

ELECTRIC POWER DEPARTMENT
ANNUAL REPORT
YEAR 1959

The Cleveland-Cliffs Iron Company produced 134,621,579 Kwh in its electric generating plants during the year 1959. This was an increase of approximately 1% above the amount generated during the year 1958. Of the amount generated 101,002,425 Kwh were billed directly to our Company and were used as follows: The Cleveland-Cliffs Iron Company used 28,239,102 Kwh (28.0%); The Athens Iron Mining Company used 569,640 Kwh (0.5%); The Humboldt Mining Company used 590,169 Kwh (0.6%); The Negaunee Mine Company used 26,770,043 Kwh (26.5%); The Marquette Iron Mining Company used 39,726,422 Kwh (39.3%); and Upper Peninsula Power Company used 5,107,049 Kwh (5.1%). Of this energy 72.1% was produced in our hydroelectric plants, 0.2% in our Ishpeming Diesel Electric Station, and 27.7% was produced by the Presque Isle Station of Upper Peninsula Generating Company.

Our Company billed to Upper Peninsula Power Company 5,107,049 Kwh during 1959. Of this amount 4,857,431 Kwh consisted of excess hydroelectric energy supplied on a special agreement to be described later. Our Company sold to Upper Peninsula Power Company for its load requirements only 249,618 Kwh, all supplied from the Ishpeming Diesel Plant for emergency service. This figure compares with 9,097,760 Kwh supplied from our plants in 1958, a reduction of 97.5%. In addition to the energy billed by us, the Power Company was billed by Upper Peninsula Generating Company for 33,619,154 Kwh which it used from the portion of the output of the Presque Isle Station to which we were entitled. This was an increase of 82.3% above the amount taken from that source last year. The Power Company put a steam generating station of 26,000 KW capacity into operation in Escanaba late in 1958. This plant made them practically independent of both our wholly owned facilities and that portion of the output of the Presque Isle Plant to which we were entitled. In order to encourage the use of the Presque Isle Plant (to obtain better economy and have the Power Company bear a portion of our idle equipment costs in that plant) a special agreement was made in the latter part of 1958. This agreement waived a portion of the fixed charges of the Presque Isle Plant which Upper Peninsula Power Company would assume by using energy from that plant above the half of the theoretical annual output to which we were entitled. Because of this agreement the Power Company operated only one of the two units available in the Escanaba Plant and increased its utilization of the energy produced by the Presque Isle Plant. Placing of the John H. Warden Station at L'Anse in operation in the latter part of this year made the Power Company still more independent of our energy generating facilities as a source of supply.

Our Company and others operated by it used 95,895,376 Kwh during the year which was a reduction of 9.4% below the amount used in the previous year. Energy use in 1958 was a reduction of nearly 20% below that used in 1957, putting this past year nearly 30% below the 1957 energy use. Continued idleness of the Humboldt Mine was a major cause of this situation as was the strike in the iron mining industry, which lasted for nearly four months. The operation of the Humboldt Mine used 16,196,014 Kwh during its last full year of operation (1957) and it is estimated that the reduction in energy used because of the strike period amounted to approximately 32,000,000 Kwh. This total reduction in energy consumption by our mining operations of approximately 35,000,000 Kwh below that required in 1957 left much idle equipment on which fixed charges in idle equipment costs were experienced. A full year of operations in 1960 and the resumption of operations by the expanded Humboldt property will do much to remedy this situation in the coming year.

O.K.
10/10/59

Of the energy required for mining operations The Cleveland-Cliffs Iron Company and The Athens Iron Mining Company obtained their entire requirements from energy generated by the hydroelectric facilities. The Negaunee Mine Company, The Humboldt Mining Company and The Marquette Iron Mining Company received 58.2% of their energy requirements from the hydroelectric generating facilities and 41.8% of their requirements from the Presque Isle Plant of Upper Peninsula Generating Company. This latter amount was only 27% of our Company's share of the amount which would be considered a normal annual output of that plant.

