State of Minnesota
Department of Conservation
Room 8 State Office Building
St. Paul 1, Minn.

March 19, 1948

Ms. Frances L. Underleak
Auditor
Olmsted County
Rochester, Minnesota

Dear Madam:

Re: Middle Branch Zumbro River (Shady Lake)
at Oronoco
Olmsted County - Ident. #1-3

Recently a member of the staff of this division, Mr. K.W.Pederson, visited the dam at the outlet of the above named lake and also discussed the situation with you and the county engineer. It appears that there is a need for clarification of some of the matters involved in this project so that all concerned will be informed as to the present status of the dam, its maintenance, operation and control.

This dam was constructed under the joint sponsorship of the State of Minnesota and the County of Olmsted through the Works Projects Administration at a total cost of approximately $44,000 of which approximately $12,000 was contributed by the State and about $6,000 by the County of Olmsted and local agencies.

On March 12, 1936 the County Board of Olmsted County passed the following resolution:

"WHEREAS, the State of Minnesota has made plans for the carrying out of what is known as the Oronoco Dam Project and has requested contributions to be made from the United States Government and from the State of Minnesota, and"

"WHEREAS, Olmsted County, Minnesota, is the owner, under options purchased from fee owners, and will secure and purchase fee title, when the Project is approved by proper authority, of the lands upon which the dam is to be erected, and the owner of all other property that will be overflowed or injured by the result of the erection thereof, and,"

"WHEREAS, the United States Government and also the State of Minnesota expect to make contributions for the carrying out of said project and the construction of the dam shown on the plans."

"NOW THEREFORE, Be it and it is hereby resolved by the County Board of the County of Olmsted, Minnesota, that said County does hereby agree to save harmless from any and all claims of every kind, character and description the United States Government and the State of Minnesota, that may arise or be caused by the erection and maintenance of the dam aforesaid."

"BE IT FURTHER RESOLVED, that said County will maintain and operate said dam to the best of its ability permanently."

"Dated at Rochester, Minnesota, this 12th day of March, A.D. 1936."

E. G. Lenton
Chairman of the County Board.

ATTEST: Amiel L. Glabe
County Auditor

(SEAL)

August 11, 1936, the County Board of Olmsted County passed an additional resolution as follows:

"BE IT AND IT IS HEREBY RESOLVED, by the County Board of the County of Olmsted, Minnesota, that the sum of Four Thousand Dollars ($4,000.00) or as much thereof as may be needed be appropriated out of the County Revenue fund for the purpose of securing additional flowage rights in connection with the work relief program at the Oronoco Dam."

"BE IT FURTHER RESOLVED, that the County Attorney be instructed to take the necessary steps to exercise options on additional flowage rights."

"Dated at Rochester, Minnesota, this 11th day of August, A.D. 1936."

E. G. LENTON,
Chairman of the County Board

ATTEST: Frances L. Underleak
County Auditor.
(SEAL)

These resolutions make it clear that Olmsted County has assumed responsibility for the acquisition of necessary lands and rights as well as the permanent maintenance and operation of this project. Since the State has a financial interest in this project as well as the general responsibility for the proper use and control of the waters of the State, it appears reasonable that the operation carried on by Olmsted County should be in accordance with the plan of operation, which was the basis for the design of the dam, outlined herein.

In general, the proposed procedure is similar to that which has been followed since the dam was constructed but certain operational steps have not been carried out and it is to clarify these matters that this letter is written.

For details regarding the elevations of the various parts of structure, a description of the bench mark used for its construction and for recommendations relative to the survey to determine the extent of additional flowage rights contemplated by the resolution of the county board adopted August 11, 1936, you are referred to the division's letter to you under date of November 28, 1939.

Some time prior to the project, easement was acquired by the State Highway Department from Roy N. Allis which provided that the pool limit should not exceed an elevation 5' above a bench mark referred to as "the old iron pin". The elevation of this point has been determined to be 945.89, Highway Department Datum, which is the datum that was used for the construction of the dam. However, subsequent modification limited the pool level to 5' above the crest of the old dam, elevation 944.8 so that at present the pool level is limited to elevation 949.8 or a water level 0.8' above the top of the flashboards headwater gage at the dam of 9.80.

