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UNITED STATES OF AMERICA

BEFORE THE

ATOMIC ENERGY COMMISSION

In the Matter of	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329A
	)	50-330A
Midland Units 1 and 2	)	

REQUEST FOR ADMISSIONS AND INTERROGATORIES AS TO PROPOSED CONTENTIONS

Pursuant to Sections 2.742 and 2.740 of the Commission's Rules of Practice, the Department of Justice requests that Applicant admit the following relevant matters of fact. Where the matter is denied in whole or in part, Applicant is requested to state its contentions with respect to each numbered request and list or otherwise identify the documents relied upon and the persons whom Applicant presently anticipates would testify in regard to those contentions. The Department further requests that the above be completed by Applicant no later than March 15, 1973.

1. The retail market for electric power in Michigan's lower peninsula is predominantly a demand market for "firm" electric power, i.e., electric power with a very high probability of continuous availability. (In some circumstances, industrial users of electricity also create a demand market for "interruptible" power--power with a lower probability of availability.)

(The following statements are concerned with the engineering and economic problems encountered in making provisions for

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the marketing of "firm" power supply. We believe that the significance of the term "firm" power can best be understood by considering the history of the furnishing of electric power in Michigan and elsewhere in the United States.)

2. Prior to the 1880's electric power in Michigan's lower peninsula and elsewhere was furnished in a few places from on-site generators located, for example, at large commercial enterprises such as department stores, hotels, or at industrial sites, ordinarily owned and operated by the user of electricity.

3. Beginning in the 1880's, "central-station" service began to be offered throughout the United States, including Michigan. Central-station service describes an arrangement in which the owners and operators of centrally located generating equipment distributed and sold electricity to others at locations relatively close to the generators--where it was economically feasible to do so.

4. Power rates to larger loads ultimately were formulated in two parts: (a) "demand charge" in which a price was fixed for each kilowatt of peak load capacity based on the fixed costs of the plant, and (b) "energy charge" in which a price was fixed for each kilowatt hour based on fuel and other operating costs. These are explained generally in Barnes, <u>Economics of Public Utility Regulation</u>, Appleton-Century-Crofts, New York, 1942, pp. 325,339.

5. Among the several advantages of central-station service over isolated on-site generation was reduction in costs of plant by reason of diversity of loads.

6. For example, if a commercial enterprise had a load of 50 kilowatts in the evening and 10 kilowatts in the morning and an industrial enterprise had a load of 50 kilowatts in the morning and 10 kilowatts in the evening, the two loads could be supplied by a single generator of 60 kilowatt capacity with the additional cost only of distribution wires between the generators and the loads.

7. Another advantage was that a single crew could attend the centrally located generating equipment.

8. The first central stations were confined to direct current systems in relatively small urban downtown areas. With the advent of the alternating current motor and transformer, a single central station could feasibily serve larger and larger areas, because alternating current could be stepped up to a higher voltage for transmission over greater distances with reduced losses and stepped down again at the points of use.

9. Provision for continuity of service--or "firm" power--was one important problem remaining to be solved for isolated central-station generation.

10. Where the source of supply was an internal combustion or steam engine or a steam turbine, the possibility of mechanical and electrical failure ("forced outage") was a significant factor affecting continuity of service.

11. This possibility of mechanical and electrical failure or "forced outage" of individual generating units persists today.

12. At the present time, the average failure rate for diesel-electric engine generator sets is approximately 1% of the time, and individual instances of failure may keep a unit out of service for several months.

13. The probability of failure for steam turbines varies from approximately 2% on average for smaller units with lower operating temperatures and pressures to approximately 6% on average for larger units with higher operating temperatures and pressures. Somewhat higher rates prevail for "immature" units, i.e., within the first year or two after their installation. Federal Power Commission (FPC) 1964 National Power Survey, Part II, p. 406.

14. Electric power supplied from a single steam turbine (with associated boiler and generating unit) with a "forced outage" rate of 2% of the time would normally be unavailable about 2 days out of every 100, or approximately a week out of every year.

15. Power from a single such generator is not commercially marketable as "firm" power in Michigan's lower peninsula or elsewhere in the United States.

16. System failures in which failure of one element causes failure of another are called "cascading" outages, and power systems can be and are ordinarily designed to minimize the probability of such outages.

17. It is thus possible to arrange for connection of two or more generating units at a single central station in such a manner that the forced outage of one of the generators will

not cause the other to fail; that is to say the probability of failure of two or more of the generators will be at random.

18. In a central station with two generating units connected in this manner, the probability of the simultaneous but random forced outage of both generators where each generator has a failure rate of 2% is .02 x .02 or .0004, and the probability of the availability of power from at least one generator would be .9996, or at all times except .0004--or approximately 1 1/2 days out of every 10 years.

19. Where such a central station contains two 10 megawatt (1 megawatt equals 1000 kilowatts) generating units, and each generator has a failure rate of 2%, the probability of availability of at least one unit or 10 megawatts of power would be .9996, and power from 10 megawatts of generating capacity would be commercially marketable as "firm." Federal Power Commission Form 12, Schedule 16, refers to such capacity as "assured capacity."

20. Where such a central station contains one 15 megawatt generating unit and one 5 megawatt unit, each with a failure rate of 2%, the probability of availability of at least one unit would still be .9996; but only 5 megawatts of generating capacity would have that high a probability of availability, and the central station could thus market only the power from 5 megawatts of capacity as "firm."

21. "Dependable capacity" refers to the number of kilowatts that a generator can be relied upon to generate continuously except for forced outage and scheduled outage for maintenance.

22. "Reserves" for a generating system of two or more generators refers to the difference between "dependable capacity" and the capacity marketable as "firm."

23. In an isolated central station of two 10 megawatt generators, the dependable capacity would be 20 megawatts, 10 megawatts of capacity would be commercially marketable as firm, and reserves would be 10 megawatts. Reserves are necessarily equal to the size of the single largest unit because that unit would not be available during maintenance or in the event of its forced outage.

24. If the isolated central station had instead one 15 megawatt generating unit and one 5 megawatt unit, the dependable capacity would still be 20 megawatts; but reserves would be 15 megawatts--again equal to the single largest unit at the station. Assuming a 2% failure rate for each generator, 5 megawatts of this station's capacity would have a .9996 probability of availability and 15 megawatts would probably be available .98 of the time. Only 5 megawatts of capacity would be marketable as firm.

25. It would be possible to decrease reserve requirements by installing smaller units.

26. For example, 10 megawatts of "firm" power could be marketed by installing eleven 1 megawatt generating units.

27. This would probably not be an optimum power supply, however, because there are economies of scale associated with increased generating unit size. As unit size increases, the costs per kilowatt and per kilowatt/hour decrease quite rapidly, particularly in unit sizes in the range of 1 to 10 megawatts.

28. The size of units selected by the system planner is a compromise between the desire to utilize the largest unit size which is economically optimal and the desire to keep the amount of reserves to a minimum, consistent with maintaining the necessary level of availability of service. (This statement applies to a lesser extent to "peaking" units, which are run only a few hours during the year at times of highest power demand, and "intermediate range" units, which run for fewer hours than the "base load" or nearly-full-time-operation units. Peaking and intermediate range units normally have lower capacity costs and higher energy costs relative to base load units, and are available in small sizes. Peaking loads are often served by a number of small units located at the points of need.

29. The necessity to maintain the equivalent of the single largest unit as reserves is particularly troublesome for a growing power system as shown by the following example.

30. A system with three 2 megawatt units and one 4 megawatt unit would have a dependable capacity of 10 megawatts and a capacity marketable as firm of 6 (4 megawatts of reserves, equivalent to largest unit). Assume the system suddenly

obtains an additional 6 megawatts of load. It cannot serve that load and maintain system reliability merely by installing a new 6 megawatt unit. If it installs a 6 megawatt unit, its dependable capacity would increase from 10 to 16, but its capacity marketable as "firm" would increase only by 4 megawatts (from 6 to 10) as its reserve requirement would increase from 4 to 6 (the largest unit on the system is now 6 megawatts).

31. Among this system's possibilities for building generation to serve the new load would be (1) to install two 3 megawatt units (and lose economies of scale), (2) to install two 4 megawatt units (total 8 megawatts; 6 megawatts for the new load with the surplus 2 megawatts earmarked to supply future load growth; no additional reserve requirement), or (3) to install a 6 megawatt unit plus a 2 megawatt peaking unit to meet the increased reserve requirement (total dependable capacity would be 18 megawatts, reserves 6 megawatts [4 megawatts original + 2 megawatts], and marketable firm power 12 megawatts--6 megawatts for the original load and 6 megawatts for the new).

32. The history of power supply from the 1880's to the 1910's generally showed a transition from isolated on-site generation to isolated central-station service (other than for some very large industrial plants with substantial power needs). (Even today some very large industrial loads and some very small farm or rural loads remote from power company lines find it economical or necessary to utilize on-site generation.)

33. In the decade from approximately 1910 to 1920 the technology of electric transmission progressed to a point where it became possible to tie two or more central stations together by a high-voltage transmission line into a single bulk power supply system.

34. Mr. W. A. Foote, who controlled one of the predecessor companies of the Consumers Power Company, and his brother pioneered this technology in Michigan (possibly as early as 1906). Interconnection of central stations in Michigan may have preceded the state of the art elsewhere in the country by a few years.

35. Where two central stations each with two 10 megawatt generating units (and thus: 20 megawatts each of dependable capacity; 10 megawatts each of firm capacity; 10 megawatts each of reserves) are tied together by a high-voltage transmission line, they can share a common reserve.

36. Ten megawatts of capacity--equal to the single largest unit on the system--will satisfactorily fulfill reserve or standby needs for the entire newly interconnected system.

37. The resulting interconnected system is thus capable of marketing 30 megawatts of firm power, as compared with a total of 20 megawatts of firm power (10 megawatts each) for the two central stations operating isolated.

38. If two similar-sized central stations interconnect, in lieu of taking the benefits by way of marketing additional firm capacity they may elect to take the benefits by installing

larger, more economic units without degrading reliability of service, as shown by the following example.

39. Two central stations, each with two 10 megawatt units (and thus 10 megawatts each of reserves or 20 megawatts total), could interconnect, agree each to continue to maintain 10 megawatts of reserves, and install 20 megawatt units in the future without degrading the reliability of service. The combined reserves of 20 megawatts would be equal to the size of the new largest unit (20 megawatts) in the interconnected system.

40. In lieu of obtaining the benefits of interconnection by way of marketing more firm capacity from existing facilities <u>or</u> by way of increasing the economic justification for installing larger units, the benefits of interconnection may be taken by way of increased reliability, as shown by the following example.

41. If two central stations (each with two 10 megawatt units) interconnect and each continue to maintain 10 megawatts of reserve and to utilize 10 megawatt units as the largest unit size, the interconnected system could withstand the simultaneous but random forced outage of <u>two</u> generating units, and still market the same amount of firm power but of even greater reliability. The probability that <u>three</u> units would be out of service simultaneously would be a much lower order of probability, resulting in a greater probability of availability of at least 20 megawatts. The probability of forced

outage of three units is .02 x .02 x .02 or .000008. The availability of at least 20 megawatts would be .999992.

42. In practice, interconnection usually results in the enjoyment of a combination of all three kinds of benefits-- marketing additional firm capacity, installing larger generating units, and improving system reliability.

43. If the two interconnecting central stations remain under separate ownership and have equal bargaining power, they will probably split the benefits equally.

44. An arrangement which would carry out "reserve sharing" would require the construction of a transmission line and the execution of an agreement to sell "emergency power" on an if-and-when-available basis without any demand charge for idle capacity but only an energy charge for energy actually used.

45. Such an agreement must also provide that each party will share fairly the "responsibility" of maintaining sufficient "reserves" to maintain reliability on the interconnected system, either by maintaining a fair portion of reserves on its own system, or by purchasing reserve capacity from other interconnected systems.

46. Under such an agreement, where two central stations each with two 10 megawatt generating units interconnect, and the bargaining strength of the parties is equal, each would be required to maintain 5 megawatts as its "reserve responsibility."

47. The reserve responsibility may be stated either in terms of an absolute number of megawatts or in terms of the percentage

of its peak load (the maximum power load delivered by the system at any one time) that each party is required to maintain as reserves.

48. If the reserve responsibility is stated in terms of an absolute amount, the reserve sharing is commonly referred to as "mutual emergency support." Thus, in the foregoing example each party would agree to maintain 5 megawatts of capacity for mutual emergency support.

49. If the reserve responsibility is stated as a percentage of peak load, in the foregoing example, it would be 10/30ths or 33 1/3% or 10 megawatts for the interconnected system and 5/15 or 33 1/3% or 5 megawatts for each participant. This manner of determining the reserve responsibility of each party to a reserve sharing agreement was applied (with slight modifications) by the FPC and approved by the Supreme Court in Gainesville Utilities Department v. Florida Power Corp., 402 U.S. 515 (1971), and will be referred to hereinafter as the "equal percentage reserves" or "Gainesville" formula.

50. Under such an agreement for reserve sharing between two central stations each with two 10 megawatt generating units, if one of the parties had a forced outage of one of its generating units at the time it was marketing 15 megawatts of firm power, it could continue to meet its marketing obligations from 10 megawatts of its own capacity and 5 megawatts of emergency power "if and when available" from the other party through its interconnection.

51. It could rely on doing so even though the "emergency power" would only be supplied "if and when available," since the probability that power from the other system would be not available (.02) at exactly the same time that the first system's second unit would be out of service (.02) would be so low (.0004) that the quality of power supply on the first system would not fall below that generally accepted as firm power.

52. The other party to the interconnection would enjoy an equal advantage.

53. The distance between the two central stations is one of the critical factors to the economic feasibility of any reserve sharing arrangement.

54. If the distance between the two central stations is relatively small, the cost of owning and operating the transmission line necessary for the reserve sharing will normally be less than the cost of constructing additional generating capacity.

55. When the distance between the two central stations is relatively great, the cost of the interconnecting transmission line may approach, equal, or exceed the benefits from the reserve sharing or other coordination.

56. Assuming feasible distances, four central stations, each with two 10 megawatt units, could interconnect and share reserves and market firm power with only 10 megawatts in reserve for the entire pool.

57. Where four central stations, each with two 10 megawatt units (80 megawatts total dependable capacity; 20 megawatts

dependable capacity each) share reserves, each need maintain only 2.5 megawatts of reserves (10 megawatts total reserves, equivalent to the interconnected system's single largest unit) and can market 17.5 megawatts of firm power (1/4 of the 70 megawatts total for the system).

58. The reserve sharing arrangement may be carried out by contract or by common ownership or control of these four central stations.

59. If a fifth such central station were admitted to this reserve sharing pool on equal terms (thus agreeing to maintain the same percentage of reserves as the other four), each of the five central stations would need maintain only 2 megawatts of reserves (10 megawatts total reserves, equivalent to the interconnected system's single largest unit) and could market 18 megawatts of firm power. (Its reserves would be 1/5 of the 10 megawatts pool reserves or 2 megawatts. Deducting this from 20 megawatts dependable capacity would leave 18 megawatts marketable as firm.)

60. The newly admitted pool member would increase its capacity marketable as firm from 10 megawatts to 18 megawatts (out of 20 megawatts dependable capacity) as its reserve responsibility would decrease from 10 megawatts to 2 megawatts.

61. Each of the four original pool members, however, would increse its capacity marketable as firm only 1/2 megawatt, from 17.5 megawatts to 18 megawatts, as its reserve responsibility would decrease only 1/2 megawatt, from 2.5 megawatts to 2 megawatts.

62. Thus, if the benefits of pooling reserves will be shared equally among all five pool members, regardless of the order in which they enter the pool, the potential benefits to the fifth central station seeking admittance are greater than the potential benefits to the four original members with which it wishes to join.

63. The four original pool members might refuse to admit the fifth central station to the pool at all, or they might permit it to join only on contractual condition that the lion's share of the total benefits of pooling reserves flow to the original members.

64. For example, under Applicant's "Holland" formula referred to below, a fifth central station with two 10 megawatt generating units joining a group of four central stations each with two 10 megawatt generating units would be permitted to market only 11 megawatts of firm power from its dependable capacity, much less than the 18 megawatts marketable under the _Gainesville_ formula and only slightly more than the 10 megawatts marketable under isolated operation.

65. As the number of generating units in a system increases, there comes a time when it becomes necessary to protect against the simultaneous but random forced outage of two or more generating units.

66. The exact point at which this would be necessary is established either by judgment of the system operator or planner, or by statistical methods which are capable of

measuring reserve requirements in terms of varying risk levels of outage probability expressed either as a percentage of time, or by frequency and duration.

67. Such methods include the "loss-of-load" method (percentage of time method) formulated by Calabrese, AIEE Transactions, Vol. 66, 1947, pp. 1439-50, Generating Reserve Capability Determined by the Probability Method, and the loss of capacity method (frequency and duration) formulated by Halperin and Adler, AIEE Transactions (Power Apparatus and Systems) Vol. 77, August, 1958, pp. 530-44.

68. Whether reserve requirements are measured by such statistical methods or by the simpler standard of maintaining the equivalent of the interconnected system's single largest unit as reserves, as previously explained, it is generally true that, when two or more systems interconnect, for any given level of outage risk the amount of reserves required for the interconnected system is less than the sum of the reserves required to maintain the same risk level for the component systems operating on an isolated basis.

69. When a small system pools its reserves with a larger system or group of systems by contributing reserves equal to an established percentage of its peak load, and thus need not maintain the equivalent of its single largest unit as reserves, its problem of building economic new generation to serve load growth is reduced, as shown by the following example.

70. As discussed earlier (Item 30), an isolated system with three 2 megawatt units and one 4 megawatt unit would have a dependable capacity of 10 megawatts and capacity marketable as firm of only 6 megawatts. To serve a new 6 megawatt load, it would have various compromise alternatives (see Item 31). If, on the other hand, this system interconnects for reserve sharing with a larger system and its required reserve is, for example, 20% of peak load, capacity marketable as firm would be 8 1/3 megawatts out of a dependable capacity of 10 megawatts (10 megawatts is 120% of the possible peak load; possible peak load/capacity marketable as firm thus equals 8 1/3 megawatts). The system could market 2 1/3 additional megawatts of firm power immediately, and it could serve a further 6 megawatts load merely by installing a single base load unit of 7.2 megawatts (6 megawatts for the load plus 20% of 6 megawatts to meet the required reserve percentage equals 7.2 megawatts). Total dependable capacity would then be 17.2 megawatts and capacity marketable as firm 14 1/3 megawatts (17.2 megawatts is 120% of 14 1/3 megawatts).

71. The electric power market throughout the United States in general over the last 70 years has been a growing market enjoying approximately 7% average annual compound growth. FPC, 1970 National Power Survey, I-3-3.

72. Of importance to the electric power system planner is the absolute amount of growth annually, or the annual increments of growth, as a constraint on the size of new units to be installed in any system.

73. If the system planner chooses new units with capacity sufficient to meet two or more annual increments of load growth, the installing system will be burdened by the fixed charges associated with the idle capacity until the time the unit is fully loaded.

74. Two or more central stations can interconnect and install larger units without incurring such economic penalty, as shown by the following example.

75. Four central stations, each with an annual load growth of 10 megawatts could pool their load growth and could in the future install 40 megawatt units annually (assuming that they had resolved the reserve sharing problem satisfactorily).

76. If a fifth central station with 10 megawatts annual load growth were admitted to the pool, the pool could then install a 50 megawatt unit each year.

77. The fifth central station could then obtain its required 10 megawatts of load growth power annually from a 50 megawatt unit and enjoy the significant economies of scale afforded by 50 megawatt units over the 10 megawatt units it would otherwise install.

78. The four original pool members, however, would gain only the lesser economic advantage of being able to install 50 megawatt units rather than 40 megawatt units.

79. The obvious bargaining disadvantage of the fifth central station with potentially more to gain than the four central stations whose load growth pool it seeks to join is no less

present when the four pooling central stations have become financially as well as electrically integrated.