Both operations and costs were seriously upset by the strike in the iron ore mining industry. During the period up to July 15th our Company's operations used between 10,000,000 and 11,200,000 Kwh a month. This energy requirement absorbed all available hydro production and utilized part of the output of the Presque Isle Station to which we are entitled. Although we had ample water to furnish a normal production of approximately 7,500,000 Kwh a month from hydroelectric generating facilities during the strike period it was necessary to curtail production during that time to approximately 2,500,000 Kwh a month, which was the entire energy requirement of all of the facilities operated by our Company. As a result, heavy precipitation beginning in August resulted in our filling our reservoir storage capacity and wasting water over the intake dams of all of our generating stations.

In order to minimize the water being wasted we made an arrangement with Upper Peninsula Power Company which permitted us to run our plants to capacity during this period with the understanding that they would use the power we did not require in our operations for furnishing a portion of their load requirements. This agreement provided that we could, at a later date after normal operations at the mines were resumed, draw upon their facilities for an equal amount of energy. To facilitate accounting an arbitrary charge of \$.005 per Kwh would be made by each company to the other, which would result in no actual exchange of money between the companies.

As a result of the curtailment hydroelectric operations during the strike period and the heavy precipitation in the fall we ended the year with water equivalent to approximately 40,000,000 Kwh in our storage reservoirs, and 4,857,431 Kwh available at \$.005 per Kwh from Upper Peninsula Power Company under the agreement mentioned in the previous paragraph. This reserve amount of electric energy available to us at a very small cost compares with 14,000,000 Kwh which we had in storage at the beginning of 1959. These conditions should materially help hydroelectric production and energy costs in 1960.

Precipitation for the year was 36.90 inches, which is slightly above normal and the highest since 1951 when it was 43.50 inches. Precipitation in the previous four years has been below 31 inches and it is felt that we are now in a wet cycle and will enjoy average or better than average water conditions for the next two or three years. Of the precipitation received this year 65% was received during the four months of the year when the mines were closed because of the strike.

Because of the reduced energy requirements from our generating facilities by our Company and by the Power Company the Ishpeming Steam Plant, which had not been operated since May 1958, remained inactive during 1959. The Ishpeming Diesel Plant was kept in readiness for operation in emergencies but was inactive for most of the year. A total of 249,618 Kwh were generated in the Diesel Plant during the year. This production is the equivalent of about 25 hours' operations at full load. All of the operations were for short periods during emergencies.

The unit charge to our Company for the wheeling of electric energy over the transmission system of Upper Peninsula Power Company increased approximately 10%

above the amount charged during the previous year. This increase was caused almost entirely by the decrease in the quantity of energy carried over the jointly used system during the period and by the fact that our small utilization of energy during the strike period resulted in us paying minimum bills for four months of the year. The actual cost of operating the jointly used system, including fixed charges and the earnings on the investment of Upper Peninsula Power Company, amounted to \$438,291.00 during 1959, compared with \$435,392.00 during the previous year. The amount of energy handled over the system during 1959 was 204,497,806 Kwh whereas during 1958 it was 215,702,582 Kwh. In addition to the increase in unit cost which was caused by both the slight increase in expense and the decrease in energy transmitted, we paid minimum bills during four months of the year. These minimum bills increased our wheeling cost \$28,000 above that which would have been paid during the year if the contract had contained no minimum bill provision. In spite of this increase in unit cost of wheeling charges and the minimum bills, the actual money paid for the use of the transmission system during 1959 was \$211,742.00, compared to \$214,272.00 in 1958, which is a reduction of 1.2%.

The output of the Presque Isle Plant of Upper Peninsula Generating Company during the year amounted to 138,146,300 Kwh, an increase of 20% above the amount generated in 1958. This increase in output resulted in a reduction in unit operating costs from \$.005193 per Kwh in 1958 to \$.004821 per Kwh during the past year, a reduction of 5%. The overall unit rate was reduced from \$.00876 to \$.00825 per Kwh (5.7%) for the same period. This reduction was reflected in the unit cost to our Company which fell from \$.01376 to \$.01232 per Kwh, a reduction of approximately 10%. In order to take income tax advantage of the change in assessment date of Michigan taxes, the 1959 costs of energy included a double expense for taxes amounting to approximately \$79,000. The burden of the fixed charges carried by our Company when we do not utilize our portion of the plant capacity is illustrated by the fact that of the overall cost of operating this plant approximately \$.00343 per Kwh (40%) consists of fixed charges, whereas the fixed charges billed to our Company amount to \$.00750 per Kwh (61%) of the total unit cost of energy.

