

ELECTRIC POWER DEPARTMENT
ANNUAL REPORT
YEAR 1954

The Cliffs Power & Light Company disposed of its transmission and distribution facilities and ceased to serve all of its customers except those affiliated with and operated by The Cleveland-Cliffs Iron Company on December 16, 1953. The purchaser of these facilities was the Upper Peninsula Power Company of Houghton, Michigan. Having been relieved of the obligation to furnish electric power and energy to anyone other than The Cleveland-Cliffs Iron Company, The Cliffs Power & Light Company was dissolved on January 29, 1954, and the generating and other facilities for power production which had formerly constituted The Cliffs Power & Light Company became the Electric Power Department of The Cleveland-Cliffs Iron Company. Throughout the year, however, the system which had formerly constituted The Cliffs Power & Light Company continued to operate as an integrated unit and all of the energy which was used by that system was furnished from the plants of The Cleveland-Cliffs Iron Company and from the purchase power sources which had formerly been available to The Cliffs Power & Light Company. Because of this situation, the power and energy producing facilities for the entire system will, in this report, be discussed as a unit and compared directly with the previous year's performance.

Total energy generated and purchased during the year 1954 amounted to 174,829,275 Kwh, which was 1.72% greater than that generated and purchased during the year 1953. Of this amount, 90,923,875 Kwh were generated by the hydro plants, 58,131,000 Kwh by the Steam Plant, 15,842,400 Kwh by the Diesel Plant, and 9,932,000 Kwh were purchased. Precipitation during the year amounted to 33.77", which is approximately normal, and the hydro production of almost 91,000,000 Kwh was higher than would be normally anticipated with the precipitation which occurred. In addition to the amount which was generated from this precipitation, the water in storage at the end of the year 1954 amounted to approximately 24,000,000 Kwh, which was 5,000,000 Kwh more than was in the reservoirs at the beginning of the year. This brings the total hydro production which will ultimately be realized from the precipitation during the calendar year up to approximately 96,000,000 Kwh. Kilowatt hour uses from the system during the year 1954 amounted to 158,155,664 Kwh, which was an increase of 2% above the corresponding figure last year. Of this amount, The Cleveland-Cliffs Iron Company distributed to its users 77,684,159 Kwh or 49%, the remainder going to the Upper Peninsula Power Company for distribution to its customers. The increase in kilowatt hours used was held to the small amount shown due to the fact that The Cleveland-Cliffs Iron Company reduced its production schedule of mining operations in the early part of the summer and this reduction was reflected in the energy uses of the mines.

Construction has gone forward on the Upper Peninsula Generating Company's new Presque Isle Station at Marquette. The original estimates for this station anticipated that it would be completed and placed in commercial operation by January 1, 1956. However, progress of the work and delivery of materials have been such that this completion has been pushed forward until at the present time it seems that the plant will be placed in commercial operation some time during the month of September, 1955. At the end of the year the construction of the building had progressed far enough to completely house all of the indoor construction, erection of some of the auxiliary apparatus had taken place, and delivery of the boiler and turbine was scheduled for the middle of January. The major portion of the work will be conducted inside of the building during the winter months and the availability of this building will mean that construction work can progress with anticipated rapidity, and it is believed that it will be easy to comply with present construction schedules.

Difficulty had been experienced in the Ishpeming Diesel Plant for some time with cracking which occurred in the engine blocks and frames. This cracking had progressed so far on #8 engine that when inspected in January by representatives of the General Motors Corporation, it was decided that it would be necessary for that engine to be repaired before it could be operated extensively. Accordingly, in February a welding specialist and metallurgist were sent to us from the Cleveland plant of the General Motors Corporation. These men worked on the #8 engine and while they were in town also inspected and worked upon several other engines in the plant which were showing difficulties due to cracking. While here also, the metallurgist assisted in the redesign of the foundations and, after they left, our employees proceeded to reinforce the present bedplates upon which the engines were setting and to regrout all of the engines on the west side of the plant. It is felt that this was a very good preventive measure to assist us in avoiding future difficulties with the engine blocks and frames and that the repairs which were made will, with the foundation revisions, avoid future difficulties of this nature.

In years of previous operation, considerable engine shutdown time was caused by the Harrison radiator type oil coolers in the Diesel Plant. There are very small oil passages in this type of cooler and the tendency of these passages to become clogged was so great that it was necessary to shut down the engines and clean them out at short intervals. To avoid this difficulty, a complete set of ten tube type oil coolers was ordered for the Diesel Plant. Installation of these coolers was started in March and was completed in June. It is anticipated that this type of cooler will be practically trouble-free.