80. The "coordinated development" of generation made possible through pooling of load growth may be accomplished by a number of methods, including: (1) establishing joint ventures for the construction of large generating units; (2) staggering the construction of generating units among pool members, with the installing system selling "unit power" (power from a particular generating unit) at the costs of the new unit to the other members either for the life of the unit or for a number of years until the installing system can fully utilize the capacity itself; and (3) transactions in "surplus power"/"deficiency power"--power surplus to the selling system after providing for load and reserve requirements, not identified as from a particular unit, sold with or without reserves to another system deficient in the power necessary to meet its load and reserve requirements, and but for the availability of which the buying system would have made plans to install new generating capacity.

81. Where the parties have equal bargaining strength, a surplus power/deficiency power transaction will usually take place at the cost of power supply currently being installed (i.e., the average costs per kilowatt of capacity and per kilowatt hour of energy of the unit being installed).

82. Setting the sale price on this basis permits the buyer to obtain new generation to serve growth markets at a cost level approximating the seller's costs for supplying growth markets.

83. "Reserve sharing" and "coordinated development" are two important kinds of coordination among the several kinds that are practiced in the electric utility industry.

84. Others include economic dispatch, or economy energy transactions, hydro-thermal coordination, maintenance coordination, coordination of spinning reserves, and some not mentioned here.

85. Common to all these kinds of coordination are two requirements: (a) high voltage transmission as the coordinating medium; (b) the willingness of other parties engaged in bulk power supply functions to plan or operate generating facilities in common.

86. Hydroelectric generation is not as sensitive to the need for access to reserve sharing as thermal generators, because hydroelectric turbine-generators have a low forced-outage rating and the economies of scale are not as significant.

87. However, where hydrologic conditions provide limited amounts of water for generation at a hydroelectric site, access to coordination to obtain off-peak surplus energy from thermal generation systems can increase the value of the hydroelectric generation.

88. The economically feasible hydroelectric sites in any area are limited in number.

89. Sometime prior to 1910 Mr. W. A. Foote was operating two or more central stations in parallel in Michigan's lower peninsula.

90. In 1910, Mr. Foote financially combined his interests in several central stations with those of Clark, Hodenpyl and Walbridge, who had interests in other central stations, and the Commonwealth Power, Railway & Light Company was formed.

91. As of 1912, the Commonwealth Power, Railway & Light Company owned approximately 73% of the water power in Michigan's lower peninsula, as indicated in Appendix A hereto, a diagram from the 1912 Report of Commissioner of Corporations on Water-Power Development in the United States (following p. 130).

92. Another 13% was owned by the Indiana & Michigan Electric Company (now a subsidiary of the American Electric Power System). See Appendix A.

93. The Commonwealth Power, Railway & Light Company was soon operating an interconnected power system combining the central stations of its operating subsidiaries. For the purpose of operating generation and transmission, several of these central stations were formed into a separate company known as the Au Sable Electric Company. Its properties are indicated on the diagram attached as Appendix B.

94. The Commonwealth Power, Railway & Light Company, a holding company, included the operating properties indicated on lines 33-70 of the attached table from Senate Document No. 316, Electric Power Development in the United States, 84th Cong. 1st Sess. (1916), part 2, pp. 366-367 (Appendix C). (In addition, the holding company controlled two electric

railways which were major users of electric power.) The remainding entries on the table indicate other independent systems in Michigan at that time.

95. The history of the Consumers Power Company from the formation of its predecessor, the Commonwealth Power, Railway & Light Co., until the present has been characterized by a continuing acquisition of ownership and control of central stations and operational integration of central stations where distances made this feasible. The constituents of Consumers Power Company are listed in Appendix D, an excerpt from E. H. Luther, Song of Service (a company history provided by Applicant on discovery in this proceeding).

96. Among the acquisitions of the predecessors of Consumers Power Company were some small systems, both privately and municipally owned, already consisting of two or more central stations. See Appendix D.

97. Acquisitions in the 1920's included the Citizens Electric Co. of Battle Creek, the Wolverine Power Co., owning hydroelectric plants on the Titibiwassee and Tabasco Rivers, a distribution system in Linden, the St. Johns municipal system, properties in Durand, Climax (municipal), Goodrich, Atlas, Bronson (municipal), Big Rapids, Greenville, Belding, Stockbridge (municipal), Spencer (municipal), Athens, Shepard, Ovid, Reed City (municipal), Wyoming Light and Power Company, Frankenmuth, Dimondale, Farwell (municipal), Beaverton, St. Charles (municipal), Flushing (municipal), Addison, and

others, many of which were relatively small. Sometimes the property came directly into the Consumers Power Company, and sometimes it came through some other corporate organization, such as a holding company (as exemplified by the acquisition of the Thornapple Gas and Electric Co.), or through another subsidiary (as in the case of Southern Michigan Light and Power Co.). See Luther, Song of Service, pp. 327-328.

98. The financial interests controlling these properties were affiliated with other financial interests controlling properties in other states too distant at that time for interconnection and coordination with the Michigan properties, including the following: American Super Power Corp., United Corp., United Gas Improvement, Electric Board and Share Co., Penn-Ohio Edison, Toledo Edison, and Commonwealth and Southern Co.

99. Applicant was formerly a part of the Commonwealth and Southern Co. The major components of the Commonwealth and Southern Co. included what is now Consumers Power Co. and what is now the Southern Company, a holding company that controls an integrated system of four operating companies.

100. The Consumers Power Company was separated from the Commonwealth and Southern financial amalgamation in an SEC proceeding in the 1940's. The proceeding arose under Section 11 of the Public Utility Holding Company Act, which required the dissolution of holding companies consisting of more than one system of properties electrically integrated or capable of being electrically integrated.

101. Among the more recent acquisitions of Consumers Power Company was Michigan Public Service Company. Acquired in 1950, Michigan Public Service Company operated an interconnected electric system in 16 counties in the northern part of Michigan's lower peninsula, including distribution service in Cheboygan, Gaylord, Ludington, Montague, Traverse City, and about 100 other smaller communities.

102. Other acquisitions of Consumers Power Company were the Blissfield municipal system (1950), the White Cloud municipal system (1952), and the Bellare municipal system (1952).

103. In 1956, Consumers Power Company acquired the Kalamazoo municipal system and approximately 1,000 retail customers.

104. In 1959, Consumers Power Company offered to purchase, and finally did acquire, the Manton municipal system.

105. In 1961, Consumers Power Company acquired the Grayling municipal electric system.

106. In 1967, Consumers Power Company acquired the Rogers City Power Company through an exchange of stock.

107. In 1968, Consumers Power Company acquired the generating and distribution facilities of the City of Allegan, Michigan.

108. At the time of the foregoing transaction, Allegan owned and operated a hydroelectric plant which it had constructed in the 1930's with PWA funds.

109. Allegan also owned several thermal generating units which had been added from time to time to supplement the output of the hydroelectric generation.

110. Immediately prior to the transaction, Allegan had sought a reserve sharing interconnection with the Consumers Power Company.

111. In connection with urging Allegan to sell its electric system, Applicant advised the town voters that the city's system would not be able to construct and operate generating facilities as cheaply as it could purchase power from the Consumers Power Company.

112. Applicant has made similar representations in efforts to acquire the generation and transmission facilities of Traverse City, Coldwater, and other cities in Michigan.

113. Applicant has made offers, thus far not accepted, to purchase the electric facilities of other cities including Charlevoix (1962), Traverse City (1965), and St. Louis (1965).

114. Applicant has succeeded in persuading some cities whose facilities it has not yet acquired to close down their generating plants and to purchase their bulk power supply from Applicant.

115. As the period from 1880 to 1910-1920 saw a transition from isolated on-site generation to isolated central-station service, so the period from 1910-1920 to present has demonstrated the advantages of electric power supply from central stations interconnected by high voltage transmission with other central stations operating either as a single company or as a "power pool" of several companies.

116. Applicant, through high voltage transmission interconnections, had emergency power arrangements with the Detroit Edison Company as early as 1928.

Later, after World War II, Detroit Edison, by contract, undertook not only to share reserves but also to coordinate development with Applicant under the Michigan Pool arrangement, on a basis which gave both parties full access to the benefits of coordination.

117. The reserve sharing arrangements of the Michigan Pool at present are in substance those of the Gainesville formula, except that the arrangements are more detailed. See Appendix E (provided by Applicant on discovery).

118. The Michigan Pool shares reserves with the Ontario Hydro System, a publicly owned system operating in the Province of Ontario, Canada, on terms which do not limit access to the benefits of coordination.

119. Under Applicant's arrangements with Ontario Hydro, emergency power is referred to as "capacity power and energy." Capacity power arrangements are made on the basis of a charge per kilowatt per day, rather than on a monthly basis as in Applicant's contract with the City of Holland. There is no reserve responsibility, and only a daily capacity charge when emergency power is used. Such an arrangement does not impose a substantial burden on access to coordination, as there is no charge for idle, standby or reserve capacity.

120. The Michigan Pool also shares reserves with Indiana & Michigan Electric Co., Commonwealth Edison Co., and Northern

Indiana Public Service Co., as provided in an area coordination agreement among the Michigan Pool companies and companies to the south, on terms which give each of them full access to the benefits of reserve sharing coordination.

121. Under its arrangement with systems to the south, Applicant uses what is nominally a mutual emergency support arrangement. However, the supported party pays no capacity charge for power in excess of mutual emergency capacity received, nor is the supplying party in default if it is unable to comply with a request for mutual emergency capacity because of an emergency on its own system. Hence, in its effect, the arrangement is similar to the Gainesville formula and superior to the mutual emergency support arrangements of Applicant's contracts with Lansing and Holland in providing access to the benefits of reserve sharing coordination.

122. It is usual in most reserve sharing arrangements, including those using the Gainesville formula, that the energy delivered with emergency power either is returned in kind or paid for at some reasonable rate, frequently out-of-pocket cost plus 10%. This is the arrangement used by Applicant with systems to the south.

123. In general, where two central stations or pools are of equal size, a pool agreement providing for mutual emergency support, wherein each party is obligated to furnish an equal number of kilowatts in case of emergency, will ordinarily result in the same sharing of interconnection benefits as the Gainesville formula.

124. Where the system sizes are drastically different, however, agreements formulating the mutual emergency support in terms of an absolute number of megawatts, even where this number is determined by formula, usually provide a greater share of interconnection benefits to the larger system than it would receive under the Gainesville formula.

125. Applicant has interconnected with the City of Holland under a formula, attached hereto as Appendix F, that incorporates a mutual emergency support formulation in addition to a stated reserve requirement.

126. Under what the formula calls "mutual emergency support," Holland in effect promises firm power without demand charge to Applicant in return for Applicant's promise of interruptible power, also without demand charge.

127. The term "reserve responsibility" as used in the electric power industry normally refers to a system's obligation to maintain reserve capacity in excess of its load to meet the risk of forced outage (and sometimes other contingencies) (or to pay others to provide it with part or all of such reserve capacity).

128. Under the Gainesville formula, the full reserve responsibility is expressed as a percentage of peak load. Where one interconnected system falls short of meeting this reserve responsibility, it must compensate the system with which it is interconnected to the extent that the second system has reserves in excess of such percentage of reserve responsibility.

129. Under the Holland formula there is an item referred to and defined as "RR" or "reserve responsibility." This is not the full reserve responsibility under the Holland formula, however. In addition to such reserve responsibility, the City of Holland (or any other electric utility who shares reserves on Holland formula terms) is required to pay additional capacity charges whenever it requires emergency power in excess of a so-called "mutual emergency support capacity" (MESC) level. See Appendix F.

130. If the mutual emergency support capacity level under the Holland formula is set somewhere above zero, then Holland's full reserve responsibility would be RR plus MESC plus the capacity charges for emergency power taken at levels above MESC. (Applicant deducts from its own reserve requirements in the Michigan Pool amounts of MESC obtained from Holland and other small systems.)

131. Under the Gainesville formula, Holland's reserve requirement would be independent of the size of its largest generating unit, and it could install larger units than it can justify economically under its present interconnection arrangement with Applicant.

132. The Michigan Municipal and Cooperative Power Pool (hereinafter M-C Pool) consists of two generation and transmission cooperative systems, Northern Michigan (which supplies three distribution cooperatives) and Wolverine (which supplies four distribution cooperatives), two relatively large municipal

systems (Grand Haven and Traverse City), and four small municipal systems (Hart, Lowell, Zeeland and Portland).

133. The present interconnection of the M-C Pool with Applicant is through one of the Pool members, Northern Michigan, at Alba.

134. The M-C Pool has over a period of years sought establishment of a reserve sharing coordinating relationship between its system and that of the Applicant.

135. Until the last two or three years, Applicant refused to exchange emergency power on an if-and-when-available basis with the M-C Pool.

136. Applicant presently sells the M-C Pool firm power on a 15 minute ratcheted demand basis. This imposes declining demand charges for a year on the M-C Pool whenever it obtains power from Applicant to meet an emergency. Under this arrangement the current monthly billing demand is the maximum 15 minute demand within the month, but not less than 60% of the highest demand within the preceding 11 months.

137. Under its existing interconnection arrangement with Applicant, the M-C Pool's reserve responsibility cannot be less than the capacity of its single largest generating unit.

138. At the present time, the M-C Pool is negotiating with Applicant for a new interconnection arrangement; and Applicant has offered terms including use of the Holland formula for reserve sharing.

139. Under the Holland formula, it could be less expensive for the M-C Pool to refrain from building additional generating facilities over the next 15 years and to purchase instead its additional bulk power supply requirements from Applicant, depending on Applicant's pricing decisions.

140. In order to obtain project loans and approval from the Rural Electrification Administration (REA), G & T cooperatives must demonstrate that self-generation constructed with REA loan funds would be cheaper than purchased power. REA Bulletin No. 20-6.

141. An interconnection with Applicant on Gainesville formula principles would permit the M-C Pool economically either to justify larger-sized generating units in its expansion program or to defer installation of generating units for a few years and market additional firm power from existing dependable capacity.

142. Access by the M-C Pool to reserve sharing and coordinated development with Applicant would permit the M-C Pool to attain costs of firm bulk power supply lower than Applicant's charges for supply of identical service.

143. Applicant has interconnected with the City of Lansing on a mutual energy support basis which restricts the city's ability to install larger units more than would interconnection based on the Gainesville formula.

144. For example, Lansing, while installing units of 160 megawatts in size, will be required to maintain reserves averaging in excess of 49% over the period 1972-82, and ranging

as high as 81% for one six month period. (At the same time, Applicant is able to install 800 megawatt or larger units and schedule reserves of approximately 18%, based on its own integration and its coordination with other systems.)

145. The City of Lansing municipal electric system has in recent years attempted to obtain an interconnection with Applicant on Gainesville formula terms.

146. If Lansing obtained an interconnection with Applicant on Gainesville formula terms, it could sell substantial amounts of surplus power to other bulk power supply systems, including the M-C Pool.

147. Applicant has used its interconnection with the City of Coldwater principally to encourage the city to purchase power at wholesale from Applicant in lieu of continued expansion of the city's own central station.

148. Applicant's representatives have over a period of years urged city officials in Coldwater that it would be in the city's interest to purchase all its power supply at wholesale from Applicant rather than to expand its generating plant.

149. Applicant has never offered Coldwater interconnection for the exchange of coordinating power and energy.

150. Applicant uses the Halperin and Adler method to measure risk of forced outage on its system. See Items 65-68.

151. The Michigan Pool also uses the Halperin and Adler method.

152. Application of the Halperin and Adler method to an interconnection by the Michigan Pool with any other system operating wholly in Michigan's lower peninsula would probably not indicate degradation of the reliability of the Michigan Pool where such system agreed to maintain a reserve percentage equal to that of the Michigan Pool, since those systems or any combination of them are small compared to the Michigan Pool. In the unlikely event that the Halperin and Adler statistical test would show a degraded reliability and the need to add generating capacity to maintain the Pool's reliability standard, there would be no burden on the Pool if the other system supplied the entire additional amount.

153. Where the size of the other system is very small in comparison with the Michigan Pool, interconnection would not increase the reserve requirement of the Michigan Pool significantly even if the other system brought no reserves to the Pool.

154. In such a case, where the other system maintains the same percentage of reserves as the Michigan Pool, the Michigan Pool could deduct from its own reserve responsibility the amount of reserves brought to the Pool by the interconnecting smaller system.

155. Applicant has made no studies applying the Halperin and Adler test to the meshing of the probabilities of unit failure on its system or that of the Michigan Pool with the probabilities of failure of units of smaller electric utility systems in Michigan.

156. Under its contract with Detroit Edison, Applicant engages in comprehensive coordinated development of generation facilities, although there is some provision for individual development of generation in exceptional circumstances.

157. Except for an arrangement in which it has sold a portion of the capacity of its Ludington Pump Storage Plant to Commonwealth Edison, Applicant has not engaged in substantial coordinated development with electric utilities other than Detroit Edison, although some of its contracts with major systems operating wholly or partly outside Michigan (e.g., Indiana & Michigan Electric Co.) provide for the possibility of such coordinated development.

158. Applicant has not engaged in any coordinated development with smaller systems wholly in Michigan nor do its contracts with such systems contemplate future coordinated development.

159. Under programs of coordinated development, sales of capacity and energy are made at the seller's long run marginal cost of capacity and energy, i.e., the cost of its current plant installations and the energy generated at those plants.

160. Applicant has entered into contracts for the sale of full or partial bulk power supply requirements to smaller systems in Michigan as customers, at rates claimed to be based on its average system cost.

161. The economic effect of a sale of full or partial bulk power requirements at average system cost is significantly different than that of such a sale at long run marginal cost where the retail market is rapidly growning.

162. Access to arrangements for coordinated development would permit an otherwise isolated system to compete more effectively for growth loads.

163. Two general types of coordinated development would be available to the M-C Pool and other small systems in Michigan if Applicant were compelled to coordinate its development with those systems.

164. One of these would involve coordination of both generation and transmission with Applicant and/or the Michigan Pool, with the M-C Pool financing portions of units installed by the Applicant or purchasing portions of the output of such units or purchasing surplus system power.

165. An alternative form of coordinated development open to the M-C Pool is coordination of generation with other small electric utilities and industries in Michigan using the transmission of Applicant, to the extent technically feasible and after payment of a fair portion of the costs of such transmission.

166. Where small bulk power supply systems are relatively far apart, they may find that the costs of building connecting transmission make a coordinated generation and transmission program infeasible or only marginally feasible. Feasibility is improved if they can find intervening systems to join in the coordination, since the intervening systems would share in the costs of the transmission (as well as add to the load). Where there are no longer any intervening independent systems

(because they have been acquired by a dominant area system), and the intervening load centers are served by the dominant area or regional system, coordination between the remaining small systems is relatively infeasible except under a program of joint transmission arrangements (or wheeling)with the dominant system.

167. Prior to 1972 or 1973, Applicant's interconnection contracts with smaller systems in Michigan contained provisions restricting their interconnection with third parties. The effect of these provisions was to limit interconnection among smaller systems where such was otherwise feasible.

168. As of 1970, Applicant owned and controlled 7,700 pole miles of transmission (44 kilovolts and above) consisting principally of 138 kv and 46 kv, with approximately 200 miles of 345 kv.

169. Applicant owns and operates all high-voltage (44 kv up to but not including 345 kv) and extra-high-voltage (345 kv and higher) transmission in Michigan's lower peninsula except for the following: (a) approximately 900 miles of 69 kv transmission and approximately 250 miles of 44 kv transmissions interconnecting the central stations of the M-C Pool; (b) transmission owned and operated by the Detroit Edison Company in the eastern portion of the lower peninsula; (c) transmission owned and operated by Indiana & Michigan Electric Co. and Michigan Power Co. (subsidiaries of the American Electric Power System) in the southwestern corner of the

peninsula; (d) a short segment of transmission owned by Lansing connecting it to Applicant's transmission system; and (e) a small amount of transmission owned by the Alpena Power Company and a small amount owned by Thumb Electric Cooperative.

170. Under the Michigan Pool agreement, Applicant has the right to use Detroit Edison's transmission system in transactions with Ontario Hydro; and Detroit Edison has the use of Applicant's transmission system in transactions with systems to the south.

171. In coordinating with Commonwealth Edison and Northern Indiana Public Service Company, the Michigan Pool companies have made arrangements to use the transmission of Indiana & Michigan Electric Company.

172. The 1970 peak load of the M-C Pool system was approximately 200 megawatts; of Lansing approximately 300 megawatts; and of Holland approximately 50 megawatts.

