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FEDERAL POWER COMMISSION
WASHINGTON, D.C. 20426

IN REPLY REFER TO:
FPR-ER

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Mr. Lester Rogers
Director, Division of Radiological
and Environmental Protection
U. S. Atomic Energy Commission
Washington, D. C. 20545

Dear Mr. Rogers:

This is in response to your letter of January 7, 1972, requesting the comments of the Federal Power Commission on the AEC's Draft Detailed Statement on Environmental Considerations Related to the Proposed Issuance of a Construction Permit to the Consumers Power Company for the Midland Plant, Units 1 and 2.

The enclosed staff report prepared by the Commission's Bureau of Power evaluates the power needs to be served by the facility; the availability of replacement power from others, if any; and the costs of such replacement power.

The report illustrates the need for the Midland Units 1 and 2 to provide an additional 1,301 megawatts of capacity for meeting peak loads in years 1977 and 1978 on the Applicant's system and the Michigan Power Pool which includes the Applicant.

Very truly yours,

T. A. Phillips
Chief, Bureau of Power

Enclosure
Staff report on the
Midland Plant, Units
1 and 2

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FEDERAL POWER COMMISSION
BUREAU OF POWER

Report on the Midland Plant Units No. 1 and No. 2
in Relation to Power Needs of Consumers Power Company
and the Michigan Power Pool

On January 7, 1972, the Director, Division of Radiological and Environmental Protection, U. S. Atomic Energy Commission requested the comments of the Federal Power Commission on AEC's Draft Detailed Statement on Environmental Considerations Related to the Proposed Issuance of a Construction Permit to the Consumers Power Company for the Midland Plant, Units 1 and 2.

These comments update those submitted by the Federal Power Commission on September 23, 1970. We understand from earlier correspondence and environmental documents filed by the Applicant that the environmental aspects of this plant are currently undergoing supplemental analysis in which the AEC wishes to consider such factors as: the effect of delays in facility operation upon the public interest, particularly the power needs to be served by the , the availability of alternative sources, if any, to meet as demands on a timely basis; and delay costs to the licensee and to consumers. Thus, our comments are directed to these points in a review of the need for the facility as concerns the adequacy and reliability of the Applicant's electric system and the Michigan Power Pool, a subregion of the East Central Area Reliability Council (ECAR) of which the Applicant is a member. This is in accordance with the National Environmental Policy Act of 1969 and the Guidelines of the President's Council on Environmental Quality dated April 23, 1971.

In preparing this report, the Bureau of Power staff has considered the AEC's Draft Detailed Statement; the Applicant's Environmental Report and Supplement thereto; the Monthly Power Statements submitted to this Commission by the Applicant; related reports made in response to the Commission's Statement of Policy a Adequacy and Reliability of Electric Service (Order No. 383-2); and the FPC staff's independent analysis of these documents together with related information from other FPC reports.

Need for the Facilities

The Midland Plant will have two units. The 486-megawatt Unit 1 is scheduled for commercial service in early 1977, and the 815-megawatt Unit 2 is scheduled for commercial service in early 1978. In addition to the plant's electric output, the Midland Plant is designed to furnish 4,050,000 pounds per hour of process steam for sale to the Dow Chemical Company.

The following tabulations show the electric system loads to be served by the Applicant and the Michigan Power Pool in which the Applicant is a member, and the relationship of the electrical output of the Midland units to the available reserve capacities on the winter-peaking Applicant's and the summer-peaking Pool's systems at the times of the 1977 summer, the 1977-78 winter, the 1978 summer and the 1978-79 winter peak periods. The Consumers Power Company and Detroit Edison Company comprise the Michigan Power Pool. The peak load periods mentioned are the anticipated initial service periods of the new units, but the life of the units is expected to be some 35 years or more, and they are expected to constitute a proportional part of the Applicant's total generating capacity throughout that period. Therefore, they will be depended upon to supply power to meet future demands over a period of many years beyond the initial service needs discussed in this report.

1977 Summer Peak Load Period

	Consumers Power Company	Detroit Edison Company	Michigan Power Pool
With Midland Unit No. 1 (486 Megawatts)			
Net Dependable Capacity, Megawatts	7,635	10,782	18,417
Peak Load, Megawatts	5,610[1]/	8,740[2]/	14,350[3]/
Reserve Margin, Megawatts	2,025	2,042	4,067
Reserve Margin, Percent of Peak Load	36.1	23.4	28.3
Without Midland Unit No. 1 (486 Megawatts)			
Net Dependable Capacity, Megawatts	7,149	10,782	17,931
Peak Load, Megawatts	5,610[1]/	8,740[2]/	14,350[3]/
Reserve Margin, Megawatts	1,539	2,042	3,581
Reserve Margin, Percent of Peak Load	27.4	23.4	25.0

1/ Includes net sales of 50 megawatts.
2/ Reduced by net purchases 605 megawatts.
3/ Reduced by net purchases 555 megawatts.