The present plan has 5 tainter gates, 10' x 20', which can be raised by manually operated hoists. The sill of the gates is at elevation 940.0. Adjacent to the gate section is a concrete spillway having its crest at 947.0 with provision for securing an additional height of two feet by means of flashboards. The pins supporting the flashboards originally were designed to fail when the overflowing water exceeded a depth of 1.5'. These pins have now been reinforced or replaced by other stronger supports so that failure is now unpredictable and this safety provision has been eliminated.

The tainter gates can be raised manually at a maximum rate of about 1' in two minutes provided conditions in the river are favorable. Gates of this type are very difficult to raise during the winter and spring months because ice tends to collect both above and below the gates. If one gate were electrically operated and kept in serviceable condition at all times much of this difficulty could be overcome. Due to ice conditions the pool must be drawn down each fall to the level of the concrete crest and the flashboards completely removed from the dam and not replaced until after the spring breakup has occurred or, in any event, not prior to May 15th.

Flashboards are not intended primarily for overflow and hence gate operation is necessary during the open water season so that overflow will not normally occur.

Briefly summarized, the plan of operation is as follows:

1. Maintain pool during open water season as nearly as practicable at 9.00 on the headwater gage of the dam by manipulating the tainter gates to secure the necessary discharge.

2. Before freezeup in the fall, draw down the pool by means of the tainter gates to the level of the concrete crest of the spillway, corresponding to a reading on the headwater gage of the dam of 7.00.

3. As soon as the pool has been drawn down to the crest, completely remove flashboards and pins from the structure and store in a suitable place adjacent to the dam and close all gates.

4. Replace the flashboards on the dam as soon as practicable after the spring breakup but not earlier than May 15th.

RECOMMENDATIONS

1. That the gate mechanism be lubricated at least twice a year, in the spring and fall.

2. All gates to be raised at least once a year to check operating mechanism.

3. Belting on tainter gates to be inspected semi-annually and kept in good repair.

4. Flashboards to be kept in good condition at all times.

5. The concrete spillway is not to be obstructed at any time by piers or other supports for stop logs but flashboards supported by pins designed to fail when water depth exceeds 1.5' are to be used in order to provide the dam with this important safety feature.

6. Designation of a responsible operator to have charge of the dam, at all times, with instructions to report gage readings regularly to this division, together with any unusual situation that may occur.

7. Equip at least one tainter gate for electric operation.

It is believed that it will seldom be necessary to operate any of the tainter gates during the winter season if the operating plan is strictly adhered to and maintenance work is thoroughly and promptly done.

State warning signs to be attached to the railings at either side of the dam are being sent to the County engineer.

A crank for operating the gates should be stored in a suitable box attached to the hand railing so constructed that it may be locked by means of a padlock. Standard U.S. Geological Survey padlocks and keys will be furnished by the Division of Water Resources.

The division will be pleased to supply gage height report cards to the county so that the gage readings and other operating data will be obtained and reported to the Division of Water Resources who will keep a record and check the operation.

Attached hereto is a list of pertinent data pertaining to the maintenance of the tainter gates and their operating mechanism for the guidance of the county engineer or some other person designated by the board to be responsible for the maintenance of the dam.

Yours very truly,

C.T. Kkman,Director

By

S.A. Frellsen, Hydrologist

Re: Middle Branch Zumbro River (Shady Lake)
at Oronoco
Olmsted County - Ident. #1 -3

5 tainter gates 10' high x 20' wide (#1-5 inclusive, from left to right looking downstream).

Elevation of gate sill - 940.0.

Elevation of top of gate -950.0.

" " operating platform - 956.5

Belting: 7" five ply.

Manufacturer: St. Paul Structural Steel Company, St. Paul, Minn.

Gate hoists:

Type: IXL 27 W T No. 49560 -1

Gear ratio - 67:1

Shafting: 2 13/16 diameter, cold rolled steel.

Manufacturer: Foote Bros. Gear and Machine Company, 521 South 7th Street, Minneapolis, Minnesota

Lubricants: Lubricate all gates with No. 4 lubricant having saybolt visosity of 135 to 195 at 210° F.

Use No. 90 transmission oil for the hoists and ordinary cupgrease where required. Each hoisting unit has two greasecups.

Hoisting chain: 3/4" round Crown Dredge Iron Chain - safe working load: 10,140 lbs.