173. The 1970 peak load for Applicant's system was approximately 3500 megawatts.

174. The 1970 peak load of the Detroit Edison Company system was approximately 5500 megawatts.

175. The 1970 total peak load of the Michigan Pool (Applicant and Detroit Edison) was approximately 9000 megawatts.

176. The 1970 peak load of the Detroit Public Lighting Commission, which serves lighting and other municipal loads in Detroit, was approximately 110 megawatts.

177. No other electric utility in Michigan's lower peninsula had a 1970 peak load exceeding 50 megawatts, except for subsidiaries of the American Electric Power System.

178. In negotiating for reserve sharing and coordinated development with the Michigan Pool, the bargaining status of the M-C Pool is that of a 200-megawatt system bargaining with a 9000-megawatt system--and, for reserve sharing purposes, the 9000-megawatt system is a coordinated part of an even larger system extending over the Province of Ontario, Canada, and parts of Indiana, Illinois, and Ohio.

179. Until recently, the Michigan Public Service Commission had not assumed jurisdiction over electric cooperatives in Michigan, notwithstanding statutory authority to do so.

180. It assumed jurisdiction upon the request of certain electric cooperatives, following their complaints of alleged unfair retail competition by Applicant.

181. Approximately 10 years ago, the electric cooperatives requested state legislation to allocate retail territory.

182. At that time the Applicant opposed such territorial allocation and favored instead unrestricted retail competition.

183. Following its assumption of jurisdiction, the Michigan Public Service Commission initiated some regulation of competition between rural distribution cooperatives and privately owned electric utilities in Michigan.

184. The Michigan Commission has adopted a territorial allocation rule with respect to electric loads served by

single-phase distribution lines; these are ordinarily small residential or small commercial loads. The Commission's single phase rule is attached hereto as Appendix G.

185. The Michigan Commission is now considering a three-phase territorial allocation rule, dealing with loads for service with three-phase distribution lines; these are normally larger loads. A rule has been proposed as shown in Appendix H.

186. Applicant has urged, through the Michigan Electric Association, that loads of 75 kilowatts or more remain open to free and unrestricted competition between privately owned electric utilities and cooperatives.

187. Applicant actually would prefer to keep loads of 25 kilowatts or more open to free and unrestricted competition between privately owned electric utilities and cooperatives.

188. Applicant favors competition with the cooperatives for large loads.

189. The Michigan Public Service Commission has no jurisdiction over municipal electric utilities and does not regulate competition between municipal electric utilities and privately owned electric utilities.

190. A provision of Article VIII of Michigan's 1908 constitution prohibited any municipality from selling outside its boundaries electric power in excess of 25% of the amount marketed inside its boundaries.

191. In a 1963 constitutional revision, the Michigan Legislature was authorized to change this limitation. See Article VII of the present constitution.

192. By the terms of a 1972 Michigan statute, the foregoing constitutional limitation does not apply to the interchange of coordinating power and energy among municipalities.

193. Rural electric cooperatives may not, by the terms of the Rural Electrification Act, compete to serve within cities at retail (with minor exceptions). 7 U.S.C. §904.

194. There is no limitation on the type of entity with which rural electric cooperatives may interchange coordinating power and energy.

195. There is free and open competition at retail within cities between municipal electric utilities and privately owned utilities that received rights to serve in those cities under Act 264, Public Acts of Michigan 1905 (Foote Act).

196. Applicant favors retail competition with municipal electric utilities within city limits.

197. There are no laws limiting competition in wholesale bulk power supply in Michigan.

198. In general, the economics of serving any given load either with full requirements power or coordinating power and energy depend on the size of the load, its rate of growth, and its distance from existing facilities.

199. It is Applicant's policy not to compete for large loads with the Alpena Power Company (a private electric utility to which Applicant furnishes bulk power at wholesale), even where it is economically feasible to do so.

200. It is Applicant's policy to seek to serve large loads within the municipal boundaries of Coldwater, Michigan, and other cities when and to the extent permitted by law, even where it has no Foote Act rights to serve within those cities.

201. Coldwater and other cities have granted Applicant permission to serve large loads within their municipal boundaries in cases where their municipal utilities have found it economically infeasible to supply those loads.

202. Michigan law permits municipalities to acquire the property of franchised public utility systems within municipal boundaries by condemnation after expiration of an outstanding franchise.

203. The Michigan Public Service Commission may not restrict municipal entry into the electric business.

204. It would be economically infeasible for a municipality to enter into the electric power distribution business if a competitively priced bulk power supply were not available.

205. There have been no municipal entrants into the electric utility business in Michigan's lower peninsula since 1925, except for the City of Zeeland.

206. Since 1925, several electric utilities have abandoned all (or nearly all) of their generating function and became wholly (or almost wholly) distribution systems; but only one electric utility has added bulk power supply functions to what was previously solely a distribution system.

207. In general, the decision to abandon the generating function or to sell an entire electric utility has been made at the time the utility's load had reached the limits of its existing bulk power capacity, and it required additional bulk power supply.

208. Applicant conceded in 1970 that it was a "public utility" subject to the jurisdiction of the Federal Power Commission.

209. Applicant has never conceded that its wholesale contracts are subject to Federal Power Commission regulation, although it has filed such contracts with the FPC.

210. It is Applicant's position that it may not be required under any provision of state or federal law or regulation to sell wholesale power to a retail distribution system or to contract for such sale with any entity proposing to own or operate a retail distribution system.

211. It is Applicant's position that it is not required under any provision of state or federal law or regulation to share reserves under the <u>Gainesville</u> formula with smaller systems operating wholly within Michigan.

212. It is Applicant's position that it may not be required under any requirement of federal or state law or regulation to coordinate development with smaller systems operating wholly within Michigan.

213. Where a number of central stations are joined by high voltage transmission lines planned and operated as one

system under common ownership, they are said to be "fully integrated."

214. Where two or more fully integrated systems are joined by transmission lines, share reserves and engage in other types of coordination short of coordinated development, they are said to engage in "limited coordination."

215. Where they also engage in coordinated development, they are said to engage in "extensive coordination."

216. Representatives of the Michigan Pool companies (Applicant and Detroit Edison) have claimed that the coordination engaged in by the members of the Pool is the most extensive coordination by any two or more companies in the United States, short of the coordination of companies controlled by a common holding company.

217. The Midland units are to be connected with the remainder of Applicant's system by high-voltage transmission lines and integrated into that system.

218. The financial feasibility of the units is predicated upon such integration.

219. The power marketed by Applicant as firm power comes from its integrated system, and the marketing arrangements do not identify the power as coming from any individual generating unit or units.

220. Several units installed by Applicant and Detroit Edison are defined in the Michigan Pool agreement as "pool units" and are a coordinated development of the Michigan Pool.

221. Only systems which are very large and fully integrated in themselves or which have full access to coordination can use large base load fossil fuel or nuclear units to market competitively priced bulk power supply.

222. At the present time, except where a small electric utility in the area of Michigan's lower peninsula generally coextensive with Applicant's transmission system is reasonably close to another small electric utility or group of electric utilities willing to coordinate with it, its only economical alternative to the purchase of power in bulk from Applicant is to construct its own isolated bulk power supply utilizing small generating units.

223. At the present time, Applicant is the only source of wholesale power from an integrated system available to actual or potential purchasers in the area of Michigan's lower peninsula generally coextensive with Applicant's transmission system, except as noted below.

224. Wholesale purchasers close to the transmission system of the M-C Pool may purchase bulk power supply from its integrated system which has capacity of approximately 200 megawatts.

225. Wholesale purchasers near the City of Lansing may purchase bulk power supply from that city's 300 megawatt system.

226. Wholesale purchasers near the periphery of Applicant's system on the south and east may find it economically feasible to purchase power from large coordinated systems close by,

such as Indiana & Michigan Electric Co., Michigan Power Co., and Ohio Power Co. (affiliates in the American Electric Power System); Northern Indiana Public Service Co., Toledo Edison Co., and Detroit Edison Co. As the size of the wholesale load increases, purchase from peripheral systems becomes economically feasible at greater distances within Applicant's area.

227. While purchase from peripheral fully coordinated systems may be feasible, some of those systems, such as Northern Indiana Public Service Co. and Toledo Edison Co. have a policy not to build transmission to provide service in Applicant's area and would even refuse to provide service should the potential wholesale customers be willing to construct transmission to their systems.

228. Were small bulk power suppliers or groups of bulk power suppliers in Michigan to have access to coordination on the same terms as those enjoyed by Applicant in its dealings with Detroit Edison, they could provide a greater degree of competition at wholesale and at retail than they are able to at present.

229. There are three relevant product markets and a geographic area associated with each. These are: (1) the retail distribution market where the buyers are consumers of electric power and the sellers are distribution utilities or distribution divisions of vertically integrated electric utilities. This market is predominantly a market for firm power although

some industrial customers can use, and prefer to purchase, interruptible power (at a lower rate because no firm demand is imposed on the seller); (2) the wholesale or bulk supply market where the purchasers or users are the sellers in the retail market. This is also predominantly a market for bulk supply of firm power; (3) the area or regional power exchange. This is a market for coordinating power and energy. Both the buyers and sellers in this market are sellers or suppliers in the second market.

230. The geographic market for each of the foregoing is defined by the size of the load and the distance from existing facilities: (1) For the retail distribution market, it includes the suppliers' existing customers and all customers located in territories capable of being served from existing facilities, or from added facilities where their cost bears some reasonable relationship to the anticipated additional revenues (for example, where the cost of facilities is equal to three times additional annual revenues); (2) The bulk supply market is also defined by the size of the load and the distance from existing bulk supply facilities. It includes all existing customers or bulk load centers and customers or load centers located a reasonable distance from existing facilities; (3) The market for coordinating power and energy is defined by the size of the load, the distance from existing facilities and the nature of the transaction. When intervening bulk power suppliers are willing to make joint transmission

arrangements (or wheel power), the distances for economically feasible coordinating arrangements are increased.

231. The relevant retail distribution market in this proceeding includes all retail loads supplied by Applicant's distribution properties and the retail loads of the other electric utilities listed in Applicant's responses to the Attorney General's questions 9 and 10, with the following exceptions: (1) loads served by subsidiaries of the American Electric Power System; (2) loads served by the Detroit Edison Company; (3) loads served by independent systems that are too distant economically to be served by Applicant, including Sebewing, Croswell, Detroit Lighting Commission, Wyandotte, Dowagiac, and Niles.

232. The relevant wholesale or bulk supply market includes all wholesale loads supplied by Applicant to its own distribution properties and the wholesale loads of other electric utilities in Applicant's responses to the Attorney General's questions 9 and 10, with the following exceptions: (1) loads served by subsidiaries of the American Electric Power System; (2) loads served by the Detroit Edison Company; (3) loads served by other independent systems that are too distant economically to be served by Applicant, including Sebewing, Croswell, Detroit Lighting Commission, Wyandotte, Dowagiac, and Niles.

233. In 1970 the relevant retail distribution market was approximately 4100 megawatts, of which approximately 3400 megawatts was supplied by Applicant.

234. In 1970 the relevant wholesale or bulk supply market was 4100 megawatts, of which approximately 3550 megawatts was supplied by Applicant.

235. In 1970 Applicant supplied approximately 80% of the retail market for electric central station service relevant to this proceeding and supplied approximately 85% of the wholesale market relevant to this proceeding.

WALLACE E. BRAND

WILLIAM T. CLABAULT

DAVID A. LECKIE

Attorneys, Department of Justice
Antitrust Division

February 12, 1973
Washington, D. C.

UNITED STATES OF AMERICA

BEFORE THE

ATOMIC ENERGY COMMISSION

In the Matter of	)	
	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329A
	)	50-330A
(Midland Plant, Units 1 and 2)	)	

CERTIFICATE OF SERVICE

I hereby certify that copies of REQUEST FOR ADMISSIONS AND INTERROGATORIES AS TO PROPOSED CONTENTIONS, dated February 12, 1973, in the above captioned matter have been served on the following by deposit in the United States mail, first class or air mail, this 12th day of February, 1973:

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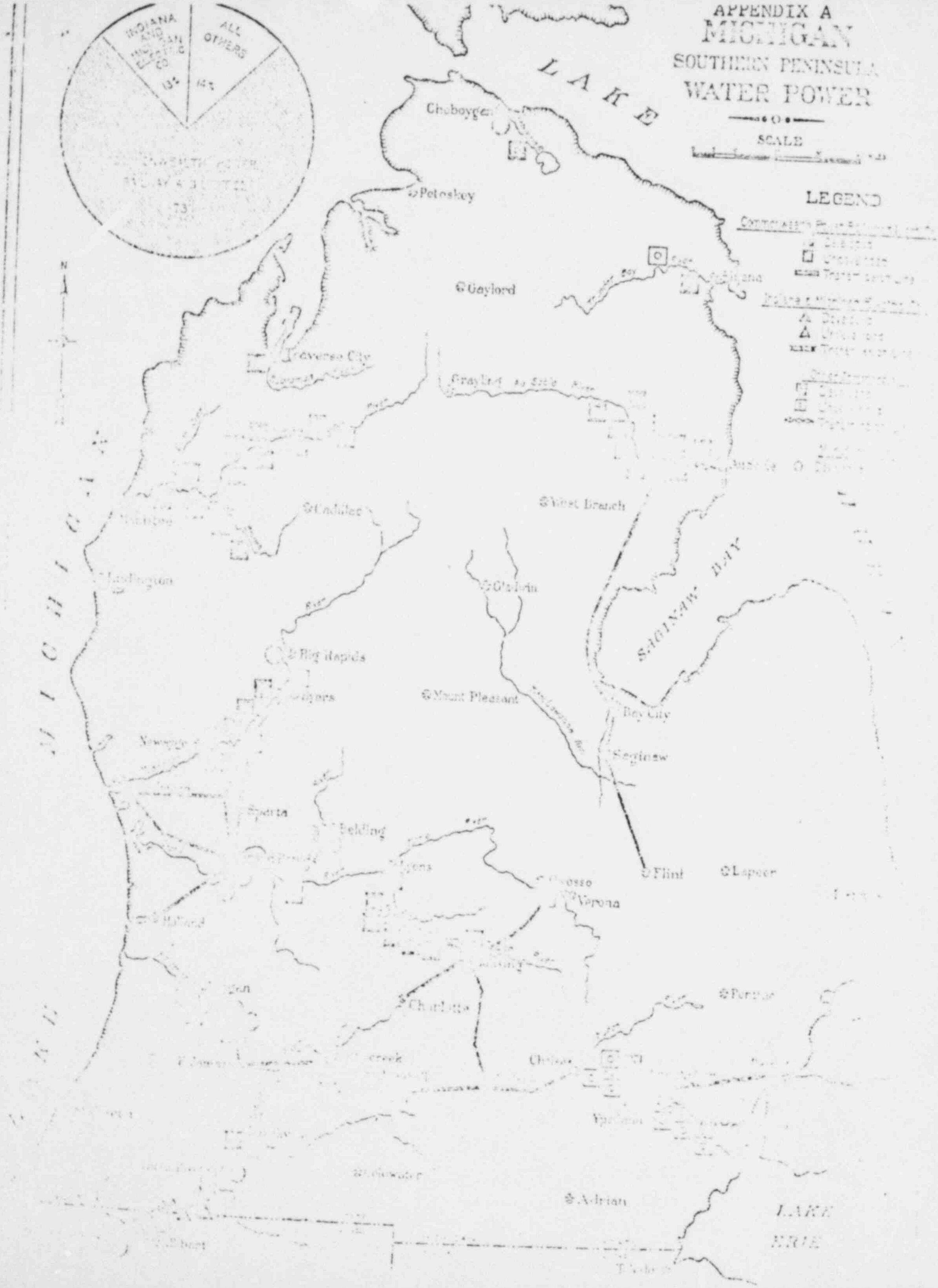
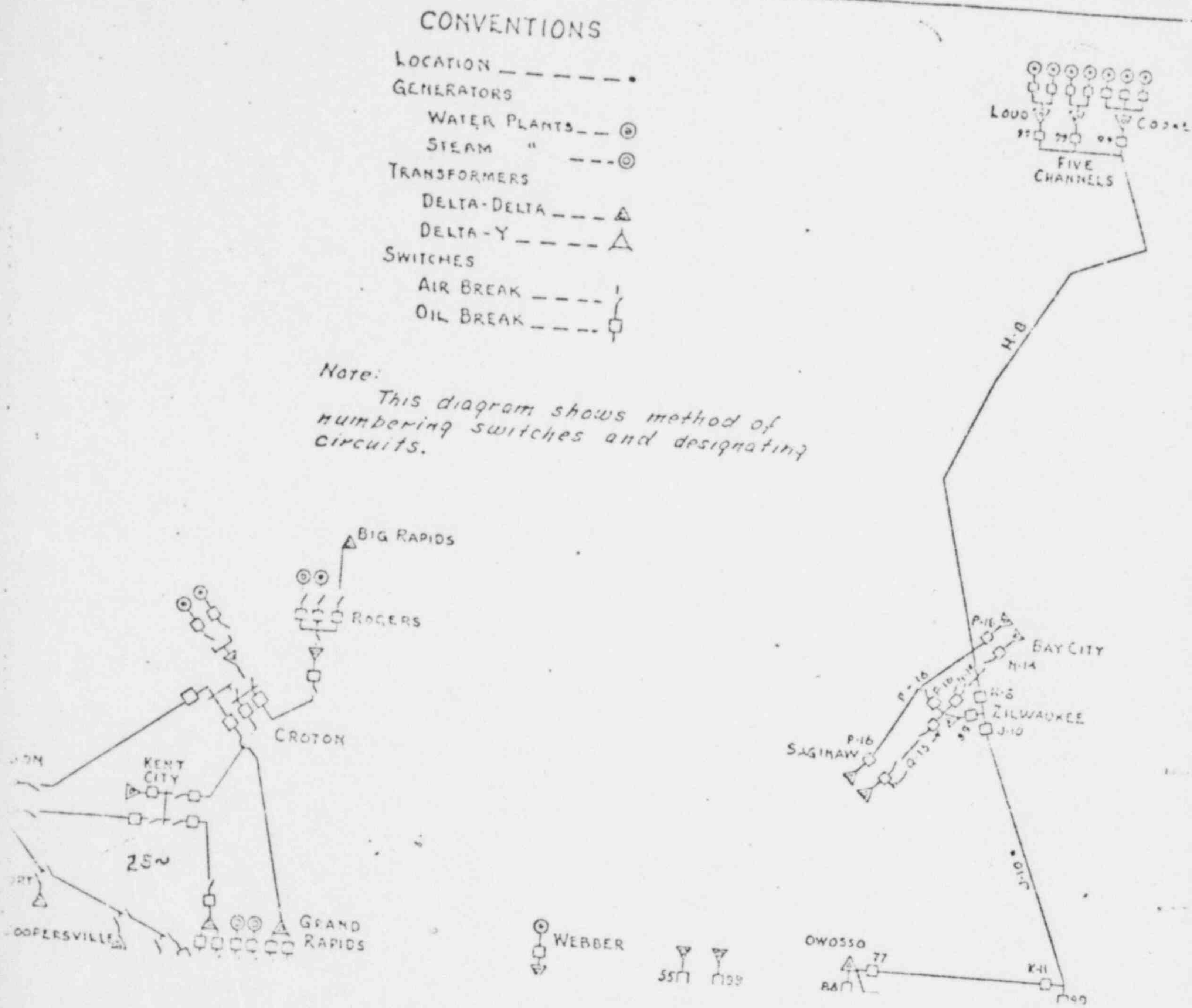
APPENDIX A

MICHIGAN SOUTHERN PENINSULA WATER POWER




CONVENTIONS
LOCATION
GENERATORS
WATER PLANTS
STEAM "
TRANSFORMERS
DELTA-DELTA
DELTA-Y
SWITCHES
AIR BREAK
OIL BREAK
Note:
This diagram shows method of numbering switches and designating circuits.
LOUD
FIVE CHANNELS
H-0
BIG RAPIDS
ROGERS
CROTON
KENT CITY
25~
GRAND RAPIDS
WEBBER
BAY CITY
H-14
ZILWAUKEE
J-10
SAGINAW
P-16
OWOSSO
77
K-11
55

APPENDIX C

64th Congress, 1st Session	SENATE	Document No. 316

ELECTRIC POWER DEVELOPMENT IN THE UNITED STATES

LETTER

FROM THE

SECRETARY OF AGRICULTURE

TRANSMITTING

A REPORT, IN RESPONSE TO A SENATE RESOLUTION OF FEBRUARY 13, 1915, AS TO THE OWNERSHIP AND CONTROL OF THE WATER-POWER SITES IN THE UNITED STATES

IN THREE PARTS

PART II

January 20, 1916.—Referred to the Committee on Printing

WASHINGTON
GOVERNMENT PRINTING OFFICE
1916

TABLE 55.—STATISTICS OF POWER DEVELOPMENTS, PUBLIC UTILITY

MASSACHUSETTS—Continued.

