VERMONT

Vermont Department of Environmental Conservation *Agency of Natural Resources*
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MEMORANDUM

TO:	**For the Record**
FROM:	**Brian A. Terhune, P.E., Dam Safety Engineer**
DATE:	**June 7, 2007**
SUBJECT:	**Inspection of Shadow Lake Dam, Glover, VT**

On June 6, 2007, Brian Terhune, Chris Pollock, and Henry Nyenbrink made a routine inspection of Shadow Lake Dam in Glover, Vermont. A number of photographs were taken. The dam is owned by the Town of Glover. The State Identification Number is 81.02. Keone Maher from the Town of Glover was present during the inspection. The inspection was carried out under the provisions of 10 VSA 1105.

OVERALL CONDITION:

The overall condition of the dam is poor.

DOWNSTREAM HAZARD CLASSIFICATION:

The dam is a Class 2, "significant hazard" dam based on a Dam-Break Flood Analysis done in April 1991.

RECOMMENDATIONS FOR THE OWNER:

1. A long-term capital construction project should be planned to regrade the earth embankment section.

2. Brushing and tree should be performed along the entire length of the dam extending to a minimum of ten (10) feet beyond the abutments the toe of the dam. With the number of trees and amount of brush to be removed, these operations should be done under engineering supervision. Large trees/brush (4 inches diameter) may cause root cavities and lead to piping (internal erosion) through the dam. This will also allow for a more thorough inspection.

3. The upstream face of the dam should be cleared of all debris to prevent the spillways from being clogged.

4. The emergency spillway channel should be cleared of debris to provide for fully hydraulic capacity.

5. The wood planks of the bridge at the gatehouse are rotten and should be replaced.

6. The stop logs should be monitored for rotting and replaced as needed.

7. The areas of erosion near the gatehouse should be filled in and stabilized.

8. A detailed Emergency Action Plan (EAP) should be developed by a professional engineer qualified in dam safety, implemented, and tested in the event of a potential failure of the dam.

BACKGROUND AND DESCRIPTION:

The dam is an earthen embankment with granite block masonry walls. The structure is approximately 129 feet long and 11.5 feet high at maximum section. The crest is an average of 16 feet wide.

The principal spillway is a cast in place concrete drop inlet with a single stop log section. Flow is controlled through a 36" diameter sluice gate. The emergency spillway is located at the left end of the embankment and is a concrete chute 33.5 feet long and 15 feet wide and has a date of 1929 cast into the left spillway wall

The actual date of construction is unknown but the dam was in place during the flood of 1927. After the flood in 1927 much of the embankment section was washed out but the granite block wall remained in place.

INSPECTION:

The inspection of the dam was conducted on June 6, 2007 at 10:00 AM. The weather was partly cloudy and in the 60s. The ground was wet. The water level in the pond was 4.8 feet below the block wall to the right of the principal spillway. The following was observed:

1. Principal Spillway

    a. Approach: The approach was full of woody vegetation and other obstructions and should be cleared.

    b. Control Section: There was a crack in the left side of the concrete gatehouse foundation.

    c. Outlet: The discharge channel was rocky with some debris. There was some undercutting occurring at the base of the spillway that should be filled in.

2. Embankment Section: The embankment is a vertical stone-faced earth fill structure. There were large trees and brush growing on both the up and downstream slopes of the embankment. No seepage was noted during this inspection due to the amount of vegetation and yard waste dumped at right abutment.

3. Abutments: The left abutment was dry and firm with heavy tree and brush growth. The right abutment also had tree and brush growth and was soft around a pipe running from the neighboring cabin. There was a large amount of yard waste dumped on the right abutment.

4. Crest: There were areas of erosion on both sides of the gatehouse and one hole behind the upstream wall on the right side. The crest was overgrown with brush and trees.

5. Emergency Spillway: The spillway is an uncontrolled concrete ogee crest type structure. There were some cracks in the concrete training walls with some efflorescence. The spillway channel was clogged with debris including the remnants of a dock.

HYDROLOGY AND HYDRAULICS:

The drainage area at this site is about 3328 acres. The lake surface area, at normal pool, is about 188 acres with storage of about 1432 acre-feet. At the dam crest, the pool stores 2283 acre-feet. The maximum discharge capacity for the unobstructed spillway is 107 cubic feet per second. The emergency spillway has a maximum hydraulic capacity of 346 cubic feet per second.

JURISDICTION:

Since the dam impounds more than 500,000 cubic feet any alteration, reconstruction or breaching would require prior approval from the Department under provisions of Title 10 of the Vermont Statutes Annotated, Chapter 43.