Fixed costs which are independent of the amount of electric energy produced comprises a large portion of the total production costs of the electric energy generated in our power plants. The reduced energy utilization during the strike period increased the amount of these costs applicable to each unit of energy utilized. On the operation of our wholly owned plants (not considering compensation for the use of facilities) this increase was not as pronounced as it was to our associates because they carried the fixed charges on the Presque Isle Plant in addition to a proportionate part of the idle equipment costs of the Ishpeming Steam and Diesel Plants. Had it not been for the reduced operations in the strike period it would have been possible to utilize more of the available capacity in both our hydro plants and in the Presque Isle Plant which would have resulted in an overall annual cost to both our Company and our associates less than was obtained in 1958.

Notwithstanding the low energy utilization discussed previously we estimated that our Company, including the Athens Iron Mining Company, would have paid \$237,150.00 (92%) more had they purchased their energy requirements at utility rates prevailing in the area than was charged by the Power Department. The associated companies, however, would have paid \$7,510.00 less. For the overall operations of our Company and its associates the energy used during the year would have increased the costs of mining operations \$229,640.00 had it been purchased at prevailing utility rates. In addition to this savings in mining costs the Power Department obtained earnings after depreciation from Upper Peninsula Power Company and our associates amounting to \$275,024.00.

At the beginning of the year data was being collected on a proposed agreement between Upper Peninsula Power Company and our Company which was under consideration

as a replacement contract for the basic agreement under which we are now operating. Trial application of the principles of this proposed contract had revealed difficulties in the application and faults in the theory upon which the agreement was based. However, the immediate need for a new unit at the Presque Isle Station was still considered imminent and a revision of the basic agreement was necessary to provide the details under which such a unit would be installed. As the year progressed postponement of the additional capacity at the Presque Isle Plant made immediate revision of the present contract unnecessary. Difficulties in interpretation and in obtaining economical operating conditions under the basic agreement occurred from time to time but temporary procedures were agreed upon which reduced these difficulties. The result was that no action was taken on the new agreement during the year, but both parties agreed to do some serious work towards revising the agreement early in the coming year.

In the January meeting of Upper Peninsula Generating Company directors need for a new unit at the Presque Isle Station was still being considered necessary for operation early in 1962. However, by the time of the July meeting it was estimated that the new John H. Warden Plant, which the Upper Peninsula Power Company was placing in operation in the fall, would supply additional system generation until early in 1963. This meant that no immediate action need be taken on a second unit until after the current year. At the end of the year it was our opinion that our Company has sufficient capacity to satisfy our energy requirements even after the expansion of the production capacity at the Republic Mine. Any additional ore production facilities which are placed in operation subsequent to that expansion will, however, necessitate additional generating equipment. At the end of the year the exact timing of the expanded development of the Republic Plant was not definite.

The Electric Power Department has a labor agreement with the United Steelworkers of America which is separate from the contract between that Union and The Cleveland-Cliffs Iron Company's other operations. This contract expires October 15th instead of July 1st when the Mining Department agreement expires. As the expiration date of the Power Department agreement approached, Union officials agreed with that Department not to strike at the time of the expiration of the contract and agreed to extend the existing agreement. An agreement was signed to the effect that such an extension would be made under the condition that such changes in the Mining Department agreement as were made would be reflected in the Power Department agreement if they were applicable to the conditions set forth in the Power Department agreement. At the end of the year no specific agreement had been worked out between the Mining Department and the Union and, accordingly, no attempt had been made to execute a revised agreement for the Power Department.

Experience with the hydraulic generators at the McClure Plant continued to be satisfactory after the overhauling and reconditioning which was done in 1958. No serious difficulties were experienced in any of the Company's hydroelectric generating stations during the year. Difficulty was noticed during the month of January with automatic electrical equipment at the McClure and Escanaba Stations but the conditions were corrected by the installation of additional relay equipment. No further major changes were made nor overhaul of apparatus conducted during the year.