C.—ALL OTHER PLANTS—Continued.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream utilized.
208	Merrimac Paper Co.			Lawrence	Lawrence	Merrimac River.
209	Monroe Felt & Paper Co.		Manufacturing	do	do	do
210	New Bedford & Onset Street Ry. Co.	G	Electric railways	Wareham	Wareham	
	New England Investment & Securities Co.	H				
211	Milford, Attleboro & Woonsocket Street Ry. Co.	G	do	Unionville	Unionville	
	New York, New Haven & Hartford R. R. Co.	H				
212	Berkshire Street Ry. Co.	G	do	Pittsfield	Pittsfield	
213	Do.	G	do	Zylonite	Zylonite	
214	Norfolk & Bristol Street Ry. Co.	G	do	South Walpole	South Walpole	
215	Northampton Street Ry. Co.	G	do	Northampton	Northampton	
216	Norton & Taunton Street Ry. Co.	G	do	Barrowsville	Barrowsville	
217	Pemberton Co.	G	Manufacturing	Lawrence	Lawrence	Merrimac River.
218	Plymouth Mills			do	do	do
219	Proprietors of locks and canals			Lowell		do
	Southeastern Electric Co.	H				
220	Taunton & Pawtucket Street Ry. Co.	G	Electric railways	Attleboro	Attleboro	
	Stone & Webster Mortgage Association	M				
221	Blue Hill Street Ry. Co.	G	do	Canton	Canton	
222	Union Street Ry. Co.	G	do	New Bedford	New Bedford	
223	United States Worsted Co.			Lawrence	Lawrence	Merrimac River.
224	Ware & Brookfield Street Ry. Co.	G	Electric railways	Ware	Ware	
225	Warren, Brookfield & Spencer Street Ry. Co.	G	do	Brookfield		
226	Wright Manufacturing Co.			Lawrence	Lawrence	Merrimac River.

MICHIGAN.

A.—PUBLIC UTILITY PLANTS.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream utilized.
1	Alma Grain & Lumber Co.	GD	Alma	Alma	Alma	Pine River.
	American Light & Traction Co.	H				
2	Muskegon Traction & Lighting Co.	GD	Muskegon	Muskegon	Muskegon	
	Alpena Power Co. (Ltd.)	H				
3	Alpena Electric Light Co.	GD	Alpena	Alpena	Alpena	Thunder Bay River.
4	Anderson Bros.	GD	Hartford	Hartford	S. 9 and 10, T. 3 S., R. 16 W.	Paw Paw River.
5	Antrim Light & Power Co.	GD	Mancelona	Mancelona		
6	Athens Mill & Power Co.	GD	Athens	Athens		
7	[illegible], J. J., Light Plant	GD	Lakeview	Lakeview	Lakeview	
8	Bay View Camp Ground Association	D	Camp Ground	Bay View		
9	Beaverton Light & Power Co.	GD	Beaverton	Beaverton		
10	Beckwith, P. D., Estate (Inc.)	GD	Dowagiac	Round Oak	S. 13, 14, and 15, T. 6 S., R. 15 W.	Dowagiac Creek.
11	Benton Harbor-St. Joe Railway & Light Co.	D	Berrien County			
12	Benzie County Power Co.	GD	Benzie and Manistee Counties.	Betzie River Dam		Betzie River.
13	Do.	GD		Frankport	Frankport	
14	Big Rapids Electric Co.	GD	Big Rapids	Big Rapids	Big Rapids	Muskegon River.
15	Boardman Light Co.	GD	South Boardman	South Boardman		
16	Boardman River Electric Light & Power Co.	GD	Traverse City	Traverse City	Traverse City	Boardman River.
	Boyne River Power Co.	H				
17	Boyne City Electric Co.	GD	Boyne City	Boyne City	Boyne City	Boyne River.
18	Do.	GD	do	do	do	
19	Brighton Electric Light & Power Co.	GD	Brighton	Brighton	Brighton	
20	Caro Light & Power Co.	GD	Caro	Caro		Caro River.
21	Centreville Water & Electric Co.	GD	Centreville	Centreville		
22	Central Lake Electric Light Co.	GD	Central Lake	Central Lake	Central Lake	
23	Cheboygan Electric Light & Power Co.	GD	Cheboygan and Emmet Counties.	Cheboygan		Black River.
24	Do.	GD	do	Pellston		Maple River.
25	Citizens Electric Co., The	GD	Battle Creek	Battle Creek		
26	Citizens Light & Power Co.	GD	Allegan	Allegan		
27	Citizens Light Co.	GD	[illegible] and Smyrna	Belding		Flat River.
28	[illegible] Electric Light, Ltd.	GD	[illegible]	[illegible]ville	Mosterville	Kalamazoo River.
29	Cleveland Cliffs Iron Co.	GD	Marquette County	Carp River		Carp River.
30	Do.			M[illegible]		
31	Do.			Princeton		

MUNICIPAL, AND INDUSTRIAL, BY STATIONS AND BY STATES, 1915—Continued.

MASSACHUSETTS—Continued.

C.—ALL OTHER PLANTS—Continued.

No.	Status of land occupied.	Horse-power of water wheels.	Horse-power of boilers.	Horse-power of steam engines.	Horse-power of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
208										O.
209	Private	500	200	200						C.
210			1,280	950		725				M. Me.
211			750	750		375				M. Me.
212 } 213 }			6,030	15,225		12,750				{M. Me. {Me.
214			500	1,100		825				M. Me.
215			800	1,200		810				M. Me.
216			(500)	800		(480)				M. Me.
217	Private	1,000	500	150		150				C.
218										O.
219		11,552								O.
220			1,000	840		400				M. Me.
221			(600)	(850)		487				M. Me.
222			3,100	4,550		5,000				M. Me.
223										O.
224			500	500		405				M. Me.
225			324	750		587				M. Me.
226										O.
	Totals, C	31,128	119,527	258,317	850	152,9[illegible]				
	Grand total	133,685	261,021	645,2[illegible]	3,337	549,9[illegible]				

MICHIGAN.

A.—PUBLIC UTILITY PLANTS.

No.	Status of land occupied.	Horse-power of water wheels.	Horse-power of boilers.	Horse-power of steam engines.	Horse-power of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
1		250	200	350		215½	$0.10			Me. C.
2			1,000	1,350		1,150				Me.
3	Private	1,335				1,080	$0.11 - .06	$0.025-$0.005		Me. O. C.
4	Do	175			50	100	.08 - .05	.05 - .035		Me. C.
5		300				270				Me.
6		165			50	90				Me.
7			180	72		60	.07			Me. C.
8									City of Petoskey	Me.
9		300	150	150		215				Me.
10	Private	150	1,200	1,200		1,000	.075	.075		Me. C.
11							.11 - .04	.05 - .02	Indiana & Michigan Electric Co.	Me. M. C.
12	Private	500				375	.10 - .04	12+,02 - .015		C.
13			300	225		500				Me.
14	Private	330				315	.08 - .035	.03 - .01		Me. C.
15		84				65				Me.
16	Private	1,000				750	.08 - .04	.03		Me. M. C.
17	Do	500				300	.10 - .04	.05 - .012		Me. M. C.
18	Do		100	100		75	.10 - .04	.05 - .015		C.
19			80	80		50				Me.
20	Private	300	(500)	500		310	.12 - .05			Me. C.
21		180				135			City of Sturgis	Me.
22	Private		150	125		80	.10			C.
23		1,320				1,000				Me. M.
24	Private	300				375	.10 - .06			Me. M. C.
25		350	700	1,050		1,500	.18			Me. M.
26		750	1,500	1,500		1,[illegible]				Me. M.
27	Private	350				200	.08	.05 - .025		M. C.
28	Do	70				25				C.
29		5,000				5,000				O.
30						1,500				O.
31						1,500				O.

TABLE 55.—STATISTICS OF POWER DEVELOPMENTS, PUBLIC UTILITY,

MICHIGAN—Continued.

A.—PUBLIC UTILITY PLANTS—Continued.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream utilized.
32	Columbiaville Woolen Mill	D	Columbiaville	Columbiaville	Columbiaville	
	Commonwealth Power, Railway & Light Co.	H				
33	Au Sable Electric Co.	GTD	Southern Michigan	Albion		
34	Do	GTD	do	Allegan		
35	Do	GTD	do	Battle Creek		
36	Do	GTD	do	do		
37	Do	GTD	do	do		
38	Do	GTD	do	Bay City		
39	Do	GTD	do	Ceresco		
40	Do	GTD	do	Cooke		Au Sable River
41	Do	GTD	do	Croton		
42	Do	GTD	do	Five Channels		Au Sable River
43	Do	GTD	do	Flint		
44	Do	GTD	do	Grand Rapids		
45	Do	GTD	do	do		
46	Do	GTD	do	Jackson		
47	Do	GTD	do	Kalamazoo		
48	Do	GTD	do	[illegible]		
49	Do	GTD	do	Lowell, No. 1		
50	Do	GTD	do	Lowell, No. 2		
51	Do	GTD	do	Otsego		
52	Do	GTD	do	Plainwell		
53	Do	GTD	do	Rogers		
54	Do	GTD	do	Saginaw		
55	Do	GTD	do	Shiawasseetown		
56	Do	GTD	do	Stronach		
57	Do	GTD	do	Trowbridge		
58	Do	GTD	do	Webber		
59	Bay City Power Co.	D	Bay City and Essexville	Bay City		
60	Cadillac Water & Light Co.	GD	Cadillac	Cadillac	Cadillac	
61	Commonwealth Power Co.	D	Jackson	Jackson		
62	Flint Electric Co.	D	Flint	Flint		
63	Grand Rapids Edison Co.	D	Kent County	Grand Rapids		
64	Grand Rapids-Muskegon Power Co.	GTD	Ottawa and Kent Counties	Big Rapids		
65	(Lessor, Grand Rapids, Grand Haven & Muskegon Ry. Co.)	L		Fruitport	Fruitport	
66	Grand Rapids, Holland & Chicago Ry. Co.			Grand Rapids		
67	Grand Rapids Ry. Co.			do		
68	Manistee Power & Light Co.	GD	Manistee	Manistee		
69	Pontiac Power Co.	GD		Pontiac		
70	Saginaw Power Co.	D		Saginaw		
71	Consolidated Light & Power Co.	GD	Isabella, Claire, and Midland Counties	Mount Pleasant	Mount Pleasant	Chippewa River
	Copper Range Co.	H				
72	Baltic Mining Co.	GD	Houghton County	Redridge	S. [illegible], T. [illegible] N., R. [illegible] W.	
73	Dundee Power Co.	GD	Dundee	Dundee		
74	East Jordan Electric Light & Power Co.	GD	East Jordan	East Jordan	East Jordan	
75	Edison Sault Electric Co.	GD	Sault Ste. Marie	Sault Ste. Marie	Sault Ste. Marie	St. Marys River
76	[illegible] Light & Power Co.	GD	Plainwell	Plainwell		Kalamazoo River
77	[illegible] Electric Light & Power Co.	GD	Munising	Munising	Munising	
78	Elk Rapids Electric Co.	GD	Elk Rapids	Elk Rapids		
79	Escanaba Traction Co.	GD	Delta County	[illegible]	[illegible]	Escanaba River
80	Do			Wells	Wells	do
81	(Lessor, City of Escanaba)	L		[illegible]	[illegible]	
82	Fennville Milling Co.	GD	Fennville	Fennville	Fennville	
83	Fowlerville Lighting Co.	GD	Fowlerville	Fowlerville	Fowlerville	
84	[illegible] Power Co.	GD	Montague	Whitehall	Whitehall	
85	Gibbs, J. H., & Sons	GD	[illegible]	[illegible]	Edmore	
86	Gibbs, Mrs. J. L.	GD	Mayfield and Kingsley	Mayfield		Mayfield Creek
87	Gladwin Light & Power Co.	GD	Gladwin	Gladwin		
88	Grand Marais Light & Water Plant	GD	Grand Marais	Grand Marais	Grand Marais	
89	Grayling Electric Co.	GD	Grayling	Grayling	Grayling	Au Sable River
90	Greene, George E., Light Plant	GD	Brooklyn	Brooklyn	Brooklyn	
91	Green, Roswell	GD	North Branch	North Branch	North Branch	
92	Hall, C. F., Light Plant	GD	Standish	Standish	Standish	
93	Harbor Beach Electric Co., The	GD	Harbor Beach	Harbor Beach	Harbor Beach	
94	Hart Milling & Power Co.	GD	[illegible]	[illegible]		
95	[illegible] Light & Water Co.	GD	[illegible]	[illegible]		Flint River
96	Homer Electric Light & Power Co.	GD	Homer	Homer	Albion	Kalamazoo River
97	Howard City Electric Light & Power Co.	GD	Howard City	Howard City	Howard City	
98	[illegible] Electric Light & Power Co.	GD	[illegible]	[illegible]		
99	Hudson Power & Light Co.	GD	Hudson	Hudson	Hudson	
100	[illegible] Co.	GD	[illegible]	[illegible]		
101	[illegible] Power & Light Co.	GD	Charlevoix	[illegible]	[illegible]	Intermediate River
102	Imlay City Electric Light Co.	GD	Imlay City	Imlay City	Imlay City	
103	[illegible]	[illegible]	[illegible]	[illegible]		St. Joseph River
104	[illegible]	GD	[illegible]	[illegible]		do
105	Iron Mountain Electric Light & Power Co.	GD	[illegible]	[illegible]		
106	[illegible]			Iron Mountain	Iron Mountain	
107	[illegible] Light & Power Co.	D	[illegible]	[illegible]		
108	[illegible] Light Co.	GD	[illegible]	[illegible]		
109	[illegible] Light & Power Co.	GD	[illegible]	[illegible]		
110	[illegible]	GD	[illegible]	[illegible]		
111	Lapeer Gas & Electric Co.	GD	Lapeer	[illegible]	[illegible]	
112	[illegible]	GD	[illegible]	[illegible]		
113	[illegible]	[illegible]				
114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
115	[illegible] Co.	GD	[illegible]	[illegible]	[illegible]	[illegible]

MUNICIPAL, AND INDUSTRIAL, BY STATIONS AND BY STATES, 1915—Continued.

MICHIGAN—Continued.

A.—PUBLIC UTILITY PLANTS—Continued.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
										Mc.
32										M. Mc.
33										M. Mc.
34										M. Mc.
35										M. Mc.
36										Mc.
37										M. Mc.
38										M. Mc.
39										M. Mc.
40										M. Mc.
41										Mc. M. O.
42										Mc. M.
43										Mc. M.
44										Mc. M.
45		54,213	29,481	62,180		84,160				Mc. M.
46										Mc. M.
47										Mc. M.
48										Mc. N.
49										Mc. M.
50										Mc. M.
51										Mc. M.
52										Mc. M.
53										Mc. M.
54										Mc. M.
55										Mc. M.
56										Mc. M.
57									Au Sable Electric Co.	Mc.
58										M. Mc.
59			700	350		450				M. Mc.
60									Au Sable Electric Co.	Mc.
61									Grand Rapids-Muskegon Power Co.	M. Mc.
62										
63										M.
64		6,000				(3,600)			Au Sable Electric Co.	Mc.
65			1,000	1,220		1,220				M.
66										M.
67										Mc. M.
68		500	300	950		700				M. Mc.
69			1,400	1,650		1,300				Mc.
70									Gladwin Light & Power Co.	Mc. C.
71		400	700	600		700				
			1,6[illegible]	2,0[illegible]		1,5[illegible]				C.
72		210	1[illegible]0	120		2[illegible]0				Mc.
73			3[illegible]0	375		4[illegible]5				Mc.
74					1,800	1,800	$0.15 - $0.02	$0.05 - $0.0075		Mc. M. C.
75	Public	3,000				400	.05			Mc. C.
76	Private	120	250	450		225				Mc.
77			500	350		250				Mc.
78		850								Mc. M. C.
79	Private	8,200	200	300		2,150	.08 - .01	.08 - .007		Mc. M. C.
80	Do	1,320				600	.08 - .01	.08 - .007		C.
81			700	400		400	.08 - .01	.08 - .007		Mc.
82			100	85		40				Mc.
83			220	220		70				Mc. C.
84	Private				125	180	.12 - .08	.08 - .04		Mc. C.
85	Do		150	160		85	.12 - .08	.08 - .04		Mc. C.
86	Do	75				45	.125			Mc.
87		400				250				Mc.
88			250	250		175				Mc. C.
89	Private	135				60	.12 - .08			Mc.
90			100	110		75				Mc. C.
91	Private		80	80		50	.15 - .08			Mc.
92			150	150		100				Mc. C.
93	Private		(450)	870		650	.10	6.00	The Huron Milling Co.	Mc. C.
94	Do	450	150	135		225	.07 - .05	.05 - .015		Mc.
95		150				120				Mc.
96	Private	100				200	.18 - .08	.18 - .08		Mc. C.
97	Do		150	225		115	.12 - .07			Mc.
98		183				45				Mc. C.
99	Private		325	325		420	.14 - .06	.035 - .025		Mc.
100		60	100	85		55				Mc. C.
101	Private	400	700	850		375	.04 - .03	.025 - .015		M.
102			250	175		175				M. M.
[illegible]		9,2[illegible]				1,500				[illegible]
[illegible]		[illegible]								[illegible]
[illegible]		500	[illegible]	370		250			[illegible]	[illegible]
[illegible]										M. M.
[illegible]			[illegible]	[illegible]		1,000				[illegible]
[illegible]		2,[illegible]								[illegible]
[illegible]		500				200				[illegible]
[illegible]			[illegible]	85		[illegible]				M. M.
[illegible]			[illegible]	[illegible]		375				Mc.
[illegible]			[illegible]	[illegible]		125				[illegible]
[illegible]					[illegible]	[illegible]	[illegible]	[illegible]		
[illegible]	Private	500	80	75		60		.15		
[illegible]	Do									

TABLE 55.—STATISTICS OF POWER DEVELOPMENTS, PUBLIC UTIL[illegible]

MICHIGAN—Continued.

