COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In the Matter of:

THE APPLICATION OF NORTH MERCER WATER DISTRICT, OF MERCER COUNTY, KENTUCKY, FOR (1) A CERTIFICATE OF PUBLIC CONVENIENCE AND NECESSITY, AUTHORIZING AND PERMITTING SAID WATER DISTRICT TO CONSTRUCT A WATERWORKS CONSTRUCTION PROJECT, CONSISTING OF EXTENSIONS, ADDITIONS, AND IMPROVEMENTS TO THE EXISTING WATERWORKS SYSTEM OF THE DISTRICT; (2) APPROVAL OF THE PROPOSED PLAN OF FINANCING OF SAID PROJECT; AND (3) APPROVAL OF THE INCREASED WATER RATES PROPOSED TO BE CHARGED BY THE DISTRICT TO CUSTOMERS OF THE DISTRICT	)	CASE NO. 9912

O R D E R

IT IS ORDERED that North Mercer Water District ("North Mercer") shall file an original and seven copies of the following information with the Commission with a copy to all parties of record no later than May 29, 1987. If the information cannot be provided by this date, North Mercer should submit a motion for an extension of time stating the reason a delay is necessary and include a date by which it will be furnished. Such motion will be considered by the Commission. North Mercer shall furnish with each response the name of the witness who will be available at the public hearing for responding to questions concerning each item of information requested.

1. North Mercer filed computer hydraulic analyses for the existing water distribution system with its application. These

analyses only depicted maximum pressure - zero demand and minimum pressure - peak demand scenarios. Unfortunately, these analyses did not depict the "on-off" operation of the existing pump, the "empty-fill" cycles of the existing tanks and apparently did not utilize actual customer demands. Based on this, provide hydraulic analyses, supported by computations and actual field measurements, of typical operational sequences of the existing water distribution system. These hydraulic analyses should demonstrate the operation of all pump stations and the "empty-fill" cycle of all water storage tanks. Computations are to be documented by a labeled schematic map of the system that shows pipeline sizes, lengths, connections, pumps, water storage tanks, wells, and sea level elevations of key points, as well as allocations of actual customer demands. Flows used in the analyses shall be identified as to whether they are based on average instantaneous flows, peak instantaneous flows, or any combination or variation thereof. The flows used in the analyses shall be documented by actual field measurements and customer use records. Justify fully any assumptions used in the analyses. (Note - these analyses should use the same schematic as the analyses of the proposed water distribution system to facilitate comparison).

2. Provide a summary of any operational deficiencies of the existing water system that are indicated by the hydraulic analyses or that are known from experience.

3. North Mercer also filed computer hydraulic analyses for the proposed water distribution system with its application. One analysis depicted a maximum pressure - zero demand scenario and a

minimum pressure - peak demand scenario. Unfortunately this analysis did not depict the "on-off" operation of the existing or proposed pump, the "empty-fill" cycles of the existing or proposed tanks, etc. Another analysis depicted a 24-hour simulation with the "on-off" operation of the proposed pump and the "empty-fill" cycles of the existing and proposed tanks but did not depict residual pressures at representative points throughout the system. Based on this, provide hydraulic analyses, supported by computations and actual field measurements, of typical operational sequences of the proposed water distribution system. These hydraulic analyses should demonstrate the operation of all pump stations and the "empty-fill" cycle of all water storage tanks as well as residual pressures at representative points throughout the system. Computations are to be documented by a labeled schematic map of the system that shows pipeline sizes, lengths, connections, pumps, water storage tanks, wells, and sea level elevations of key points, as well as allocations of actual customer demands. Flows used in the analyses shall be identified as to whether they are based on average instantaneous flows, peak instantaneous flows, or any combination or variation thereof. The flows used in the analyses shall be documented by actual field measurements and customer use records. Justify fully any assumptions used in the analyses. (Note - these analyses should use the same schematic as the analyses of the existing water distribution system to facilitate comparison).

4. In order to obtain realistic results when utilizing computer hydraulic analyses to predict a water distribution system's

performance, engineering references stress the importance of calibrating the results predicted to actual hydraulic conditions. This calibration process should include matching field measurements to the results predicted by the computer over a wide range of actual operating conditions. As a minimum this should include average and maximum water consumption periods, as well as "fire flow" or very high demand periods.

Based on the above, explain the procedures used to verify the computer hydraulic analyses filed in this case. This explanation should be documented by field measurements, hydraulic calculations, etc.

5. The computer hydraulic analyses filed in this case are based on a diurnal customer demand pattern varying from .1 times the average demand to 1.7 times the average demand. The average demand is defined as .15 gallons per minute per customer.

Most engineering references state that instantaneous customer demands can peak at 3 to 15 times the 24-hour average demand. In addition, most engineering references also state that a water distribution system should be designed to meet at least the maximum hourly demand of its customers.

Based on the above information state exactly what measurements were made of North Mercer's maximum hourly usage. If the maximum hourly usage was not measured directly, state why it was not.

In addition, state how the diurnal pattern for North Mercer's system as well as the appropriate demand multipliers were

determined. This response should be documented by appropriate field measurements.