Early in the spring the Michigan State Highway Department indicated that they wished right-of-way to rebuild Highway M-28 in Alger County. This highway passes between our AuTrain Dam and the L.S. & I. Railway. We did not desire to grant full right-of-way privileges in this area because of the crowded conditions which existed and it was feared that if the construction work on the highway was not done properly and at the right period of the year it might adversely effect the stability and safety of the AuTrain Storage Dam. Accordingly, our Company worked with the Highway Department to give them an easement to do specific work in the area but did not grant any additional permanent right-of-way to them. This work will be done in an

agreed upon manner and will include additional drainage and maintenance facilities which we feel are desirable and which will be installed at Highway Department expense.

Original plans during the year had called for the Presque Isle Plant of the Upper Peninsula Generating Company to be shut down for annual inspection the latter part of April or early in May. Because of difficulties with the penstock of Upper Peninsula Power Company's Victoria Hydro Plant it was decided to have a shutdown of the Presque Isle Plant for boiler inspection and postpone the inspection of the turbo-generator until next year. Accordingly, the plant was taken out of operation on April 28 and remained out of service until May 3rd. Maintenance and inspection of the boiler, the coal pulverizing equipment, the draft fan, and many small items were accomplished at this time. Although as much of an inspection of the turbo-generator unit was made as could be conducted without dismantling it no complete dismantling and inspection of the unit was conducted. The inspection which was made, however, gave no indication of any difficulties or abnormal conditions existing in the unit. After the inspection the plant was operated with no prolonged shutdown until December 25th when a superheater tube in the boiler was ruptured. This failure necessitated the plant being out of service until December 30th. Sufficient capacity was available in other stations to supply load requirements and no curtailment of service was experienced.

During the month of February the penstock to Upper Peninsula Power Company's Victoria Plant failed and a considerable portion of the penstock was washed out. A failure had been experienced in this same penstock during 1958. The difficulty which occurred in February necessitated the plant being out of service from February 22nd until April 14th. This penstock was in very bad condition and Upper Peninsula Power Company decided that it was necessary to replace all of it in order to avoid expensive failures in the future. Accordingly, the plant was taken out of service in August and the work of dismantling and replacing the pipe was conducted until the middle of October. Because of voltage conditions in the Houghton territory it was necessary to run the Houghton Steam Station and to purchase energy from the White Pine Copper Company during the time that this station was out of service.

The John H. Warden Station of the Upper Peninsula Power Company at L'Anse was dedicated on October 14th. This station had been placed in operation previous to the dedication but trouble was experienced from time to time until the latter part of the year caused by thrash in the circulating water system. Dependable operation, however, was obtained early in November and the station has been operating as a source of energy for the Upper Peninsula Power Company. This station was constructed at the site of a new plant operated by the Celotex Company and supplies steam for processing in the Celotex plant as well as energy for its operation. The John H. Warden Station is estimated at a capacity of approximately 16,000 KW, of which the Celotex operations will require about 7,000 KW, leaving approximately 9,000 KW for system use. This plant adds to the Upper Peninsula Power Company's total generating facilities and makes its generating facilities adequate to supply its load requirements without utilization of our Company's energy producing facilities.

ELECTRIC POWER DEPARTMENT
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STATISTICAL DATA - 1959

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Precipitation -	.44	.61	1.57	1.86	2.82	2.98	6.25	6.98	4.82	5.91	1.13	1.53
Total precipitation at Ishpeming during 1959 -	36.90" (3.075 ft.)											
Average "	"	"	"	- 30.84" (47 year record)								

CARP RIVER PLANT:

Drainage area above intake dam	66.66 sq. miles											
Cubic feet precipitation in 1959	5,714,500,493											
Kilowatt hours generated in 1959	17,157,000											
Cubic feet water utilized in 1959 (90 cu. ft. - 1 kwh)	1,544,130,000											
" " " wasted over intake dam in 1959	95,400,000											
" " " in Carp storage Dec. 19, 1958	332,412,300											
" " " " " " " Dec. 21, 1959	899,028,000											
" " " increase in Carp storage in 1959	566,615,700											
Total run-off in 1959 (cubic feet)	2,206,145,760											
Run-off per square mile of drainage area (cubic feet)	33,095,496											
Second-feet run-off	1.044											

	1913	1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
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

	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
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

	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951
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

	1952	1953	1954	1955	1956	1957	1958	1959
Total Precip.	24.35	35.42	33.77	30.82	25.52	24.53	30.81	36.90
Sec.-ft. Run-off	0.69	0.85	0.84	0.93	0.77	0.687	0.748	1.044