A.—PUBLIC UTILITY PLANTS—Continued.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream [illegible]
116	Manistique Light & Power Co.	GD	Manistique	Manistique		
117	Marine City Roller Mills Co.	GD	Marine City	Marine City	Marine City	
118	Menominee & Marinette Light & Traction Co.	GTD	Menominee and Marinette, Wis.	Rapids		Menominee [illegible]
119	Do.	GD		Menominee		
120	Michigan Power Co.	GD	Lansing and East Lansing	Lansing	Lansing	
121	Do.	GD	do	do		Grand River
	Middle West Utilities Co.	H				
122	Constantine Hydraulic Co.	GD	St. Joseph and Cass Counties	Constantine	Constantine	St. Joseph River
123	Marquette County Gas & Electric Co.	GTD	Marquette County	Negaunee	Negaunee	
124	Milling & Power Co.	GD	Cassopolis	Cassopolis	Cassopolis	
125	Three Rivers Light & Power Co.	GTD	Three Rivers	Three Rivers	Three Rivers	Portage River
126	Milford Electric Co.	GD	Milford	Milford	Milford	Huron River
127	Monaghan & Taylor Light Plant	D	Rose City	Rose City	Rose City	
128	Morenci-Fayette Light & Power Co.	GD	Morenci and Fayette	Morenci	Morenci	
129	Nadeau Bros.	GD	Nadeau	Nadeau	Nadeau	
	National Gas, Electric Light & Power Co.	H				
130	Port Huron Gas & Electric Co.	GD	Port Huron	Port Huron	Port Huron	
131	Newaygo Portland Cement Co.	GD	Newaygo	Newaygo		
	North American Co., The	H				
132	Detroit Edison Co., The	GTD	Southeastern Michigan	Argo	Ann Arbor	Huron River
133	Do.			Barton	S. 17, T. 2 S., R. 6 E.	do
134	Do.			Connors Creek, No. 1	Detroit	
135	Do.			Delray, No. 1	do	
136	Do.			Delray, No. 2	do	
137	Do.			Geddes	Geddes	
138	Do.			do	S. 3[illegible], T. 2 S., R. 6 E.	Huron River
139	Do.			Mount Clemens	Mount Clemens	
140	Do.			Superior	S. [illegible], T. 3 S., R. 7 E.	Huron River
141	Do.			West Willis Avenue	Detroit	
142	(Lessor, City of Northville)	L	Northville	Northville	Northville	
143	Edison Illuminating Co. of Detroit	D	Detroit	Detroit		
144	Oak Park Power Co.	GD	Flint	Flint	Flint	
145	Ogemaw Power Co.	GD	West Branch	West Branch		
146	Omer Mill & Electric Co.	D	Omer	Omer	Omer	
147	Onaway Electric Light & Power Co.	GD	Onaway and Tower	Onaway		Black River
148	O'Rourke, J. H., Light Plant	GD	Clio	Clio	Clio	
149	Osceola Light & Power Co.	GD	Reed City	Reed City	Reed City	Hersey River
150	Peninsular Power Co.	GD	Iron Mountain and Iron River	Iron Mountain		Menominee River
151	Do.	GD	do	Iron River	Iron River	
152	Peters, R. G., Salt & Lumber Co.	GD	Eastlake	Eastlake	Eastlake	
153	Pinconning Light & Power Co.	GD	Pinconning	Pinconning	Pinconning	
154	Postum Cereal Co.			Battle Creek		
155	Preston & [illegible]	GD	Wolverine	Wolverine	Wolverine	Sturgeon River
156	Rockafellow Grain Co.	GD	Carson City	Carson City	Carson City	
157	R[illegible] Electric Light & Power Co.	GD	Rockford	Rockford		Rogue River
158	Sa[illegible] Plant	GD	Crystal	Crystal	Crystal	
159	Schl[illegible] Light & Power Co.	GD	Lapeer	Lapeer		
160	S[illegible], C. P., & Co.	GD	Deerfield and Petersburg	[illegible]		
161	[illegible] Electric Co.			[illegible]		
162	S[illegible] Lumber Co.	GD	Kenton	Kenton	Kenton	
163	Spencer Electric Light & Power Co.	GD	Belding and Smyrna	Smyrna	Smyrna	Flat River
164	Stearns Lighting & Power Co.	GD	Mason and Oceana Counties	Ludington	Ludington	
165	Stone & Stone Electric Light Co.	GD	Marion	Marion		North Branch Muskegon River
	Stone & Webster	M				
166	Houghton County Electric Light Co.	GD	Houghton, Keweenaw and Ontonagon Counties	Houghton	Houghton	
617	Sturgis & Sons Light Plant	GD	Fowler	Fowler	Fowler	
168	Tecumseh Electric Co., The	GD	Lenawee County	Tecumseh		Raisin River
169	Tower, R. J., Electric Co.	GD	Greenville	Greenville		Flat River
170	United Electric Co.	GD	Burr Oak	Burr Oak		
171	Do.	GD	Mendon	Mendon		
172	Do.	GD	Parkville	Parkville		
173	Utica Electric & Water Co.	GD	Utica	Utica		
	United [illegible] Co.	H				
174	Michigan Northern Power Co.	GD	Sault Ste. Marie	Sault Ste. Marie	Sault Ste. Marie	St. Marys River
175	Vanderbilt Electric Light & Power Co.	GD	Vanderbilt	Vanderbilt	Vanderbilt	
176	Wayland Light & Power Co.	GD	Wayland	Wayland	Wayland	
177	Western Utilities Co.			Grand Rapids		
178	W[illegible], O. R., Light Plant	GD	[illegible]	[illegible]	[illegible]	
	White, J. G., & Co.					
179	Thornapple Gas & Electric Co.	GD	Barry and Kent Counties	Hastings	Hastings	
180	Do.	GD	[illegible]	[illegible]	[illegible]	
181	William[illegible]	GD	[illegible]	[illegible]	[illegible]	[illegible]
182	W[illegible] Lumber Co.	GD	C[illegible]	[illegible]	[illegible]	

…NICIPAL, AND INDUSTRIAL, BY STATIONS AND BY STATES, 1915—Continued.

MICHIGAN—Continued.

A.—PUBLIC UTILITY PLANTS—Continued.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
116		700				760				Me.
117			250	250		250				Me.
118	Private	5,700				3,700	$0.009-$0.035	$0.015-$0.075		Me.M.O.C.
119			(1,600)	1,100		(600)				Me.O.
120			3,250	4,670		3,500				Me.M.
121		2,000				1,000				Me.M.
122	Private	2,046				1,200	.10 - .05	.05 - .035		Me.C.
123	Do		1,000	1,170		1,000	.10 - .07	.05 - .015		Me.M.C.
124	Do		250	150		125	.11 - .05	.07 - .035	Constantine Hydraulic Co.	Me.C.
125		240				200		.02		Me.C.
126	Private	300				250	.12 - .04	.12 - .02		Me.C.
127										Me.
128			225	250		200				Me.
129	Private		250	120		25	.40* - .25*			Me.C.
130	Do		2,000	3,500		4,300	.10 - .03	.15 - .02		Me.C.
131		2,000				1,395				Me.M.
132	Private	1,150				1,211				C.
133	Do	2,215				1,500				C.
134	Do		9,450	55,250		40,000				M.Me.C.
135	Do		12,000	42,670		32,000				M.Me.C.
136	Do		21,245	78,000		57,000				M.Me.C.
137	Do		1,750	2,000		1,500				M.Me.C.
138	Do	600				400				C.
139	Do		1,050	687		500				M.Me.C.
140	Do	1,150				700				C.
141	Do		2,475	1,000		1,200				M.Me.C.
142	Do	35	200	225		250				C.
143			3,600	4,000		2,500				Me.
144						175				Me.
145		500								Me.
146						150	.12	.02		Me.C.
147	Private	272				65				Me.
148			200	150						Me.C.
149	Private	183				250	.10 - .04	.02 - .01		Me.M.
150		5,250				3,750				M.Me.
151			1,450	873		625				Me.
152			2,[illegible]	1,500	50	125				Me.C.
153	Private		[illegible]	140		75				M.
154						60	.11 - .05	.05		Me.
155	Private	115	200		100	90	.10			Me.C.
156						120	.09 - .07	.05 - .01		Me.
157	Private	225				15	.10			Me.C.
158			125	60						Me.
159		100	150	150		200				Me.
160		100	80	80	80	125				P.
161						25				Me.
162		150	(150)	150		500	.08	.05 - .023		Me.
163		250								Me.C.
164	Private		(1,600)	2,400		1,625	.09 - .05	.04 - .02	Buys steam	Me.C.
165	Do	85			35	30	.10			M.Me.C.
166	Private		1,500	4,250		2,500	.12	.07 - .01		Me.
167			100	80	25	40				Me.C.
168	Private	325	400	600		250	.10 - .02	.10 - .02		Me.C.
169	Do	400	250	200		350	.05 - .035	.02 - .018		Me.
170		300	220			225				Me.
172										Me.
173		270				1,500				Me.M.O.C.
174	Private	30,500				20,750				Me.
175			150	58		(37)	.20			Me.
176	Private		80	50		30	.10			M.
177					60	45				Me.
178			315	300		600	.12 - .03	.04 - .01		Me.C.
179	Private	35				250	.12 - .03	.04 - .01		Me.C.
180		125	[illegible]			70				Me.
181			[illegible]							Me.
	Total A	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				

TABLE 55.—STATISTICS OF POWER DEVELOPMENTS, PUBLIC UTILITY.

MICHIGAN—Continued.

B.—MUNICIPAL PLANTS.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream utilized.
183		GD	Addison	Addison		
184		GD	Algonac	Algonac	Algonac	
185		D	Allegan	Allegan		
186		GD	Alpena	Alpena	Alpena	
187		GD	Bad Axe	Bad Axe	Bad Axe	
188		GD	Bangor	Bangor	Bangor	
189		GD	Baraga	Baraga	Baraga	
190		GD	Bay City	Bay City	Bay City	
191		GD	Bellaire	Bellaire	Bellaire	Cedar River
192		GD	Blissfield	Blissfield	Blissfield	
193		GD	Bronson	Bronson	Bronson	
194		GD	Brown City	Brown City	Brown City	
195		D	Capac	Capac		
196		GD	Cass City	Cass City	Cass City	
197		GD	Charlevoix	Charlevoix	Charlevoix	
198		GD	Chelsea	Chelsea	Chelsea	
199		GD	Chesaning	Chesaning	Chesaning	
200		GD	Clinton	Clinton	Clinton	
201		GD	Coldwater	Coldwater	S. 21, T. 6 S., R. 6 W.	
202		GD	Croswell	Croswell	Croswell	
203		GD	Crystal Falls	Crystal Falls		Paint River
204		GD	Davison	Davison	Davison	
205		GD	Decatur	Decatur	Decatur	
206		GD	Deckerville	Deckerville	Deckerville	
207		GD	Detroit	Detroit	Detroit	
208		GD	Dexter	Dexter	Dexter	
209		GD	Dowagiac	Dowagiac	Dowagiac	
210		GD	Durand	Durand	Durand	
211		GD	East Tawas and Tawas City	East Tawas	East Tawas	
212		GD	Eaton Rapids	Eaton Rapids	Eaton Rapids	
213		D	Escanaba	Escanaba	Escanaba	
214		GD	Evart	Evart	Evart	
215		GD	Gaylord	Gaylord	Gaylord	
216		D	Gladstone	Gladstone	Wells	
217		GD	Grand Haven	Grand Haven	Grand Haven	
218		GD	Grand Rapids	Grand Rapids	Grand Rapids	
219		D	Grand Ledge	Grand Ledge		
220		GD	Harbor Springs	Harbor Springs	Harbor Springs	
221		GD	Harrisville	Harrisville	Harrisville	
222		GD	Hillsdale	Hillsdale	Hillsdale	
223		GD	Holland	Holland	Holland	
224		GD	Howell	Howell	Howell	
225		GD	Ithaca	Ithaca	Ithaca	
226		GD	Jonesville	Jonesville	Jonesville	
227		GD	Kalamazoo	Kalamazoo	Kalamazoo	
228		GD	L'Anse	L'Anse	L'Anse	Fall River
229		GD	Lansing	Lansing	Lansing	
230		GD	Lawton	Lawton	Lawton	
231		GD	Lowell	Lowell		
232		GD	Lyons	Lyons		
233		GD	Mackinac Island	Mackinac Island	Mackinac Island	
234		GD	Manchester	Manchester		
235		GD	Manton	Manton	Manton	
236		GD	Marcellus	Marcellus	Marcellus	
237		GD	Marlette	Marlette	Marlette	
238		GD	Marquette	Marquette	Marquette	Dead River
239		GD	Marshall	Marshall	Marshall	Kalamazoo River
240		GD	Mason	Mason	Mason	
241		GD	Mayville	Mayville	Mayville	
242		GD	Monroe	Monroe	Monroe	
243		GD	Negaunee	Negaunee	Negaunee	
244		GD	New Baltimore	New Baltimore	New Baltimore	
245		GD	Newberry	Newberry	Newberry	
246		GD	Niles	Niles		[illegible]
247		GD	North Adams	North Adams	North Adams	
248		GD	Norway and Vulcan	Norway	Norway	
249		GD	[illegible]	[illegible]	[illegible]	
250		D	[illegible]	[illegible]	[illegible]	
251		GD	[illegible]	[illegible]	[illegible]	
252		GD	Oxford	Oxford	[illegible]	
253		GD	Paw Paw	Paw Paw	Paw Paw	Paw Paw River
254		GD	[illegible]	[illegible]		Bear River
255		GD	[illegible]	[illegible]	[illegible]	
256		GD	[illegible]	[illegible]	[illegible]	Grand River
257		GD	Quincy	Quincy	Quincy	
258		GD	Reading	Reading	[illegible]	
259		[illegible]	[illegible]	[illegible]	[illegible]	
260		[illegible]	[illegible]	[illegible]	[illegible]	
261		[illegible]	[illegible]	[illegible]	[illegible]	
262		GD	[illegible]	[illegible]	[illegible]	

MUNICIPAL, AND INDUSTRIAL, BY STATIONS AND BY STATES, 1915—Continued.

MICHIGAN—Continued.

B.—MUNICIPAL PLANTS.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
183		95	65	60		(50)			Addison Milling Co.	Mc.
184			250	125		75				Mc.
185									Commonwealth Power Co.	Mc.
186			710	225		150				Mc. C.
187			250	225		250				Mc.
188			160	102		60	$0.10			Mc. C.
189					175	75				Mc.
190	City		800	2,513		2,450	.10-.04	$0.02		Mc. C.
191	Private	150				200				Mc. C.
192			160	130		150				Mc.
193			160	170		180				Mc.
194			200	100		160				Mc.
195										Mc.
196			240	165		175	.10	.045		Mc. C
197			200	150	100	90			Hydraulic Power & Light Co.	Mc. C.
198			350	200		100				Mc.
199			330	140		100	.10-.06	.08-.03		Mc. C.
200			300	[illegible]		100				Mc.
201	Private		600	450		250	.08-.04	.03		Mc. C.
202	Do.		200	150		100				Mc. C.
203	Do.	650				550	.06-.01	.05-.03		Mc. C.
204					67	46	.13			Mc. C.
205			400	350		(150)				Mc.
206			80	(80)		50				Mc.
207			3,500	7,050		5,600				Mc.
208			100	80		60				Mc.
209			242	250		238				Mc. C.
210			400	325		[illegible]				Mc.
211			100	150		150				Mc.
212			300	160		150				Mc.
213	Private						.07-.035	.07-.03	Escanaba Traction Co.	Mc. C.
214			160	125	80	122	.07			Mc. C.
215			225	325		110	.075			Mc. C.
216									Escanaba Traction Co.	Mc. C.
217			400	700		470				Mc.
218	Private		2,150	1,600		[illegible]				Mc. C.
219										Mc.
220			450	580		[illegible]				Mc.
221			40	40		[illegible]				Mc.
222			[illegible]	675		[illegible]				Mc.
223	City		[illegible]	2,450		[illegible]	.06-.04	.05-.02		Mc. C.
224			250	600		445	.08-.07	.05-.04		Mc. C.
225			200	225		150				Mc.
226	Private		335	250		160	.10			Mc. C.
227			600	1,500		1,200				Mc. C.
228	Private		200	(310)	[illegible]	187				C.
229	Do.		[illegible]	7,150		[illegible]	.05-.0175	.05-.0175		Mc. C.
230			175	165		[illegible]	.10			Mc. C.
231		[illegible]				[illegible]				Mc.
232		152				45				Mc.
233			(150)	600		400				Mc.
234		296				75				Mc.
235			300	[illegible]		75				Mc.
236			250	125		75				Mc.
237			250	152		60	.10			Mc. C.
238	Private	2,500				2,500	.05-.02	.03-.01		Mc. C.
239	Do.	[illegible]				[illegible]	.05-.04	.03-.01	Commonwealth Power Co.	Mc. C.
240	Do.		320	200		205				Mc. C.
241			100	150		60				Mc.
242			500	300		250				Mc.
243	Private		500	600		500	.10-.03	.04		Mc. C.
244			150	125		75				Mc.
245			270	300		180				Mc.
246	Private	700	125	120		600	.08-.05	.07-.018	Indiana & Michigan Electric Co.	Mc. C.
247			(300)	(80)		50				Mc.
[illegible]			[illegible]	[illegible]		170				Mc.
[illegible]			200	[illegible]		[illegible]				[illegible]
[illegible]									Commonwealth Power Co.	[illegible]
[illegible]			[illegible]	[illegible]		[illegible]	.12	[illegible]		[illegible]
[illegible]			[illegible]	[illegible]		[illegible]				[illegible]
[illegible]	Private	[illegible]				[illegible]	[illegible]			[illegible]
[illegible]			[illegible]	[illegible]		[illegible]	.07-[illegible]			[illegible]
[illegible]										[illegible]
[illegible]	[illegible]	[illegible]				[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	Do.		[illegible]	225		[illegible]	.10	.10-.04		[illegible]
[illegible]			[illegible]	[illegible]		[illegible]	.10-.05	.05-.015		[illegible]
[illegible]			[illegible]	[illegible]		[illegible]				[illegible]
[illegible]						[illegible]				[illegible]
[illegible]						[illegible]				[illegible]

TABLE 55.—STATISTICS OF POWER DEVELOPMENTS, PUBLIC UT[illegible]

MICHIGAN—Continued.

B.—MUNICIPAL PLANTS—Continued.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream.
263		GD	St. Ignace	St. Ignace	St. Ignace	
264		GD	St. Johns	St. Johns	St. Johns	
265		GD	St. Joseph	St. Joseph	St. Joseph	
266		GD	St. Louis	St. Louis	St. Louis	
267		GD	Sandusky	Sandusky	Sandusky	
268		GD	Schoolcraft	Schoolcraft	Schoolcraft	
269		GD	Sebewaing	Sebewaing	Sebewaing	
270		GD	Shepherd	Shepherd		
271		GD	South Haven	South Haven	South Haven	
272		GD	Springport	Springport	Springport	
273		GD	Stanton	Stanton	Stanton	
274		GD	Sturgis and Centerville	Sturgis		St. Joseph [illegible]
275		GD	Thompsonville	Thompsonville		Big Betsy [illegible]
276		GD	Three Oaks	Three Oaks	Three Oaks	
277		GD	Traverse City	Traverse City		
278		GD	Union City	Union City	Union City	
279		GD	Vassar	Vassar	Vassar	
280		GD	Vicksburg	Vicksburg	Vicksburg	
281		GD	White Cloud	White Cloud		
282		GD	Whitehall	Whitehall	Whitehall	
283		GD	Wyandotte	Wyandotte	S. 29, T. 4 S., R. 11 E.	
284		GD	Yale	Yale	Yale	
285		GD	Ypsilanti	Ypsilanti		
286		GD	Zeeland	Zeeland	Zeeland	

C.—ALL OTHER PLANTS.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream.
	Cambria Steel Co	H				
287	Penn Iron Mining Co	G	Mining	Vulcan	Vulcan	Menominee [illegible]
288	Do	G	do	[illegible]	do	
	Carnegie Steel Co					
289	Oliver Iron Mining Co			Iron Mountain		Menominee [illegible]
290	Detroit United Railway Co	HG	Electric railway	Birmingham	Birmingham	
291	Do			Detroit, A	Detroit	
292	Do			[illegible]	[illegible]	
293	Do			[illegible] Junction	[illegible] Junction	
294	Do			Port Huron	Port Huron	
295	Do			[illegible]	[illegible]	
296	Detroit, Jackson & Chicago Ry. Co	G	do	Ypsilanti	Ypsilanti	
297	Detroit, Monroe & Toledo Short Line Ry. Co		do	[illegible]	Monroe	
298	Detroit & Port Huron Shore Line Ry. Co		do	New Baltimore	New Baltimore	
299	Grand Trunk Railway Co		do	Port Huron	Port Huron	
300	Marquette City & Presque Isle Ry. Co		do	Marquette	Marquette	
301	Otsego Water Power Co		Mills	Otsego	Otsego	Kalamazoo [illegible]
	Stone & Webster					
302	Houghton County Traction Co		Electric railway	Hancock	Hancock	
303	Victoria Copper Mining Co		Mining and milling	Victoria	Victoria	West branch [illegible] gan River

MINNESOTA.

A.—PUBLIC UTILITY PLANTS.