1977-78 Winter Peak Period

	Consumers Power Company	Detroit Edison Company	Michigan Power Pool
With Midland Unit No. 1 (486 Megawatts)			
Net Dependable Capacity, Megawatts	7,635	10,782	18,417
Peak Load, Megawatts	5,840[1]	8,325	14,165[1]
Reserve Margin, Megawatts	1,795	2,457	4,252
Reserve Margin, Percent of Peak Load	30.7	29.5	30.0
Without Midland Unit No. 1 (486 Megawatts)			
Net Dependable Capacity, Megawatts	7,149	10,782	17,931
Peak Load, Megawatts	5,840[1]	8,325	14,165[1]
Reserve Margin, Megawatts	1,309	2,457	3,766
Reserve Margin, Percent of Peak Load	22.4	29.5	26.6

1/ Includes net sales of 50 megawatts.

1978 Summer Peak Load Period

	Consumers Power Company	Detroit Edison Company	Michigan Power Pool
With Midland Units Nos. 1 & 2 (1,301 Megawatts)			
Net Dependable Capacity, Megawatts	8,450	10,782	19,232
Peak Load, Megawatts	6,451[2]	8,930[3]	15,381[4]
Reserve Margin, Megawatts	1,999	1,852	3,851
Reserve Margin, Percent of Peak Load	31.0	20.7	25.0
Without Midland Units Nos. 1 & 2 (1,301 Megawatts)			
Net Dependable Capacity, Megawatts	7,149	10,782	17,931
Peak Load, Megawatts	6,451[2]	8,930[3]	15,381[4]
Reserve Margin, Megawatts	698	1,852	2,550
Reserve Margin, Percent of Peak Load	10.8	20.7	16.6
Applicant's Stated Needed Reserve, Megawatts (18 percent of peak load)[1]	1,161	1,607	2,768
Reserve Deficiency, Megawatts	463	---	218

1/ [illegible] Pool Coordinating Committee reserves of 18 percent of peak load necessary to obtain adequate system reliability.

2/ Includes net sales of 481 megawatts.

3/ Reduced by net purchases 1,125 megawatts.

4/ Reduced by net purchases 644 megawatts.

1978-79 Winter Peak Period

	Consumers Power Company	Detroit Edison Company	Michigan Power Pool
With Midland Units Nos. 1 & 2 (1,301 Megawatts)			
Net Dependable Capacity, Megawatts	8,450	10,782	19,232
Peak Load, Megawatts	6,691[1]	8,835	15,526[1]
Reserve Margin, Megawatts	1,759	1,947	3,706
Reserve Margin, Percent of Peak Load	26.3	22.0	23.9
Without Midland Units Nos. 1 & 2 (1,301 Megawatts)			
Net Dependable Capacity, Megawatts	7,149	10,782	17,931
Peak Load, Megawatts	6,691[1]	8,835	15,526[1]
Reserve Margin, Megawatts	458	1,947	2,405
Reserve Margin, Percent of Peak Load	6.8	22.0	15.0
Applicant's Stated Needed Reserve, Megawatts (18 percent of peak load)	1,204	1,590	2,795
Reserve Deficiency, Megawatts	746	--	390

1/ Includes net sales of 481 megawatts.

The adequacy and reliability of the Applicant's system and the Detroit Edison Company's system which comprise the Michigan Power Pool are increasingly dependent upon the timely and continued operation of large nuclear units. The 8,450 megawatts of capacity the Applicant plans to have in operation to meet the 1978-79 winter peak includes the two Midland units, totaling 1,301 megawatts, and the 700-megawatt Palisades unit. The 2,002 megawatts of capacity of these three units represent 23.7 percent of the Applicant's generating capacity. Because of the relative efficiencies and economies of scale in the operation of these large units, it would not be normal to expect these units to be scheduled out-of-service for routine or normal maintenance during these periods, consequently the forced outage of any of these units during these periods has a proportionally large effect upon the system's ability to withstand second or third contingencies. The 31.0 percent (1,929 megawatts) reserve margin the Applicant indicates for the 1978 summer peak is completely vested in the two Midland units and the Palisades unit.

