wood Construction.

Maintained double track miles	76.4
Installed	0

Sidings & Yards, Wood Construction.

Maintained single track miles	36.41
Installed " " "	3.7

Poles & Fixtures, Steel Construction.

Maintained double track miles	2.78
Maintained single track miles	20.28
Installed " " "	.40

Poles & Fixtures, Steel Bridge Construction.

Maintained double track miles	22.1
Installed " " "	0

Feeder Cable Maintained.

Maintained single wire miles	158.1
Installed " " "	5.75

Trolley Wire Direct Suspension.

Maintained single track miles	206.25
Installed " " "	3.9
Replaced " " "	30.

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Compound Catenary Contact System.

Maintained double track miles	21.57
Installed " " "	0

Simple Catenary Contact System.

Maintained single track miles	1.99
Installed " " "	0

Rail Bonding.

Maintained single track miles	233.61
Installed " " "	3.9

Electric Lighted Passenger Stations.

Maintained	67
Installed	0

Electric Lighted Freight Stations.

Maintained	12
Installed	0

Electric Lighted Shelters.

Maintained	34
Installed	8

Electric Lighted Shops & Car Houses.

Maintained	3
Installed	0

Electric Lighted Miscellaneous Buildings.

Maintained	28
Installed	2

Electric Lighted Station Platforms.

Maintained	191
Installed	10

Electric Lighted Substation Buildings.

Maintained	9
Installed	0

Electric Lighted Office Buildings.

Maintained	2
Installed	0

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Electric Lighted Freight Yards.

Maintained	3
Installed	0

Electric Lighted Terminal Yards.

Maintained	4
Installed	1

Automatic Substations.

Maintained	6
Installed	0

Manual Substations.

Maintained	4
Installed	0
Operated	4

Transmission Lines, 60 Cycle, 23000 Volt.

Maintained miles of 3 wire line	31.9
Installed	0

Transmission Lines, 25 Cycle, 22000 Volt.

Maintained miles of 3 wire line	48.1
Installed miles of 3 wire line	0

Transmission Lines, 60 Cycle, 3300 Volt.

Maintained miles of two wire line	12.3
Installed	0

Transmission Lines, 60 Cycle, 2300 Volt.

Maintained miles of two wire line	17.5
Installed " " " " "	1.23

Transmission Lines, 25 Cycle, 13200 Volt.

Maintained miles of three wire line	2.37
Installed " " " " "	0

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Construction Work Performed

A.F.E.

- 2836 Installed 2300 Volt Transmission Line from Dempster Street to Oakton Street on Niles Center Line.
- 2852 Installed Ticket Agent's Signal Bell at Belmont Ave. Station.
- 2854 Purchased two steel poles which were set in place, from T.M.E.R. & L.Co.
- 2853 Installed 5 $\frac{1}{2}$ miles of 500,000 C.M. feeder cable from Rapids Road to a point 5 $\frac{1}{2}$ miles north.
- 2894 Installed floodlighting system in the Harrison Street Yards, Milwaukee.
- 2909 Installed lighting main from Milwaukee Ave. to Diamond Road, and light clusters at Stewart Ave., Garfield Ave. and Diamond Road, on Libertyville Line.
- 2924 Purchase of 37 $\frac{1}{2}$ K.V.A. transformer, 35' pole with 7500 volt switch and lines at Highwood Office, so power used for lighting would be billed at power contract rates.
- 2931 Installed trolley wire and necessary curve suspension on 300 feet of track to Soo Line, at Mundelein.
- 3006 Install necessary insulation and switches, so that power can be cut off of unloading track and track insulated while gasoline cars are being unloaded at Libertyville.
- 3007 Install necessary insulation and switches, so that power can be cut off of unloading track, and track insulated while gasoline cars are being unloaded at Grand Ave., Waukegan, Ill.
- 3008 Install necessary insulation and switches, so that power can be cut off of unloading track, and track insulated while gasoline cars are being unloaded at Kenosha Siding.
- 3004 Install necessary insulation and switches, so that power can be cut off of unloading track, and track insulated while gasoline cars are being unloaded at Racine Siding.

ELECTRICAL DEPARTMENT ANNUAL REPORT
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Construction Work Performed

A.F.E.

- 2960 Dismantled Electrical Equipment in the old 25 Cycle Highwood Substation, and retired same from Capital Account.
- 2886 Installed poles and direct suspension trolley wire in order to electrify 375 feet of Blow Siding.
- 2826 Installed poles and direct suspension trolley wire in order to electrify 1500 feet of loading track at Edison Court, Waukegan.
- 2933 Installed poles and direct suspension trolley wire in order to electrify 315 feet of Wagner Siding.
- 2931 Installed poles and direct suspension trolley wire in order to electrify 670 feet, Mundelein Passing Track.
- 2922 Installed poles and direct suspension trolley wire in order to electrify 2400 feet of siding, Glen Rock, Waukegan.
- 2945 Installed poles and direct suspension trolley wire in order to electrify 825 feet of siding for West Racine Fuel Co.
- 2945 Installed poles and direct suspension trolley wire in order to electrify 500 feet of siding on Sorenson Siding, Racine.
- 2884 Installed poles and direct suspension trolley wire in order to electrify 6987 feet of Industrial Track at Dundee Road.
- 2926 Installed poles and trolley wire direct suspension in order to electrify 1071 feet of new Waukegan Loop.
- 2961 Installed poles and trolley wire direct suspension in order to electrify 1184 feet of Industrial track at 12th Street, North Chicago.
- 2951 Installed poles and trolley wire direct suspension in order to electrify 2550 feet of Interchange Track at Racine Wye.
- 2883 Installed poles and direct suspension trolley wire in order to electrify 2000 feet of yard tracks in Pettibone Yards.