On August 26, there was an oil failure in the #10 engine at the Diesel Plant which resulted in failure of all of the bearings, etc. and practically the destruction of all lubricating surfaces. The engine was torn down and completely rebuilt, including the purchase and installation of a new crankshaft for the engine. This engine was not completely repaired and placed back into operation until early in the month of November.

On September 30, there was a failure of the main bearings in #6 engine at the Diesel Plant which destroyed four bearings and scored the crankshaft of that engine badly. Although it is not known exactly what caused this failure, it was fortunately discovered early enough to prevent complete destruction of the engine as occurred in the #10 engine. The engine was taken out of service immediately, but no attempt was made to dismantle it and make extensive investigations until the #10 engine was placed back in service in November.

All of the Diesel engines are provided with a safety trip which is supposed to shut the engine down in case of low oil pressure or failure in the lubricating oil supply. This apparatus is actuated by the closing of an electrical circuit which trips the necessary relays at various points in the engine operating mechanism. If for any reason such as dirty contacts or wires broken due to vibration, etc. the circuit is unable to close, the machine continues to operate in spite of the incorrect lubrication. To correct this situation we have made plans to change this tripping mechanism so that it will be actuated by the opening of an electrical circuit. In other words, at all times when the engine is operating the circuit will be closed, but if lubrication difficulties arise, the low pressure will open the circuit and the engine will be shut down. This is a much more positive method than the one employed at the present time, and we hope that it will avoid such difficulties as were experienced in the #6 and #10 engines.

Difficulties were experienced in the Ishpeming Steam Station with the temporary wall which was installed on the east side of the station. This wall was constructed of Galbestos material which was purchased from the H. H. Robertson Company, and it was found during the summer that the material was cracking badly. This was called to the attention of the company from which the purchase was made and they sent their workmen to Ishpeming and applied an entirely new coating to the entire east wall of the building during the early part of July. It is anticipated that this application of a new coating will correct the difficulties which have been experienced in the past.

On July 17, the Ishpeming Steam Station was shut down in order to permit boiler inspection by both the insurance company and by a representative of the Riley Stoker Corporation. This boiler was inspected by these people on July 18 and was put back into service on July 19. The representative from the Riley Stoker Corporation stayed in Ishpeming until August 6 for the purpose of making tests on the boiler, varying the fly ash disposal and reinjection cycle. The fly ash disposal system was installed during the summer of 1953 and has been successful in helping to eliminate a good many of the difficulties which had been previously experienced in the boiler furnace. The tests which were conducted by the Riley Stoker Corporation were made to obtain information for their Design Department on this type of an installation.

On August 17, there was a rupture of one superheater tube and two steam generator tubes in the boiler in the Ishpeming Steam Station. This necessitated immediate shutdown of the unit which was out of service until August 28, during which time repairs to it were made. The repairs necessitated the services of Mr. T. H. Pentecost of the Riley Stoker Corporation in Chicago and a certified welder for the Riley Stoker Corporation who came from Paducah, Kentucky. The report on the failure was made to the American Motorists Insurance Company who later informed us that they accepted the failure as being an accident occurring to the boiler and would assume such liability therefor as was called for under their insurance policy with us. No settlement had been made by the end of the year, but it is anticipated that a discussion of this matter will be held early in 1955. At the time that the boiler was shut down, opportunity was taken to reinforce other places in the boiler which would be subject to the same type of failure, and it was also discovered that there had been numerous failures of air preheater tubes which were unnoticed in the former shutdown and inspection. All of these tubes were replaced during the shutdown.

Intrusion-Prepakt began work on the Carp pipeline on June 6 and proceeded as rapidly as possible with the repair of that pipeline in an effort to get all of the leaks stopped and the repairs completed during the summer. This was completed during the month of July and the construction gang that had been doing that work was moved from there to the Hoist Plant to repair deteriorated concrete on the discharge side of the plant near the water line. The crew was then moved to the AuTrain Plant to remove a wall supporting the pipeline under the L.S. & I. bridge and install new supports for that pipeline. All of this work was completed in the early part of September, and it is not anticipated that it will be necessary to use this company in the coming year.

In September, 1953, the necessary switchboard equipment to convert the #2 and #3 hydroelectric generators at the Hoist Plant to automatic operation was ordered from Westinghouse Electric Corporation. This equipment was scheduled to arrive early in the summer of 1954, but delivery was somewhat delayed. However, delivery was made during the fall of 1954 and work was started immediately

to convert the plant from manual operation, as it has been up until the present time, to automatic control. Installation of the equipment was completed in the early part of December and the plant was operated on a trial basis until the first of the year, at which time it was placed on an automatic operating schedule. There were originally at this plant a Chief Operator and four shift operators. One of the shift operators was transferred to the McClure Plant to replace an operator who was brought to the Ishpeming Steam Station and two of the other shift operators were brought into the Ishpeming Steam Station which permitted the reduction of forces in the Hoist Plant by three men. It is anticipated that this operation will be as satisfactory in the future as has that of our other automatic plants and that a similar change to automatic equipment in the McClure Plant can be made, possibly in the year 1956.