McCLURE PLANT:

Drainage area above intake dam	140.52 sq. miles											
Cubic feet precipitation in 1959 (Hoist Plant - 41.91"-3.4925')	13,681,773,642											
Kilowatt hours generated in 1959	32,457,000											
Cubic feet water utilized in 1959 (125 cu. ft. - 1 kwh)	4,057,125,000											
" " " wasted over intake dam 1959	256,320,000											
" " " in Hoist storage basin Dec. 19, 1958	995,046,900											
" " " " " " " Dec. 21, 1959	2,006,029,000											
" " " increase in 1959	1,010,982,100											
" " " in Silver Lake Dec. 19, 1958	0											
" " " " " " " Dec. 21, 1959	1,020,000,000											
" " " increase in 1959	1,020,000,000											
Total run-off in 1959 (cubic feet)	6,344,427,100											
Run-off per square mile of drainage area (cubic feet)	45,149,638											
Second-feet run-off	1.424											

	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933
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

	1934	1935	1936	1937	1938	1939	1940	1941	1942	1943	1944	1945	1946
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

	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959
Total Precip.	37.27	28.81	43.28	40.65	50.90	29.27	41.56	38.13	35.70	31.71	28.78	28.95	41.91
Sec.-ft. Run-off	1.22	0.78	1.24	1.37	2.09	0.97	1.33	1.29	1.03	1.18	1.237	1.119	1.424

Average precipitation at Hoist Plant - 36.11" (39 year record)

ELECTRIC POWER DEPARTMENTSTATISTICAL DATA - 1959

Energy Delivered to Transmission System
by CCI Co. Generating Facilities

	Kwh Delivered to Lines			<u>Total</u>
	<u>CCICo.</u> <u>Hydro</u>	<u>CCICo.</u> <u>Diesel</u>	<u>UPGCo.</u> <u>Steam</u>	
Jan.	6,792,551	6,085	2,117,581	8,916,217
Feb.	6,468,865	4,050	4,122,743	10,595,658
Mar.	4,300,107	9,825	5,658,366	9,968,298
Apr.	6,128,369		4,292,935	10,421,304
May	8,053,489	227,270	2,819,769	11,100,528
June	6,618,138		4,549,716	11,167,854
July	5,510,724		3,816,460	9,327,184
Aug.	3,279,638			3,279,638
Sept.	2,454,591		88,365	2,542,956
Oct.	3,154,775			3,154,775
Nov.	9,382,744	2,388		9,385,132
Dec.	10,581,670		561,211	11,142,881
Total annual use by UPGCo. of CCICo. energy from UPGCo.	_____	_____	<u>33,619,154</u>	<u>33,619,154</u>
Total energy produced by CCICo. generating facilities	72,725,661	249,618	61,646,300	134,621,579

ELECTRIC POWER DEPARTMENT

STATISTICAL DATA - 1952

Utilization of Energy Delivered to
Transmission System by CCICo. Generating Facilities

	<u>Hydro</u> <u>Kwh</u>	<u>%</u>	<u>Diesel</u> <u>Kwh</u>	<u>%</u>	<u>UPGCo.</u> <u>Kwh</u>	<u>%</u>	<u>Total Kwh</u>	<u>% of</u> <u>Total</u>
The Cleveland-Cliffs Iron Co.	28,239,102	20.9					28,239,102	20.9
Athens Iron Mining Co.	569,640	0.4					569,640	0.4
Negaunee Mine Co.	15,586,177	11.6			11,183,866	8.3	26,770,043	19.9
Marquette Iron Mining Co.	23,129,700	17.2			16,596,722	12.3	39,726,422	29.5
Humboldt Mining Co.	343,611	0.3			246,558	0.2	590,169	.5
Upper Peninsula Power Co.	<u>4,857,431</u>	<u>3.6</u>	<u>249,618</u>	<u>0.2</u>	<u>33,619,154</u>	<u>25.0</u>	<u>38,726,203</u>	<u>28.8</u>
Total	72,725,661	54.0	249,618	0.2	61,646,300	45.8	134,621,579	100.0

ENERGY & POWER REQUIREMENTS C.C.I. CO. OPERATIONS