No.	Name of parent company and of subsidiaries or lessors.	Character of company.	Market supplied.	Name of plant.	Location.	Stream.
	American Light & Traction Co	H				
1	St. Paul Gas Light Co	GD	St. Paul	St. Paul	St. Paul	
	American Public Utilities Co	H				
2	Wisconsin-Minnesota Light & Power Co	GTD	W[illegible], Lake City, and Red Wing	Red Wing	Red Wing	
3	Annandale Electric Light & Power Co	GD	Annandale	Annandale	Annandale	
4	[illegible]	GD	[illegible]	[illegible]	[illegible]	
5	[illegible]	G	[illegible] Co	[illegible]	S. [illegible], T. 115 N., R. 2 W.	[illegible]
6	[illegible]	GD	[illegible]	[illegible]	[illegible]	
7	[illegible]	GD	[illegible]	[illegible]	[illegible]	
8	[illegible]	GD	[illegible]	[illegible]	New [illegible]	
9	[illegible]	D	[illegible]			
	[illegible]	H				
10	[illegible]			[illegible] Falls	Cannon Lake	Cannon [illegible]
11	Do			[illegible]	[illegible]	
12	Do			[illegible]	[illegible]	[illegible]
13	Do	GTD	Southeastern Minnesota	[illegible]	[illegible]	
14	Do			[illegible]	[illegible]	
15	[illegible]			[illegible]	[illegible]	
16	[illegible]			[illegible]	[illegible]	[illegible]
17	[illegible]			[illegible]	[illegible]	[illegible]
18	[illegible] Co	GT	Do	[illegible]	[illegible]	[illegible]
19	[illegible]	GTD	[illegible]	[illegible] Falls	[illegible]	[illegible]

MUNICIPAL, AND INDUSTRIAL, BY STATIONS AND BY STATES, 1915—Continued.

MICHIGAN—Continued.

B.—MUNICIPAL PLANTS—Continued.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
263			200	200		[illegible]				Me.
264			375	275		317				Me.
265	Private				115	75				Me. C.
266		268	180	215		195				Me.
267	Private		200	300		225	$0.08			Me. C.
268	Do		300	125		75	[1] $0.50-$0.35			Me. C.
269					150	95	.125			Me. C.
270									Consolidated Light & Power Co.	Me.
271	Private		450	700		600	.12- .05	$0.10-$0.04		Me. C.
272			250	100		70				Me.
273	Private		200	125		100	.10			Me. C.
274		1,688	250	200		1,200				Me. O.
275	Private	150				175	.06			Me. C.
276			200	100		85				Me.
277		800				600				Me.
278	Private		440	200		125	.10	.10		Me.
279	Do		120	200		150	.06			Me. C.
280			120	140		140				Me.
281			160	(150)		60				Me.
282			150	150		113				Me.
283	Private		1,200	550		550	.06- .01	.05- .02		Me. C.
284			125	200		125				Me.
285		300	200	350		(180)				Me.
286			250	225		135				Me. C.
	Total, B	10,972	32,342	41,[illegible]	687	35,986				

C.—ALL OTHER PLANTS.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
287	Private	5,000				3,500				M. C.
288			800	2,600		1,500				M. O. C.
										C.
										M.
289		3,800								M. O.
290			500	1,1[illegible]		700			Detroit Edison Co.	Me. C.
291			4,400	[illegible]		5,500			do	Me. C.
292			6,800	11,500		15,[illegible]			do	Me. C.
293			2,600	2,200		1,[illegible]				Me. C.
294										Me. C.
295			2,[illegible]	7,[illegible]		4,150				Me. C.
296			[illegible]	3,[illegible]		2,[illegible]			Detroit Edison Co.	Me. C.
297			2,000	5,[illegible]		3,[illegible]			do	M. Me. C.
298			2,700	6,[illegible]		3,200				M. Me. C.
299										M. Me. C.
300			1,600	3,200		2,500				Me.
301	Private	3,000	6,000	5,000		3,000				M. Me. O. C.
302			625	1,800		1,600			Houghton County Electric Light Co.	M. Me.
303	Private	4,000								M. O. C.
	Total, C	[illegible]	[illegible]	[illegible]		[illegible]				
	Grand total	[illegible]	[illegible]	[illegible]	1,4[illegible]	41[illegible]				

MINNESOTA.

A.—PUBLIC UTILITY PLANTS.

No.	Status of land occupied.	Horsepower of water wheels.	Horsepower of boilers.	Horsepower of steam engines.	Horsepower of gas engines.	KVA rating of generators.	Lighting rate per kilowatt-hour or lamp-hour.	Power rate per kilowatt-hour or horsepower-year.	Purchases power from—	Source of information.
1	Private	7,[illegible]	2,[illegible]	2,[illegible]		[illegible]	$0.11-$0.0[illegible]	$0.0[illegible]-$0.011	Consumers Power Co.	C. Me.
2					350	195				M. Me.
3					35	1,250	.18			C. Me.
4					40	44				C. [illegible]
5		1,100				500				Me. & DC.
[illegible]			[illegible]	[illegible]		[illegible]				[illegible]
[illegible]			200	[illegible]		[illegible]				[illegible]
[illegible]	Private	[illegible]	[illegible]	[illegible]		[illegible]	.1[illegible]	.1[illegible]		[illegible]
[illegible]									Cloquet [illegible] Co.	[illegible]
[illegible]		[illegible]				[illegible]				
[illegible]				1,2[illegible]		[illegible]				C.
[illegible]		[illegible]				[illegible]				[illegible]
[illegible]			6,[illegible]	16,[illegible]		12,[illegible]				[illegible]
[illegible]			[illegible]	[illegible]		[illegible]				C.
[illegible]			[illegible]	1,[illegible]		[illegible]				C. M. Me.
[illegible]		[illegible]				[illegible]				[illegible]
[illegible]		[illegible]	[illegible]	[illegible]		[illegible]				M. [illegible] S[illegible].

[1] Lamp-hour.

APPENDIX D

CONSUMERS POWER COMPANY

Incorporated in Maine in 1910
Licensed in Michigan 1915

- 2. Michigan Public Service 1923-1950
- 3. Citizens Light & Power 1902-1958
- 4. Michigan Federated Utilities 1926-1934
- 5. Lower Peninsula Power 1927-1934
- 6. Southern Mich. Light & Power 1926-1930
- 7. Thornapple Gas & Electric 1905-1927
- Lansing Fuel & Gas (Lansing Gas Light '73-'06) 1906-1925
- 8. Michigan Light (Michigan) 1914-1922
- 9. Grand Rapids-Muskegon Power 1904-1915
- 10. Commonwealth Power (Co.) 1904-1915
- 11. Saginaw Power 1909-1915
- 12. Bay City Power 1900-1915
- 13. Consumers Power (Mich.) 1900-1915
- 14. Flint Electric 19[illegible]-1915
- Economy Power Co. (Generating Plant Ownership) 1909-1915
- 15. Pontiac Power 1903-1915
- Au Sable Elec (Production & Transm Oper) 1909-1916
- 16. Manistee Power & Light [illegible] 1912-1916
- 17. Cadillac Water & Light 1905-1915

NOTE: Where a number is placed before firm designation, its tree is developed on a succeeding page.

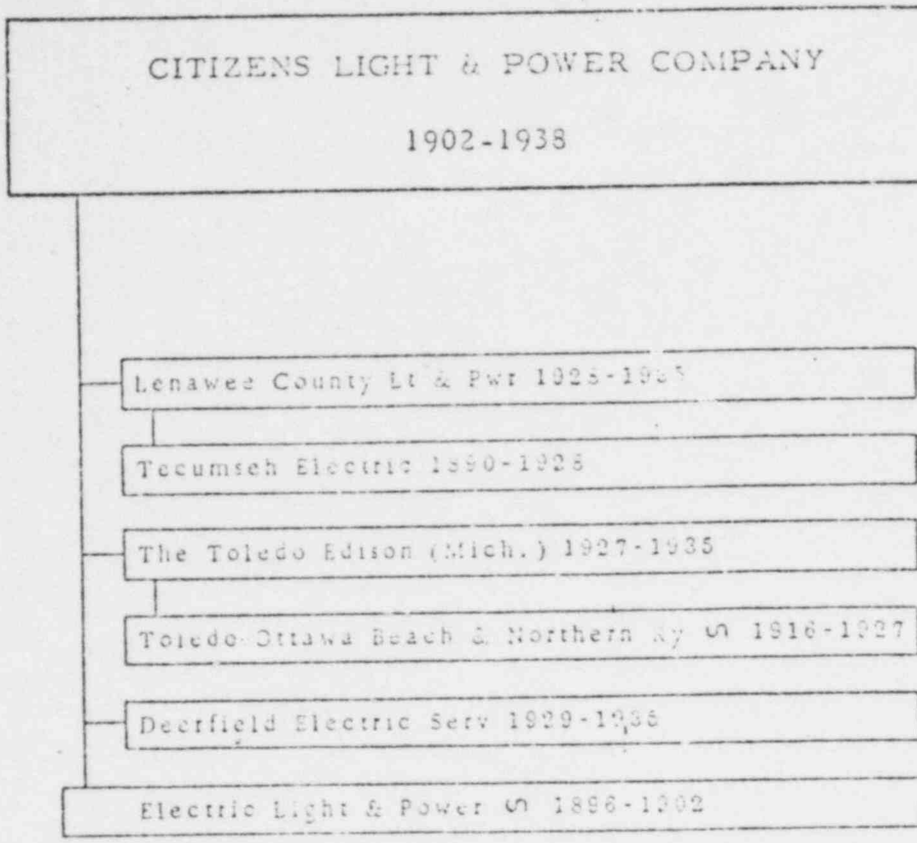
On Page 731 there is also a tabulation of property acquisitions not covered on the regular charts.

MICHIGAN PUBLIC SERVICE COMPANY

1923-1950

- East Jordan Elec Lt & Pwr 1901-1929
- Antrim Light & Power 1906-1928
- Northern Mich. Public Serv 1925-1928
- Boyne Falls Lt & Pwr 1920-1927
- The Mich. United Lt & Pwr 1922-1927
  - The Stearns Lighting & Pwr 1901-1922
- White River Power & Light 1917-1927
  - Frugale Power 1912-1917
- Boyne River Power 1907-1927
- Grayling Electric 1901-1927
- Elk Electric 1910-1927
- The Cheboygan Elec Lt & Pwr 1886-1923
  - Pellston Lt & Pwr ?-1913
  - N. & A. McArthur ⌒ 1889-1896

NOTE: ⌒ Indicates incomplete record.



NOTE: ♈ Indicates incomplete record.

MICHIGAN FEDERATED UTILITIES

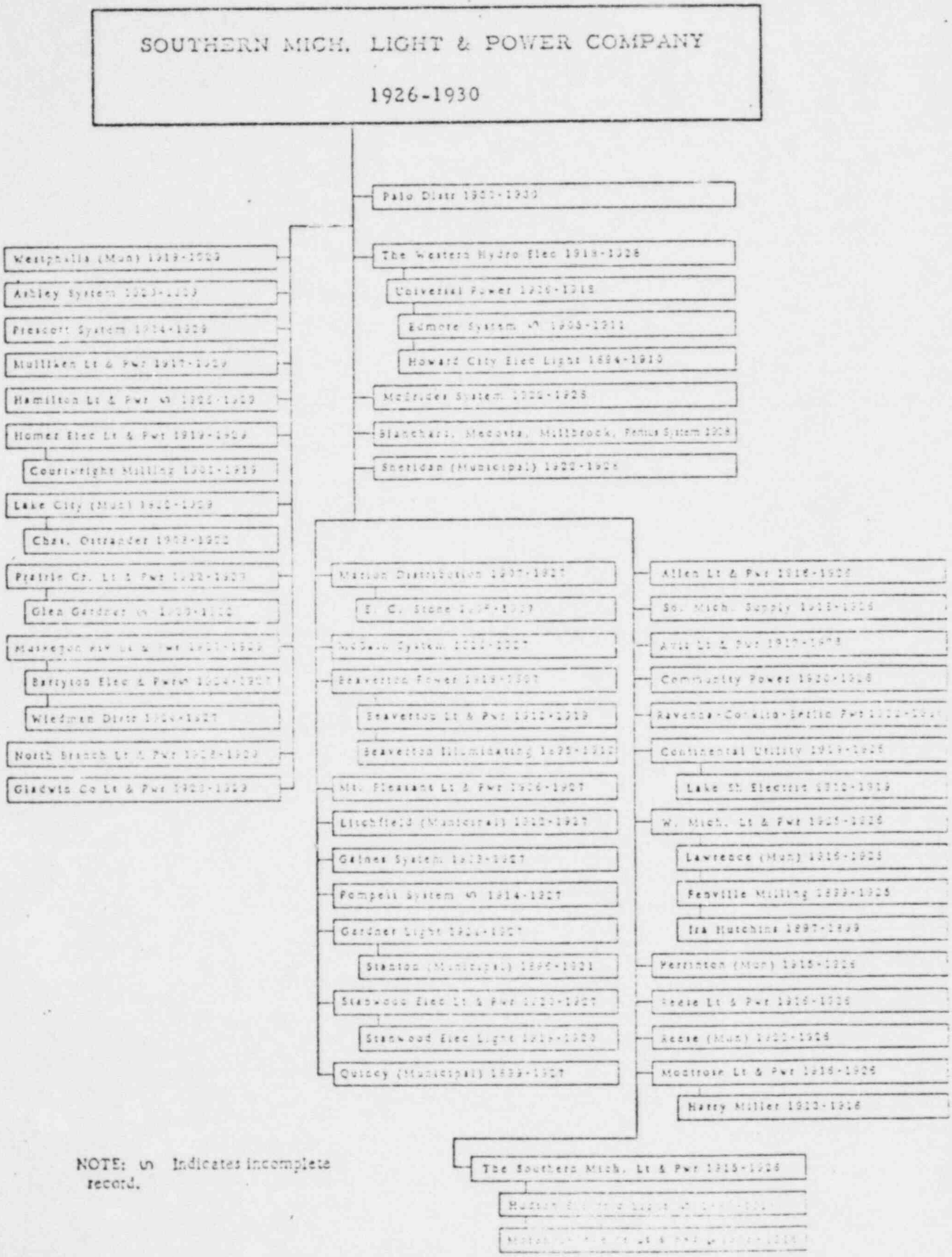
1925-1934

- Mutual Gas 1886-1928
- Mt. Clemens Gas Lt 1909-1928
  - Mt. Clemens Gas 1897-1909
- Gas Engineering Service 1922-1925
  - Sault Ste. Marie G&E 1906-1925
    - H. F. Clerque 1904-1906
  - Plymouth Northville Gas 1914-1925
  - Gratiot County Gas 1914-1925
  - Alpena Gas 1911-1925
    - Alpena Gas Lt & Fuel 1903-1911
      - Alpena Gas Light 1900-1903
        - Alpena Gas 1885-1900
  - Owosso Gas Light 1886-1925
  - Marshall Gas Light 1903-1925
    - Marshall Light 1886-1903
      - Marshall Gas 1874-1886
        - Geo. W. [illegible] John W. [illegible] 1874-[illegible]
          - Nat'l Gas Works Bldg 1870-1874

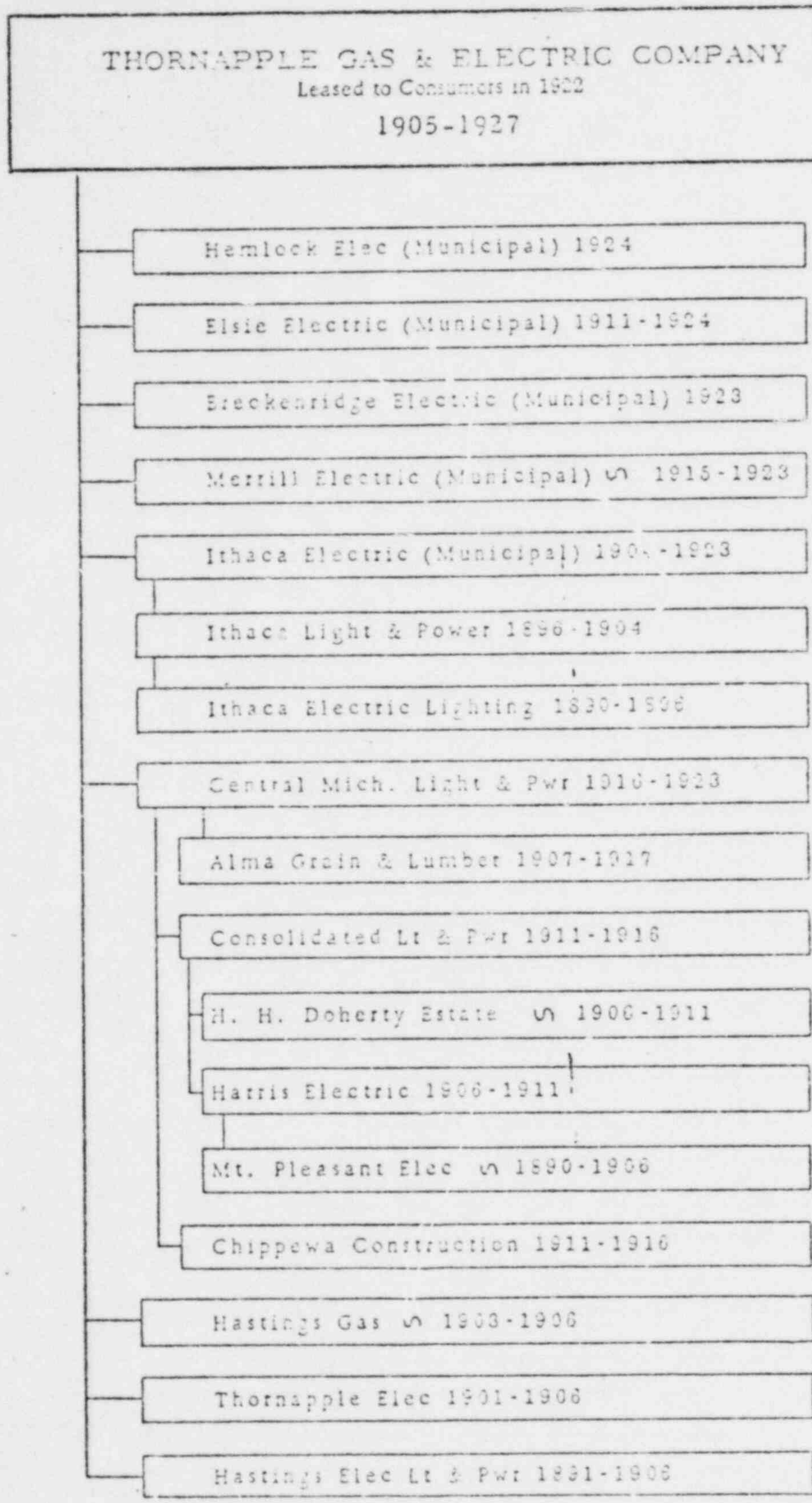
LOWER PENINSULA POWER

1927-1934

- Michigan Water Power 1925-1927
- Lower Peninsula Power (Old) 1926-1927
  - Benzie County Power 1912-1926
    - Frankfort Elec Light 1911-1913
  - Mattin & Wayland Light & Pwr 1921-1926
    - Wayland Electric Light & Pwr 1905-1921
  - Eesley Light & Power 1904-1926



NOTE: ɯ Indicates incomplete record.



NOTE: ∽ Indicates incomplete record.

MICHIGAN LIGHT COMPANY

Incorporated in Michigan 1914
Into Consumers Power Company 1922

- 18. Saginaw City Gas 1901-1914
- 19. The Bay City Gas 1899-1914
- 20. Pontiac Light 1902-1914
- 21. Flint Gas 1904-1914
- 22. Jackson Gas 1897-1914
- 23. Kalamazoo Gas 1899-1917
- 24. Manistee Power & Light (Gas Prop.) 1912-1915

NOTE: This should not be confused with The Michigan Light Company (N. J.) a holding company 1904-1914.

Where a number is placed before firm designation, its tree is developed on a succeeding page.

GRAND RAPIDS MUSKEGON POWER COMPANY

1904-1915

From 1904-1906 Called G. R. Musk. Water Pwr Elec Co.