At the time the retroactive wage settlement was made in the fall of 1952, there was a grievance filed on the manner in which the Company calculated the amounts of these payments. This grievance was carried to arbitration and a decision was rendered against the Company. The checks covering the re-calculation of this pay were mailed to employees on February 9, the total amount of the payments being approximately \$2,000.00.

In May an agreement was signed by the Electric Power Department of The Cleveland-Cliffs Iron Company with the United Steelworkers of America, retroactive to January 29, under which the Company and the Union agreed that all the terms and conditions of the labor agreement and pension and insurance agreement in effect at the time of the dissolution of The Cliffs Power & Light Company would be assumed by the Electric Power Department of the Company. The labor agreement thus adopted expired October 14, 1954, and several meetings were held with the Union to discuss the terms of the new agreement. The final meeting was held on October 14, at which time it was agreed that a new contract would be signed between the Union and the Electric Power Department, and all of the features of this new agreement were agreed upon with the exception that certain sections were dependent upon an agreement which would be reached at a later time between the Mining Department of the Company and the Union. At the end of the year the final agreement on the details of this latter contract had not been reached and for that reason the contract with the Electric Power Department was being held in abeyance. As soon as the contract for the Mining Department is completed, the contract with the Electric Power Department will be signed. The granting of the pay increase equivalent to that which was given by the Mining Department to its employees on July 1, 1954, was contingent on the signing of the satisfactory agreement with the Electric Power Department. Since this agreement had not been signed up to the first of the year, the retroactive pay has been accumulated since July 1 and will be payable whenever the final agreement is executed.

ELECTRIC POWER DEPARTMENT
STATISTICAL DATA - 1954

	<u>McClure</u>	<u>Hoist</u>	<u>Carp</u>	<u>AuTrain</u>	<u>Republic</u>	<u>Escanaba</u>	<u>Total Hydro</u>	<u>Steam</u>	<u>Diesel</u>	<u>Total Generated</u>
Jan.	4,074,000	1,454,000	1,171,000	226,600	137,500	252,000	7,315,100	4,841,000	889,900	13,046,000
Feb.	4,504,000	1,570,000	938,000	312,000	74,800	227,000	7,625,800	4,456,000	447,000	12,528,800
Mar.	4,425,000	1,454,000	800,000	485,800	88,500	260,000	7,513,300	5,113,000	1,296,000	13,922,300
Apr.	3,119,000	960,000	1,867,000	714,700	216,700	648,000	7,525,400	4,245,000	1,020,900	12,791,300
May	3,383,000	1,203,000	1,680,000	809,900	331,600	1,035,000	8,442,500	5,292,000	1,376,800	15,111,300
June	3,092,000	1,104,000	1,496,000	588,600	379,300	652,000	7,311,900	5,396,000	1,009,600	13,717,500
July	3,455,000	1,272,000	906,000	467,400	210,100	517,000	6,827,500	4,776,000	1,598,900	13,202,400
Aug.	4,010,000	1,516,000	1,126,000	259,800	99,000	344,000	7,354,800	4,733,000	1,237,600	13,325,400
Sept.	4,024,000	1,469,000	1,733,000	136,000	72,700	314,000	7,748,700	3,565,000	1,973,900	13,287,600
Oct.	3,574,000	1,348,000	2,084,000	104,800	243,600	750,000	8,104,400	4,975,000	1,870,300	14,949,700
Nov.	3,508,000	1,274,000	1,714,000	337,800	316,300	633,000	7,783,100	5,194,000	1,585,500	14,562,600
Dec.	<u>3,518,000</u>	<u>1,337,875</u>	<u>1,396,000</u>	<u>499,300</u>	<u>209,200</u>	<u>411,000</u>	<u>7,371,375</u>	<u>5,545,000</u>	<u>1,536,000</u>	<u>14,452,375</u>
	44,686,000	15,961,875	16,911,000	4,942,700	2,379,300	6,043,000	90,923,875	58,131,000	15,812,400	164,897,275