6. Provide a pressure recording chart showing the actual 24-hour continuously measured pressure available at the locations listed below on North Mercer's system. Identify the 24-hour period recorded, the exact location of the pressure recorder and the sea level elevation of the recorder. Also state the schematic junction number nearest the location of the pressure recorder.

a. The water storage tank in the vicinity of junction 523 (McCroskey Tank).

b. The water storage tank in the vicinity of junction 312 (Rose Hill Tank).

c. The water storage tank in the vicinity of junction 518 (Salvisa Tank).

d. The water storage tank in the vicinity of junction 446 (Mayo Tank).

e. On the suction and discharge sides of the pump in line 310.

7. Provide a list of each of North Mercer's water storage tanks. Give the location, capacity, and overflow elevation of each tank. Explain how water is supplied to each tank and how the water level in each storage tank is controlled.

8. Provide a list of each of North Mercer's existing pump stations. Give the location, number of pumps and their rated capacities, and the purpose of each pump station. Explain how the operation of each pump station is controlled. Provide a copy of the pump manufacturer's characteristic (head/capacity) curve for

each of North Mercer's existing pumps. Identify each curve as to the particular pump and pump station to which it applies. Also state if pump is in use and if pump will remain in use, will be abandoned or will be replaced.

9. Provide a copy of the pump manufacturer's characteristic (head/capacity) curve on which the design of the proposed pump station was based.

10. Provide the criteria used in determining the location, size, overflow elevation and head range for the proposed water storage tank. In addition, state what other sites were considered and why they were not selected.

11. Provide a narrative description of the proposed daily operational sequences of the water system. Documentation should include the methods and mechanisms proposed to provide positive control of all storage tank water levels. The description should also include an hourly summary of how all tanks will "work" (expected inflow or outflow of water) and how all pumps will function. The description should be fully supported by appropriate field measurements and hydraulic calculations.

12. Provide a copy of each of the county court orders establishing North Mercer and defining its boundaries.

13. Provide a highway map at a scale of at least one inch equals two miles marked to show North Mercer's existing and proposed systems. The map of the systems shall show pipeline sizes, location, and connections as well as pumps, water storage tanks and sea level elevations of key points. The map shall also

be marked to show the location of the water district's boundaries and labeled to indicate the appropriate court order from which each boundary was determined.

14. The computer hydraulic analyses filed in this case for the existing water distribution system indicate that the potential exists for the system to experience low pressure (less than 30 psig) at Nodes 300, 301, 302, 306, 307, 308, 309, 310, 312, 400, 403, 404, 405, 406, 407, 408, 413, 415, 416, 419, 424, 427, 445, 506, 510, 529, 531, 533, 534 and 535. Pressures at this level are in violation of PSC regulation 807 KAR 5:066, Section 6 (1). Provide details of any preventive measures or additional construction North Mercer intends to perform to protect against this type of occurrence. Details should be documented by hydraulic analyses and field measurements. In addition state whether any complaints of low pressure have been received at these locations.

15. The computer hydraulic analyses filed in this case for the proposed water distribution system indicate that the potential exists for the system to experience low pressure (less than 30 psig) at Nodes 420, 424, 427, 445, 526 and 580. Pressures at this level are in violation of PSC regulation 807 KAR 5:066, Section 6 (1). Provide details on any preventive measures or additional construction North Mercer intends to perform to protect against this type of occurence. Details should be documented by hydraulic analyses and field measurements.

16. The information filed in this case indicates that the proposed water storage tank is to be built on the same site as the existing Rose Hill water storage tank. The information also

indicates that the overflow of the proposed tank is to be at an elevation of 1075 feet above sea level ("A.S.L.") and the bottom of the tank is to be at an elevation of 1061 feet A.S.L. In addition, the information indicates that the existing tank has an overflow elevation of 1032 feet A.S.L. and the bottom of the existing tank is at an elevation of 1020 feet A.S.L. The hydraulic analyses which were filed indicate that the normal hydraulic gradient at the Rose Hill tank site after completion of the proposed construction will never be below 1060 feet A.S.L. Under these conditions it would appear that the existing Rose Hill tank would remain full and no water turnover would take place. As such it would appear that the existing Rose Hill tank would serve no useful purpose and would not be needed. Based on the above, provide details of the operational plans for the existing Rose Hill tank after construction of the proposed tank (e.g. the tank will be taken out of service, the system will be operated such that the water level will be made to fluctuate, etc.). The operational plans should be documented by appropriate field measurements and hydraulic calculations.

17. The proposed pump station is to be a concrete slab, concrete block building with a concrete slab roof. Provide documentation that supports this type construction. Also state whether a shingle type roof or a built-up roof was considered for this building. In addition, state whether a "can" type below ground pump station was considered. If neither was considered, state why not.

18. Exhibit M, Page 1, Billing Analysis of Existing Customers at proposed rate appears to have mathematical errors in the minimum bill and truck loading station revenue. Minimum bill revenue should be: 15,234 bills x $900 = $137,106. Truck loading station revenue should be: (3,042,000 ÷ 160) x $.50 = $9,506.25. Please indicate whether you agree with these amounts.

19. Exhibit M, Page 1, shows a reduction of 21,000 gallons of water sold from truck loading stations from that shown on Exhibit M, Page 2 (3,063,000 - 3,042,000 = 21,000). Please explain.

20. Please explain why no increase is proposed in the truck loading rate.

21. Please explain the methodology used in determining the average monthly usage of 3,600 gallons and in determining the adjustments to bills and usage resulting from new customers.

Done at Frankfort, Kentucky, this 12th day of May, 1987.

PUBLIC SERVICE COMMISSION

Robert D. Vernon Jr.
For the Commission

ATTEST:

Executive Director