- Grand Rapids Edison 1902-1915
  - Lowell Water & Light 1892-1902
    - Lowell Water 1887-1892
    - Lowell Elec Lt ∽ 1888-1892
  - Peninsula Lt Pwr & Heat 1893-1902
  - West Mich. Electric 1893-1902
  - G. R. Elec Lt & Pwr 1880-1902
    - Mich. Iron Works EL&P 1882-1884
  - Edison Light of G. R. 1886-1902
- Fremont System ∽ 1905-1915
- Ottawa Beach Water & Elec ∽ 1908-1914
- Macatawa Park System ∽ 1905-1914
- Muskegon River Water Pwr ∽ 1899-1906

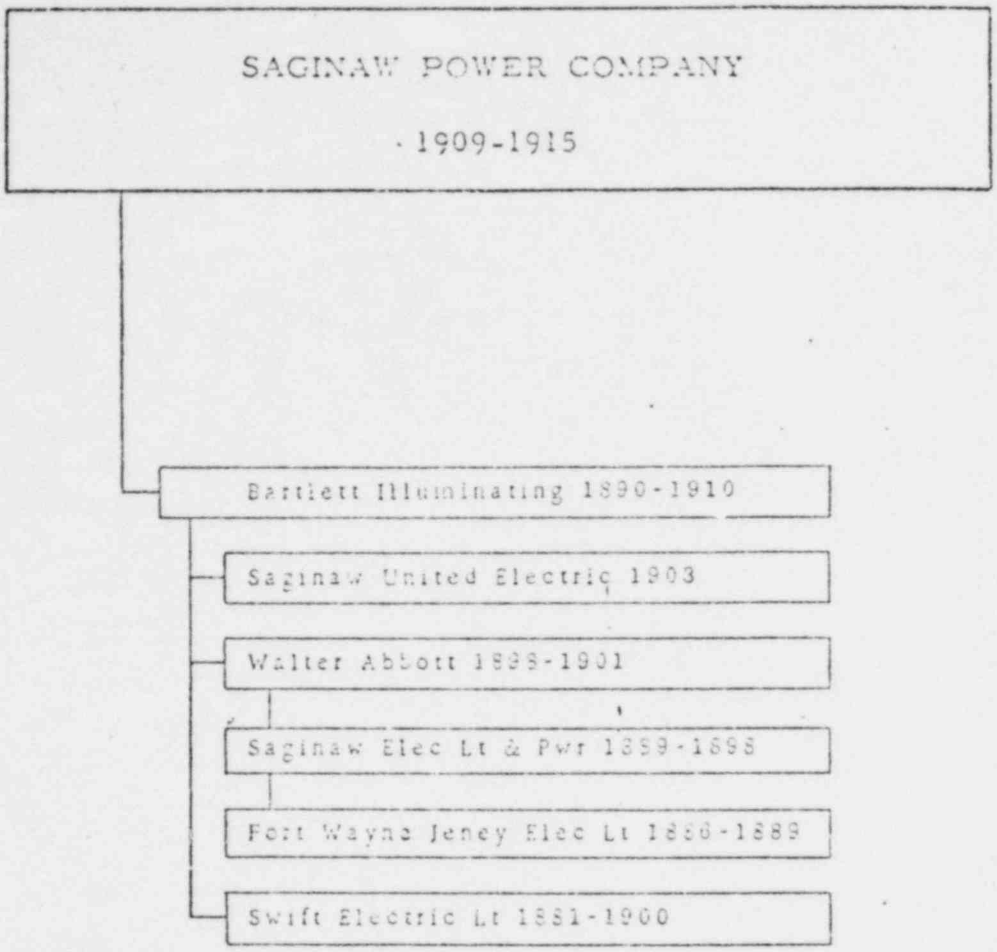
NOTE: ∽ Indicates incomplete record.

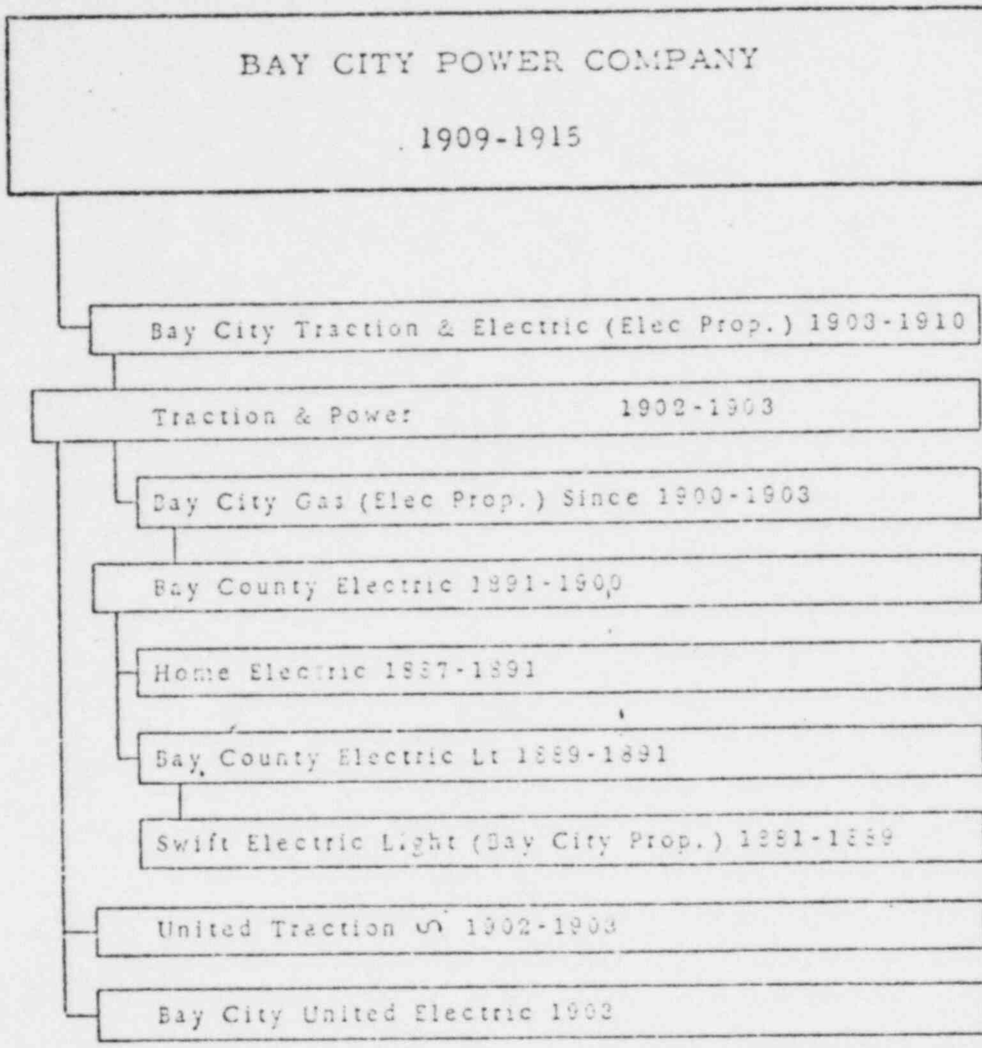
COMMONWEALTH POWER COMPANY

1904-1915

- Grand Ledge Elec Power 1904-1907
- W. A. Foote 1910-1912
  - Leslie Elec Lt & Pwr 1891-1910
- Jackson Light & Power 1893-1911
  - Jackson Elec Lt Works 1888-1893
    - Jarvis & Foote 1886-1888
  - Edison Elec Lt 1885-1893
    - Jackson Elec Lt & Pwr ∽ 1884-1885
- Allegan Light & Power ∽ 1903-1911
- Battle Creek Electric 1889-1905
  - Battle Creek Elec Lt & Pwr 1887-1889
- Kalamazoo Elec (Kal Valley Elec From '99) 1885-1905
- Albion Elec Light 1888-1905
- Ceresco Mill & Hydraulic 1895-1905
- Plainwell Power 1902-1905
- Otsego Power 1903-1905
  - Pine Creek Power 1902-1903

NOTE: ∽ Indicates incomplete record


SAGINAW POWER COMPANY
1909-1915
Bartlett Illuminating 1890-1910
Saginaw United Electric 1903
Walter Abbott 1898-1901
Saginaw Elec Lt & Pwr 1889-1898
Fort Wayne Jeney Elec Lt 1886-1889
Swift Electric Lt 1881-1900



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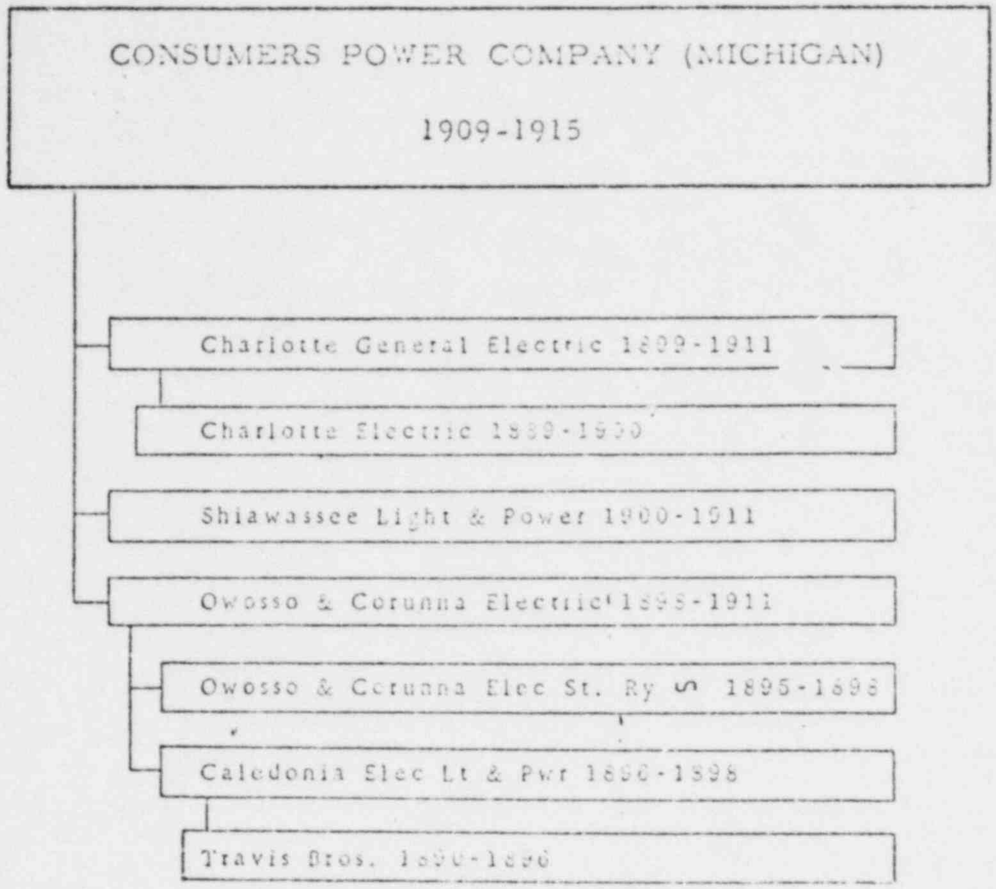
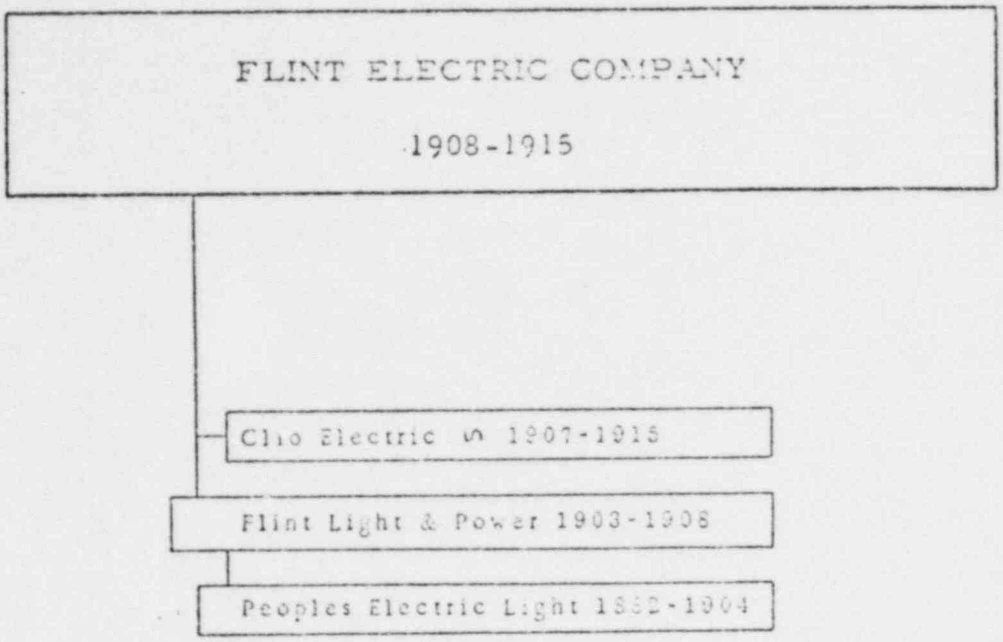
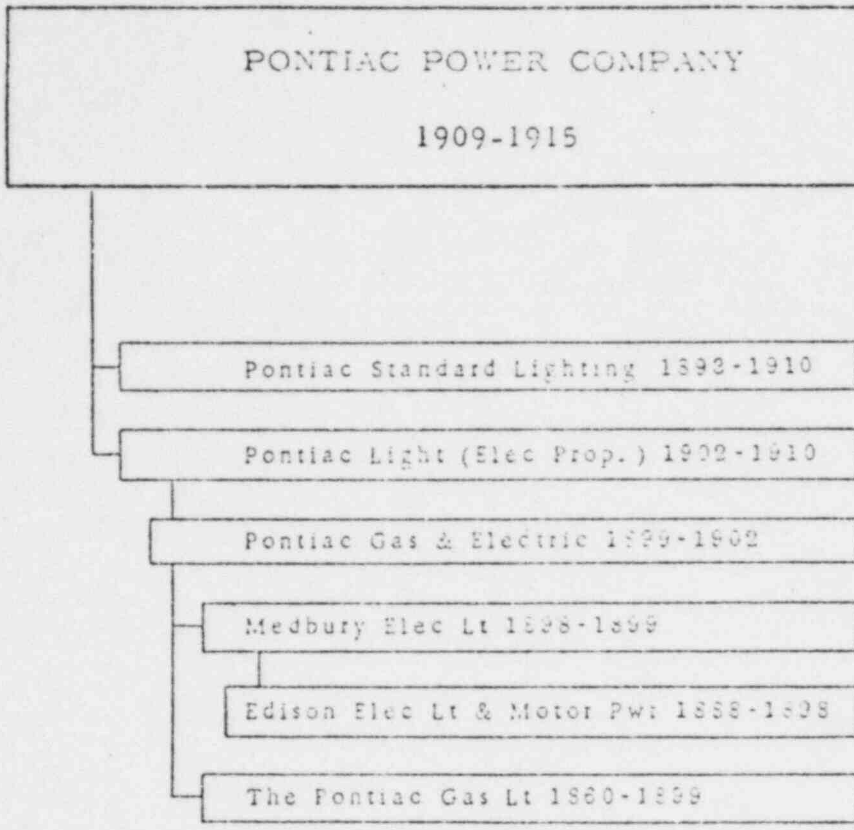


NOTE: ∽ Indicates incomplete record.


FLINT ELECTRIC COMPANY
1908-1915
Clio Electric 1907-1915
Flint Light & Power 1903-1908
Peoples Electric Light 1882-1904


PONTIAC POWER COMPANY
1909-1915
Pontiac Standard Lighting 1893-1910
Pontiac Light (Elec Prop.) 1902-1910
Pontiac Gas & Electric 1899-1902
Medbury Elec Lt 1898-1899
Edison Elec Lt & Motor Pwr 1888-1898
The Pontiac Gas Lt 1860-1899

MANISTEE POWER & LIGHT COMPANY
(Electric Properties)
1912-1915

F. M. Edwards (7-1-12) G. H. Bourne (10-17-12)

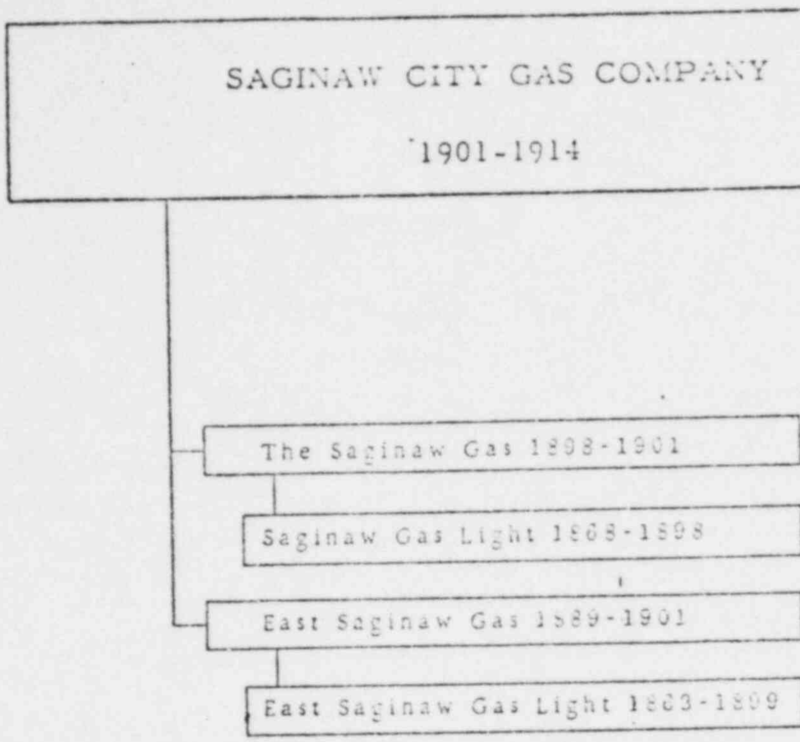
Northwestern Mich. Lt & Pwr (Man. Lt & Traction) 1906-1912

Manistee Gas & Electric 1902-1906

CADILLAC WATER & LIGHT COMPANY

1905-1915

- Cadillac Water 1893-1905
- Cummer Electric 1893-1905

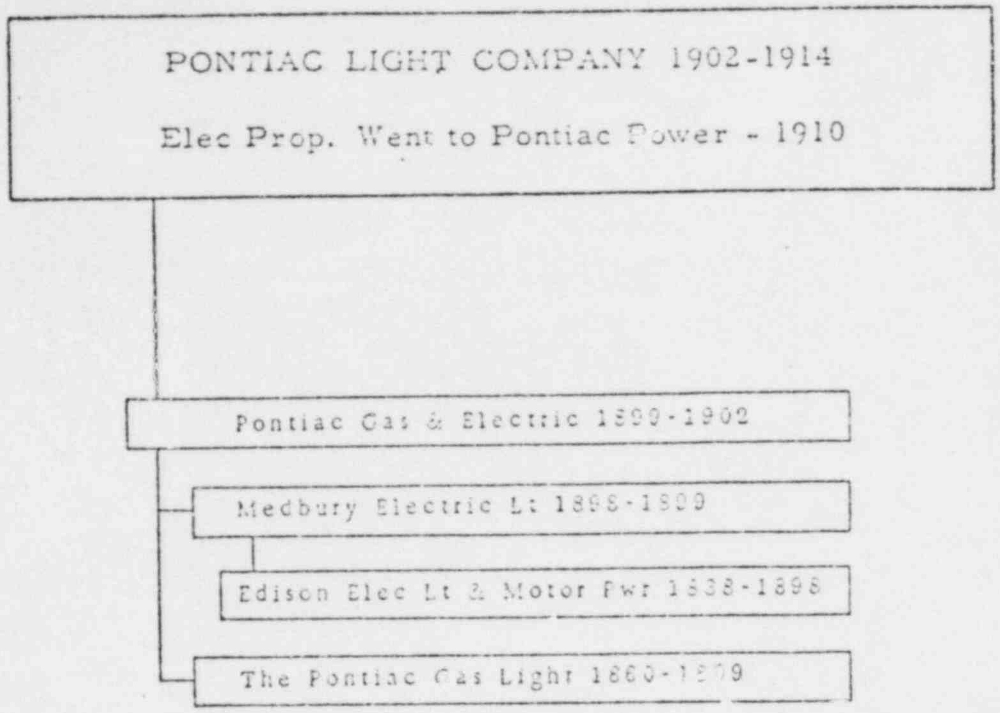

SAGINAW CITY GAS COMPANY
1901-1914
The Saginaw Gas 1898-1901
Saginaw Gas Light 1868-1898
East Saginaw Gas 1889-1901
East Saginaw Gas Light 1863-1889

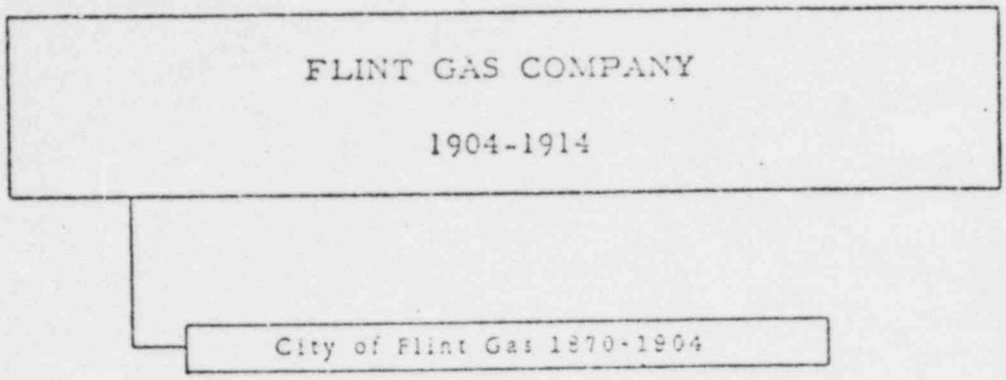
THE BAY CITY GAS COMPANY

1899-1914

Bay City Gas Light 1868-1899

NOTE: See 12 Bay City Power for electric property involvement of the Bay City Gas Co.


