

## THE CASCADE DAM

July 18, 1998

**History:** The Cascade Dam was constructed by the Michigan Water Power Company in 1926 for hydroelectric generation. It was designed by Spooner & Merrill, Consulting Engineers. Consumers Power Company acquired the dam in 1934 from the Lower Peninsula Power Company, and operated the plant until it was retired in 1971. At that time, the dam and powerhouse were offered to the Cascade-Thornapple River Association, but they declined to purchase it over concerns about future liabilities. Cascade Township then purchased the dam and powerhouse from Consumer Power. The generating equipment had been removed by Consumers Power before the sale and the dam then remained idle until 1986 when STS HydroPower, Ltd. leased and renovated the facility for hydroelectric generation. STS continues to operate the dam and generates electric power which it sells to the Consumers Power Company.

The lease agreement requires a minimum yearly payment to Cascade Township of \$50,000. This amount could be adjusted upward if the base rate for electricity should become greater than it was in 1986. Currently the base rate is lower than in 1986. In addition, Cascade Township is paid for half of any generation over 7,500,000 Kwhr in a year at the yearly average rate paid by Consumers. In 1995, Cascade Township received \$82,395 in rent. Cascade Township reimburses STS Hydro for any necessary maintenance expenses.

**Safety:** Dam safety inspections were conducted in 1970 and 1972 by Williams and Works in conjunction with Fargo Engineering. Reports from both dates found the dam structure to be in good condition. In April of 1980, the Cascade Dam was inspected under the National Dam Safety Program and reported to be in "generally good condition". This report classified the dam as an intermediate size dam with a high hazard potential (presumably because of the downstream residences).

Now inspections are required under the Federal Energy Resource Commission (FERC). They send a personal inspector once a year and require periodic safety inspection reports by STS Hydro who retain qualified registered engineers to perform the required tests and measurements.

Briefly, the local geology, foundation conditions from borings, stability of materials in the embankments, earthquake risk for the area, and sinkhole potential for the limestone bedrock are evaluated for the site. Four observation wells are monitored to warn if any water is leaking through the scouring from water currents. Survey markers are established to check for any settling of the dam and powerhouse structure. The FERC reports show there has been no settling or horizontal movement of the dam in the past 4 years.

In the report to FERC, a study is included to determine if the spillway has adequate capacity to handle the maximum flood water. A stream gauging station is maintained at Caledonia that measures the flow in the Thornapple. At the gauging point, 95% of the dam's watershed is included. The maximum flood recorded since 1956 was 6,700 cubic ft./sec. The spillway at the dam is rated at a maximum of 24,000 cfs. It appears that there is little danger of flood to the Cascade impoundment, but a separate study has been filed with FERC to address flood danger.

**Operation:** The dam is operated on a "run of the river" basis. Automatic controls at the gates operate to maintain the level of the pond within close limits. This year we have had little rainfall so it appears that there will be little if any income above the \$50,000 base rental.

Information above largely from Third, Part 12 Inspection Report to FERC from STS HydroPower compiled by John Davies, Cascade-Thornapple River Association.