VERMONT

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

TO:	For the Record
FROM:	Stephen Bushman, P.E., Dam Safety Engineer
DATE:	November 20, 2012
SUBJECT:	Inspection of Shadow Lake Dam, Glover, VT

On September 6, 2012, Stephen Bushman, P.E., 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. It was last inspected on June 11, 2009. The State Identification Number is 81.02. The inspection was carried out under the provisions of 10 VSA 1105. Nick Ecker-Racz and Jack Sumberg, Selectman, were present.

OVERALL CONDITION:

The overall condition of the dam is poor. However, commendable efforts are being made to clear the dam of trees and perform other maintenance items.

DOWNSTREAM HAZARD CLASSIFICATION:

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

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.

RECOMMENDATIONS FOR THE OWNER:

1. The portion of the dam to the right (looking downstream) of the emergency spillway has been cleared of trees and brush since the last inspection. Brushing and tree removal should continue along the remaining length of the dam and extending to a minimum of ten (10) feet beyond the abutments and the toe of the dam. The tree stumps should be monitored for decay, and voids backfilled as necessary.

2. The upstream face of the dam, including the areas between the lake and the upstream stone wall and the area in the vicinity of the trash racks, should be cleared/kept cleared of all trees and debris to prevent the spillways from being clogged and to prevent tree roots from destabilizing the upstream stone wall.

3. The emergency spillway channel, including the discharge channel at least 50 feet downstream of the end of the concrete apron, should be cleared of debris to provide for full hydraulic capacity. The remaining stop log pin should be removed so that it does cause clogging of the spillway approach.

4. One wooden trash rack member and the trash rack anchor plate should be replaced.

5. Monitor the cracking concrete in the gatehouse foundation and the spillway and repair as necessary.

6. Fill in the large sinkholes on the left side of the control house and the small sinkhole near the right upstream wall. A gravelly material with sufficient fines should be used.

7. Remove the larger stones form the discharge channel immediately downstream of the control house. The channel should be monitored for further destabilization and re-armored as necessary.

8. An 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.

INSPECTION:

The inspection of the dam was conducted on September 6, 2012 at 1600 hours. The following was observed:

1. Upstream Stone Wall: The upstream stone wall consists of large granite blocks. In general, the wall appeared to be stable but irregular, with a few blocks slightly out of alignment to the right of the gatehouse. Trees were growing adjacent to the wall adding to the instability. The trees to right of the control house had been removed, while several large trees remained between the control house and emergency spillway. Left of the emergency spillway contained primarily heavy brush.

2. Embankment Section: Downstream of the stone wall is an earth filled section about 16 feet wide. The trees and brush previously reported had been mostly removed from the area to the right of the control house and between the control house and emergency spillway. Most of the trees on the left embankment had been felled but remained on the embankment. Several standing trees were noted near the left abutment. The downstream clearing limit, including the toe area, was good, but brush from the clearing operation remained in places. No seepage was noted during this inspection but the toe area, however the left side was difficult to inspect due to heavy brush.

3. Principal Spillway:

    a. Approach: The approach was mostly clear with minor woody debris present. The trash fence noted previously had been removed. One of the wooden trash rack members was missing and the anchor plank appeared to be rotting.

    b. Control Section: There was a crack in the left side of the concrete gatehouse foundation; otherwise the concrete appeared to be in good condition. The bridge across the principal spillway channel had been replaced since the last inspection and was in good condition.

    c. Outlet: The sluice gate was viewed from inside the control house. It had some rust but otherwise appeared to be in good condition and opened about twelve inches. The gate is operated frequently and was well greased. The discharge channel was rocky with some debris. There had been some scour in the channel immediately downstream of the outlet due to TS Irene. Several large boulders that lined the channel had fallen into the channel partially blocking it.

4. Abutments: The left abutment was dry and firm but still had some heavy tree growth near the abutment. Brush from recent clearing was still present. The right abutment was clear and appeared firm and good for line and grade.

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. Most of the debris had been cleared from the concrete portion of the channel since the last inspection but some remained, especially near the outlet. The downstream spillway channel was clogged with debris and brush. One stop log pin, which is no longer used, remained in place.

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.