ELECTRIC POWER DEPARTMENT

STATISTICAL DATA - 1954

	<u>Total Generated</u>	<u>Purchased</u>	<u>Total Gen. and Purch.</u>	<u>Station Use</u>	<u>Net Energy For Load</u>	<u>Used by C.C.I. and U.P. Power</u>	<u>Losses - Jointly Used System</u>
Jan.	13,046,000	432,000	13,478,000	404,420	13,073,580	11,298,799	1,774,781
Feb.	12,528,800	750,000	13,278,800	379,980	12,898,820	12,494,095	404,725
Mar.	13,922,300	661,000	14,583,300	427,909	14,155,391	13,221,683	933,708
Apr.	12,791,300	643,000	13,434,300	394,500	13,039,800	12,218,769	821,031
May	15,111,300	850,000	15,961,300	413,920	15,547,380	14,650,556	896,824
June	13,717,500	821,000	14,538,500	407,670	14,130,830	13,272,016	858,814
July	13,202,400	802,000	14,004,400	361,297	13,643,103	12,796,430	846,673
Aug.	13,325,400	1,680,000	15,005,400	375,327	14,630,073	13,554,533	1,075,540
Sept.	13,287,600	1,094,000	14,381,600	292,806	14,088,794	13,994,561	94,233
Oct.	14,949,700	824,000	15,773,700	399,345	15,374,355	14,724,928	649,427
Nov.	14,562,600	759,000	15,321,600	396,880	14,924,720	14,376,006	548,714
Dec.	<u>14,452,375</u>	<u>616,000</u>	<u>15,068,375</u>	<u>417,595</u>	<u>14,650,780</u>	<u>14,212,658</u>	<u>438,122</u>
	164,897,275	9,932,000	174,829,275	4,671,649	170,157,626	160,815,034	9,342,592

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STATISTICAL DATA - 1954

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Precipitation -	1.23	0.89	2.38	4.00	3.73	3.43	1.80	2.34	6.46	4.01	2.50	1.00
Total precipitation at Ishpeming during 1954 - 33.77" (2.814 ft.)												
Average "	"	"	Marquette	- 32.80" (46 year record)								

CARP RIVER PLANT:

Drainage area above intake dam													66.66 sq. miles
Cubic feet precipitation in 1954													5,229,465,000
Kilowatt hours generated in 1954													16 911 000
Cubic feet water utilized in 1954 (90 cu. ft. - 1 Kwh)													1 521 990 000
" " " wasted over intake dam in 1954													87 336 000
" " " in Carp storage Dec. 23, 1953													224 160 000
" " " " " " " Dec. 20, 1954													389 076 950
" " " added to Carp storage in 1954													164 916 950
Total run-off in 1954 (cubic feet)													1 774 242 950
Run-off per sq. mile of drainage area (cubic feet)													26 616 305
Second-foot run-off													0.843
	<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>
Total Precip.	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
Sec.-ft. Run-off	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
	<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>
Total Precip.	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
Sec.-ft. Run-off	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
	<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>
Total Precip.	33.58	30.34	32.20	34.26	32.04	32.77	30.81	26.12	32.88	22.87	37.23	30.64	43.50
Sec.-ft. Run-off	1.47	1.05	0.83	0.84	1.17	0.70	0.81	0.56	0.88	0.44	0.77	1.09	1.54
	<u>1952</u>	<u>1953</u>	<u>1954</u>										
Total Precip.	24.35	35.42	33.77										
Sec.-ft. Run-off	0.69	0.85	0.84										

McCLURE PLANT:

Drainage area above intake dam													140.52 sq. miles
Cubic feet precipitation in 1954 (Hoist Plant - 38.13"-3.17')													12,449,728,457
Kilowatt hours generated in 1954													44 686 000
Cubic feet water utilized in 1954 (125 cu. ft. - 1 Kwh)													5 371 625 000
" " " wasted over intake dam in 1954													0
" " " in Hoist storage basin Dec. 23, 1953													1 587 952 000
" " " " " " " " Dec. 20, 1954													1 962 348 484
" " " increase in 1954													374 396 484
" " " in Silver Lake Dec. 23, 1953													0
" " " " " " " " Dec. 20, 1954													0
" " " taken from Silver Lake in 1954													0
Total run-off in 1954 (cubic feet)													5 746 021 484
Run-off per sq. mile of drainage area (cubic feet)													40 891 129
Second-foot run-off													1.297
	<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>
Total Precip.	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
Sec.-ft. Run-off	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
	<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>
Total Precip.	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
Sec.-ft. Run-off	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
	<u>1947</u>	<u>1948</u>	<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>					
Total Precip.	37.27	28.81	43.28	40.65	50.90	29.27	41.56	38.13					
Sec.-ft. Run-off	1.22	0.78	1.24	1.37	2.09	0.97	1.33	1.29					

PRECIPITATION BY YEARS