The Michigan Power Pool's 1978 planned capability of 19,232 megawatts includes about 10,413 megawatts of new generating capacity; 5,460 megawatts fossil-fueled, 3,151 megawatts nuclear-fueled and 1,672 pumped storage hydroelectric capacity. The 23.9 percent (3,706 megawatts) reserve margin estimated to obtain at the time of the 1978-79 winter peak will be dependent upon the timely commercial operation of planned new nuclear generating capacity for 65 percent of capacity reserves.

The reserve margins indicated in the foregoing tabulations and text are gross in that they include allowances for scheduled maintenance, forced outages, errors in load forecasting, exceptional weather, and spinning reserve requirements. Recent experience with new large generating units, however, indicates that frequent forced outages of such units is to be expected during the initial months of their operation. The Applicant reports that the Pool considers capacity reserves of 18 percent of peak load necessary to insure adequate system reliability.

Transmission Facilities

Two 2.3 mile, single circuit, 345 kilovolt lines will deliver the energy generated by the Midland Plant to the Tittabawassee Substation, a point on the existing bulk power network. The Applicant states the route is over land principally owned by the Dow Chemical Company, and does not pass through areas with national, historic, scenic or recreational value.

The Applicant further states that all transmission lines associated with the project have been routed, designed and will be constructed and maintained according to Environmental Criteria for Electric Transmission Systems developed by the United States Departments of Interior and Agriculture; and Guidelines for the Protection of Natural, Historic, Scenic, and Recreational Values in the Design and Location of Rights-of-Way and Transmission Facilities published by the Federal Power Commission.

Alternates to the Proposed Facilities

In planning to meet its power needs for the 1977 and 1978 period and beyond, the Applicant considered that there were no sites for base load hydroelectric development available, that combustion turbines are costly to operate and that it does not consider them as base load generating facilities, and that it did not foresee purchased power available at a cost comparable to its own base load generation.

The Applicant studied the economics of nuclear versus fossil-fired base load generation and states that the economic benefits favored the nuclear-fueled facilities to meet its increasing load obligations. In arriving at this decision, it considered natural gas to be unavailable in the quantity needed and oil to be more costly and likely to be

subject to greater procurement difficulties than coal. The Midland Plant is a dual purpose nuclear plant. Besides supplying much-needed base load generation, it is designed to also supply process steam for the Dow Chemical Company. This provision will enable Dow Chemical to completely close down its much less efficient, fossil fuel-burning plant. Comparison by the Applicant of total costs (present worth at 8.75 percent annual discount) of operating comparable-sized, single purpose, plants over an estimated life of 40 years indicated for the nuclear plant total operating costs of $260,000,000, and for the coal-fired plant total operating costs of $700,000,000. These lower operating costs for the nuclear plant greatly outweigh its higher capital costs. The Applicant, in developing total costs, used for nuclear plants a fuel cost of 1.99 mills per kilowatt hour plus 0.50 mills per kilowatt hour for operating and maintenance expenses. For coal-fired plants, it used 5.70 and 0.80 mills per kilowatt hour, respectively.

Assuming that the Midland Plant had been designed as a single purpose plant for supplying 1,301 megawatts of electrical capacity and no process steam, the capital costs are estimated by the Applicant to be about $466,000,000 (about $360 per kilowatt) including a cooling tower. The capital cost of a comparable-sized coal-burning plant is estimated to be $390,000,000 (about $300 per kilowatt, including $35 per kilowatt for sulfur dioxide removal equipment).

These capital, fuel, and operating unit costs are within the general range of costs reported to the Federal Power Commission by others for comparable situations. On this basis, they are considered to be reasonable. These costs must ultimately be borne by the consumer as they become a part of the cost of electric energy. Also any increases in costs which might result from delays in construction of the proposed facilities would be similarly borne by the consumers. Information on estimated costs of delays was not submitted by the Applicant, therefore, no comments are made in that regard.

Conclusions

The staff considers that the capacity represented by the Midland Units 1 and 2 is needed to assist in meeting the Applicant's and the Michigan Pool's 1977 and 1978 summer and winter peaks and to provide reasonable reserve margins for adequacy and reliability of electric service. Prudent and responsible operations of a power system must include provisions for loss of capacity due to forced outages of generating capacity, occurence of loads higher than those forecast, operating margins required to fulfill obligations to participants in the interconnected systems, and operating margins to provide for flexibility in the allocation of load to generating resources because of abnormal bulk power system conditions. The new Midland units will help to meet those objectives of the Michigan systems.