PONTIAC LIGHT COMPANY 1902-1914
Elec Prop. Went to Pontiac Power - 1910
Pontiac Gas & Electric 1899-1902
Medbury Electric Lt 1898-1899
Edison Elec Lt & Motor Pwr 1888-1898
The Pontiac Gas Light 1860-1899


FLINT GAS COMPANY
1904-1914
City of Flint Gas 1870-1904

JACKSON GAS COMPANY

1897-1914

- Jackson Natl Gas & Fuel 1887-1897
  - Jackson Gas Light-1887-1889
  - Natl Gas Lt & Fuel 1887-1889

KALAMAZOO GAS COMPANY

1899-1917

Kalamazoo Gas Light 1856-1899

MANISTEE POWER & LIGHT COMPANY
(Gas Properties)

1912-1915

F. M. Edwards (7-1-12) G. H. Bourne (10-17-12)

Northwestern Mich Lt & Pwr (Man. Lt Tract) 1906-1912

Manistee Gas & Electric 1902-1906

The Man. Fuel & Gas 1896-1902

Louis Sands 1889-1896

The Man. Gas Lt & Coke 1881-1889

MISCELLANEOUS ADDITIONS NOT COVERED ON PRECEDING CHARTS

ORIGIN	DESCRIPTION	YEAR INTO CONSUMERS
1909	Central Power (Oscoda)	1915
1912	Battle Creek Heating & Lighting	1915
1905	Fenton Power & Light	1915
1907	Bristol Electric Light	1915
1902	Zeeland (Municipal)	1915
1914	Saginaw Heating	1915
1891	East Tawas (Municipal)	1916
1905	Tawas (Municipal)	1916
1908	Mason (Municipal)	1917
1911	Manistee County Electric	1917
1908	Western Michigan Power	1917
1906	Holly Electric (Independent Power 1912-1916, Holly Lighting prior to 1911)	1917
1900	United Electric (Mendon (Municipal) 1900-1912, Burr Oak Electric 1907-1912)	1923
1915	Linden System (E. P. Jamison 1918-1923, W. Wolverton 1916-1918, Independent Power 1915-1916)	1923
1892	Citizens Electric	1923
1896	Durand Electric Distribution (Municipal)	1923
1892	St. Johns Electric Distribution (Municipal)	1923
1890	Bronson Distribution (Municipal) (W. H. Friedrich prior to 1910)	1924
1889	Big Rapids Electric (W. E. Donley Light & Power 1893-1909 and Hudnutt Electric prior to 1893)	1924
1919	Atlas Distribution System	1924
1912	Goodrich Distribution System (Municipal)	1924
1916	Climax Electric (Municipal)	1924
1909	Stockbridge Light & Power	1925
1907	Tower Electric	1925
1893	Spencer Electric Light & Power	1925
1900	Citizens Light	1925
1903	Manchester (Municipal)	1925
[illegible]	[illegible]	1925

ORIGIN	DESCRIPTION	YEAR INTO CONSUMERS
1905	Athens (Municipal)	1925
1919	East Side Water Power	1925
1894	Ovid (Municipal)	1925
1888	Ionia Electric - after 1904, Ionia Water Power Electric	1925
1904	New Grand Ledge Gas (Grand Ledge Gas prior to 1920)	1925
1876	Ionia Gas (The Ionia Gas Light & Coke 1882-1924. Site owned previously by L. F. Mills 1879-1882 and the Ionia Gas Light prior)	1925
1892	Rogue River Electric Light & Power (A. Delbert Tower prior to 1902)	1926
1891	Reed City (Municipal) and Predecessors	1926
1919	Wyoming Light & Power	1926
1912	Frankenmuth Light & Power	1926
1922	Dimondale (Municipal)	1926
1916	Farwell (Municipal)	1926
1885	New Charlotte Gas (William E. Harvey 1906, W. Engle & J. H. Findley 1902-1906, Charlotte Gas prior to 1902)	1927
1902	St. Charles (Municipal) - (Robert Gage Coal prior to 1911)	1927
1906	Grass Lake (Municipal)	1927
1895	Flushing Distribution	1927
1905	The Hart Milling & Power (Flushing)	1927
1922	Evart Distribution	1929
1926	Tittabawassee Electric (Farm Lines)	1929
1926	Tipton (Farm Lines)	1929
1929	Morenci Distribution System	1929
1897	Centreville Water & Electric (Water sold 1934)	1930
1903	Callier Light & Power and Predecessors	1930
1905	Addison Electric Distribution	1930
[illegible]	Michigan Electric Power	[illegible]
[illegible]	Schultz and Schultz	[illegible]
1922	Spring Arbor Distribution	1931
[illegible]	Lyons (Municipal)	[illegible]

ORIGIN	DESCRIPTION	YEAR INTO CONSUMERS
1926	Mesick Distribution	1931
1906 ✓	Muskegon Traction & Lighting Electric System (Name changed to Muskegon Gas 1930)	1931
1909	American Electric Service (Freeport Electric 1919-1928, Freeport Milling 1909-1919)	1932
1920	Callum Hydro Plant	1932
1915 ✓	Belding (Municipal) (Belding Textile Mill in 1932 and Belding Bros. 1915-1932)	1933
1925	Greenbush Township Light & Powe.	1935
1921	Beech Tree Power & Light	1936
1917 ✓	Hillsdale County Electric (Indiana Electric Utility 1924-1926, Economy Electric ✓ 1917-1924)	1936
1920 ✓	Northern Power	1936
1921	Munger Power & Light	1936
1906	Hersey Distribution	1936
1910 ✓	Harrison Electric System	1937
1922	Harmony Electric	1941
1921	Bellevue Distribution (Municipal)	1946
1898	Bli[illegible]field (Municipal)	1950
1928	Frederic Distribution (William Leng. Electric Service)	1951
1918	City of White Cloud (Municipal)	1951
1912	Bellaire (Municipal)	1952
1940	Stanton Gas (Serving Stanton, Sheridan, Crystal, Cedar Lake, etc)	1953
1895	Kalamazoo (Municipal)	1956
1899	City of Manton (The municipal system started in 1917. Also there was Manton Electric Co. in 1917. Between 1899 and 1917 there were various individuals named Wheeler, Billings, Phelps and Baker)	1959
1940	City of Grayling (Municipal)	1961

✓ Incomplete Corporate Records

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Presented to FPC Rates 1/9/69 ... 10

APPENDIX E

NOTES ON MICHIGAN ELECTRIC POWER POOLING AGREEMENT

This Agreement is divided into two main parts. Part I generally covers the objectives and the obligations of Consumers Power Company and The Detroit Edison Company. Part II is composed of appendices and the procedures for implementing the Agreement. This division into two parts was made with the objective of establishing general principles in Part I with the idea that these principles would be modified only infrequently, if at all. It was recognized that the appendices and implementation procedures would require frequent changes and Part II is designed with this in mind.

Part I contains sixteen articles, some of which are so-called "boiler plate," and general requirements for any such Agreement. Following is a description of these articles and certain items will be discussed in some detail.

Article I covers the general obligations and it is noteworthy, I believe, that even though this document was executed in December of 1962 the importance of reliability was properly recognized. The very first obligation is that "each of the parties hereto recognizes a mutual interest and advantage in maintaining a continuous and uninterrupted supply of electric power and energy available to customers of both the parties hereto." The next main general obligation is that new resources and system operations will be carried forward on a coordinated basis. Next is the obligation to share the capacity from so-called pool units although such units are to be engineered, constructed and owned by only one party. This item covers conventional units as well as generating units "having unusual

In the appendices setting up the sharing of pool unit capacity, three levels of reserve are established. The larger reserve is called forecasted pool reserve and is the result of the relation between pool load and capacity including the pool unit. The next lower level of reserve is planned pool reserve and this is the reserve level that would be attained if the precise sized new unit were available and economically desired. The lowest reserve level is minimum pool reserve and this is the level below which it is believed serious jeopardy to load carrying capability might exist. The principal capacity equalization charges are made to adjust the relationship between each party's actual reserve and the three levels of reserve just enumerated.

In making the charges for capacity equalization, three levels of charge rates are provided. The first is the base rate, the second is one and one-half times the base rate and the third is two times the base rate. The base rate is used when one party's reserve drops below the forecasted reserve but the pool reserve remains above the minimum reserve. The base rate is agreed to between the parties and fundamentally is equal to the average cost per kilowatt of generation and associated transmission on the two systems.

Briefly, the one and one-half times base rate is applied when one party's reserve drops below the minimum pool reserve percentage, but this has not caused the pool reserve to drop below the minimum. The two times base rate is applied when one or both parties' reserves drop to the points that reduce the pool reserve below the minimum. At times these charge rates, exceeding the base rate, have been described as penalties, but they can be viewed as compensatory payments fully justified for the party who receives revenue for increased load or as a ready-made backup for inadvertent loss of capacity. I have handed you examples of the kinds of situations that may exis' in the area of principal capacity adjustments and we can discuss these briefly. In the matter of the equity of charging up to two times the base rate, we might consider the situation of two equally-sized systems, one of which has - say, a 2% load growth in excess of estimates. This party has, presumably, then enjoyed a 2% increase in revenue and, of course, has required the extra 2% of capacity to supply that load. Now since the two systems are the same size, the 2% change of load for one party will reduce the reserve of the pool by only 1%. Since the heavy load growth party's reserve was reduced approximately 2% and since the pool reserve has gone down 1%, that party is obligated to purchase 1% capacity to equalize reserve. Now, if he paid only the base rate, he would have received load carrying capability for 2% load growth with only a base rate payment for 1%. This situation is deemed to be quite equitable in allowing the heavy load growth party to receive incremental capacity at a low rate; however, in case reduced reserve percentage of one party tends to jeopardize the adequacy of reserve in the pool, it was considered proper that a rate of charge up to two times the base rate would serve to encourage to maintain adequate reserve and at the same time would only require the deficient party to pay for required additional capacity at a rate equivalent to the average cost for capacity in the pool.

Another type of charge is a secondary capacity adjustment which is based upon reserves that occur from day to day throughout each season. Actually the adjustment is made in relation to equalized reserve responsibilities but the charge rate is one-half the base rate. This charge rate was adopted as a reflection of the capacity availability from day to day for maintenance and operation room. In computing the secondary capacity

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adjustments, credits and debits respectively are made to the parties for any kilowatts already purchased and sold as principal capacity adjustments. Provision is made for a party that anticipates deficiency of reserve to purchase firm capacity from the authorized capability of the other party in advance avoid principal capacity charges in the high rate levels. A provision is made that as the Operating Committee foresees reserves declining below minimum pool requirements, that this Committee will notify the Administrative Committee and the party causing such decline shall be obligated to remedy the deficiency in any practicable way even though extraordinary high costs are involved.

Article III provides for sharing the energy from pool units in proportion to the respective capacity allocations and it also provides for sharing any economy energy available on the two systems.

Article IV provides for purchasing capacity and/or energy from third parties. Any such arrangements which are made with third parties operating outside the State of Michigan are to be made by the agreement of the two parties and costs and benefits are to be shared equally.

Article V provides for making interconnections and interchanging capacity and/or energy by either party and a nonutility party. Unless otherwise agreed, such arrangements are to be only between one party and the nonutility with which it is interconnected.

Article VI provides for the sharing of costs for facilities and operations thereof used to interconnect the two parties. Basically the principle is that the total ownership costs and operating costs of such interconnections shall be shared equally regardless of which company's service area is the site of such facilities.

Article VII provides for the ownership and operation of pool associated transmission facilities other than interconnections. It is recognized that certain facilities within one party's service area may provide a principal grid transmission function useful to both parties and this article provides that the ownership costs and operation costs thereof shall be shared equally.

Article VIII establishes five committees which are - Administrative Committee, a Planning Committee, an Operating Committee, a Fiscal Committee and a Public Information Committee. The principal functions of each Committee are set forth in this article.

The remaining articles, IX through XVI, cover usual provisions for such contracts dealing with such matters as billing, modifications, due diligence, waivers, defaults, etc.

In addition to the articles, a set of "Definition of Terms" is included. These definitions were thought to be helpful in precluding ambiguities of meaning in the contract. In the contract, each defined term is underlined in order to call attention to its prescribed definiti[illegible].

The original contract also included Supplements A, B, C, F, G, H, L, M and Z which set forth the general principles and procedures for activating the contract and committees' functions. Since execution of the Agreement in December 1962, some 28 amendments and appendices have been executed. Almost all of these have been as anticipated in the regular line of operating the Agreement. They cover supplements and changes in interconnection charges, sharing of pool units, purchases and sales of authorized capability as well as some modifications in definitions and in operating and planning practices.

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439-38(6)

PERCENT RESERVE

A. BOTH PARTIES ACTUAL RESERVES MORE THAN FORECAST

(NO ADJUSTMENT NECESSARY)

-*-*-*- ACTUAL PARTY 'A' RESERVE

- - - - - ACTUAL POOL RESERVE

-o-o-o- ACTUAL PARTY 'B' RESERVE

-.-.-.-.- 19% FORECASTED POOL RESERVE

B. POOL ACTUAL RESERVE HIGHER & ONE PARTY'S ACTUAL RESERVE LESS THAN FORECAST

-*-*-*- ACTUAL PARTY 'A' RESERVE

- - - - - ACTUAL POOL RESERVE

-.-.-.-.- 19% FORECASTED POOL RESERVE

DEFICIENCY MW X 1.0

-o-o-o- ACTUAL PARTY 'B' RESERVE

C. POOL ACTUAL RESERVE LOWER THAN ESTIMATED BUT GREATER THAN MINIMUM

CASE C-1

PERCENT RESERVE

CASE C-2

-*-*-*- ACTUAL PARTY 'A'

-.-.-.-.- 19% FORECASTED POOL

- - - - - ACTUAL POOL

DEFICIENCY MW X 1.0

-o-o-o- ACTUAL PARTY 'B' (below Minimum)

-.-.-.-.- 12% MINIMUM REQUIRED

DEFICIENCY MW X 1.0

DEFICIENCY MW X 1.5

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439-38(2)

BASES FOR ADJUSTMENT OF CAPACITY

PERCENT RESERVE

D-1 POOL ACTUAL RESERVE LESS THAN MINIMUM

One Party Below Minimum

19% FORECASTED POOL RESERVE

PARTY 'A' ACTUAL RESERVE

12% MINIMUM REQUIRED RESERVE

ACTUAL POOL RESERVE

DEFICIENCY MW X 2.0

PARTY 'B' ACTUAL RESERVE

D-2 POOL ACTUAL RESERVE LESS THAN MINIMUM

Both Parties Below Minimum

19% FORECASTED POOL RESERVE

12% MINIMUM REQUIRED RESERVE

PARTY 'A' ACTUAL RESERVE

ACTUAL POOL RESERVE

DEFICIENCY MW X 2.0

PARTY 'B' ACTUAL RESERVE

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439-38 (8)

APPENDIX F

SUPPLEMENT A
TO AGREEMENT FOR ELECTRIC SERVICE BETWEEN
CONSUMERS POWER COMPANY AND THE CITY OF
HOLLAND DATED November 15, 1967

As specified in Section 7 of the Agreement, the method for determining and redetermining the megawatt value of mutual emergency capacity is as follows:

1. Holland's reserve will be determined and redetermined in accordance with the formula:

$$R = C - L$$

where:

R = Holland's reserve.
C = Holland's maximum net demonstrated capability.
L = Holland's estimated peak hourly demand for the appropriate period.

2. Holland's reserve responsibility will be determined and redetermined in accordance with the formula:

$$RR = \frac{C_1 + 0.5C_2 - 0.15L}{2} + 0.15L$$

where:

RR = Holland's reserve responsibility.
C_1 = Maximum net demonstrated capability of Holland's largest unit.
C_2 = Maximum net demonstrated capability of Holland's second largest unit.
L = Holland's estimated peak hourly demand for the appropriate period. (Same as in 1 above.)

3. The mutual emergency capacity shall be determined and redetermined by subtracting Holland's reserve responsibility (RR as computed in 2 above) from Holland's reserve (R as computed in 1 above). The value of mutual emergency capacity to be utilized for the appropriate period shall be rounded to the nearest megawatt.

EXHIBIT "A"
Page 1 of 2
Case No. U-2291

RULES GOVERNING THE EXTENSION OF SINGLE-PHASE ELECTRIC SERVICE IN AREAS SERVED BY TWO OR MORE UTILITIES

1. For the purpose of these rules

   (a) the word "utility" shall include both a private utility and a rural electric cooperative;

   (b) the term "distribution facilities" shall include both single-phase and three-phase service and shall not include service drops;

   (c) "distances" shall be determined by direct measurement from the closest point of a utility's existing distribution facilities to the customer's meter location and shall not be determined by the circuit feet involved in any extension;

   (d) the word "customer" shall mean the buildings and facilities served.

2. Existing customers shall not transfer from one utility to another.

3. Prospective customers for single-phase service located within 300 feet of the distribution facilities of two or more utilities shall have the service of their choice.

4. Prospective customers for single-phase service located at a distance greater than 300 feet and within 2,640 feet from the distribution facilities of two or more utilities shall be served by the closest utility.

5. Prospect.ve customers for single-phase service located more than 2,640 feet from the distribution facilities of any utility shall have the service of their choice subject to the provisions of Rule No. 6.

6. The extension of single-phase distribution facilities, except as provided in Rules No. 3 and No. 4, where such extension will be located within one mile of another utility's distribution facilities, shall not be made by a utility without first giving the Commission and any affected utility 10 days' notice of its intention by filing a map showing the location of the proposed new distribution facilities, the location of the prospective customers and the location of the facilities of any other utility in the area. If no objections to the proposed extension of single-phase distribution facilities are received within the aforesaid 10-day notice period by the Commission, the utility may proceed to construct said facilities.

7. The first utility serving a customer in accordance with these rules shall be entitled to serve the entire electric load on the premises of that customer even though another utility is closer to a portion of the customer's load.

8. A utility may waive its rights to serve a customer or group of customers provided that another utility is willing and able to provide the required service and the Commission is notified and has no objections.

9. Nothing in these rules shall prohibit a utility or a customer from applying to the Commission for relief from the operation of these rules or prevent the Commission from granting such relief if it finds such action to be in the public interest.

10. Nothing contained in these rules shall be construed to circumvent the requirements of Act 69, P.A. 1929, or to authorize a utility to extend its service into a municipality then being served by another utility without complying with the provisions of the before-mentioned Act 69.

APPENDIX H

(To Be Supplied)