

MEMORANDUM

TO: For the Record
FROM: Stephen Bushman, P.E., Dam Safety Engineer
DATE: June 23, 2010
SUBJECT: Inspection of Lake Fairlee Dam, Thetford, VT

On November 13, 2009 Stephen Bushman, P.E, made a routine periodic inspection of the Lake Fairlee Dam located in Thetford, Vermont, State Identification Number 206.01. Tig Tillinghast, Thetford Select Board Chair, was also present during the inspection. Several photographs and field notes were taken during the inspection. The last inspection of the dam was on March 17, 1987. This report updates previous observations and records additional information.

OVERALL CONDITION:

The overall condition of the dam is fair.

DOWNSTREAM HAZARD CLASSIFICATION:

The dam is a Class 3 ("low hazard") structure.

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 OWNER:

1. Monitor the cracking in the concrete on the upstream slope and the crest of the auxiliary spillway and the crack in the principal spillway.
2. Monitor deterioration of concrete on downstream face in order to keep the stone that is left from dislodging with the falling concrete.
3. Due to the deteriorating condition of the concrete, plans for repairs and/or replacement of the concrete should be implemented.
4. Remove debris including leaves and needles from the upstream slope so that cracking can be monitored and inspected more clearly.

5. Monitor the leakage through the wall isolating the principal spillway from the house for increase in flow.
6. Monitor the stones downstream of the auxiliary spillway and the drain pipe for increase in flow.
7. The low-level drain should be tested to insure it is operational. The low-level drain is important for repairs and emergency drawdown.

INSPECTION:

The inspection of the dam was conducted on November 13, 2009 at 1030 hours. The weather was overcast with temperatures in the 40's. The water level was 0.2 feet over the center of the principal spillway. The following was observed:

1. Principal Spillway (left side of dam facing downstream)
 - a) Approach Channel: The approach was clear of debris
 - b) Control Section: Concrete was in good condition, except some scour and spalling where it joins with the auxiliary spillway. No undercutting was noted. There is a crack at the center as noted in the previous inspection.
2. Auxiliary Spillway:
 - a) Upstream Slope: The upstream slope appeared to be in fair condition, although it was covered with leaves and needles which made it difficult to observe. There was a long crack that was noted in the previous inspection that appeared unchanged. The upstream slope is always submerged. The concrete wing wall has minor spalling.
 - b) Crest: The crest was covered with numerous transverse cracks that were evenly spaced. These cracks had been repaired with mortar. There was some spacing noted at the cracks. Loss of concrete was noted around the posts where the crest is cantilevered.
 - c) Downstream Slope: The concrete was in poor condition and extremely deteriorated. Continuous deterioration was noted since the previous inspection. Numerous stones have dislodged from the wall as a result of concrete falling off. It is not clear why concrete was used on the downstream wall. There were numerous areas of leakage through the stones. In general the stone appeared good to fair and was good for line and grade. The dam was founded on bedrock.
3. Stone Walls:
 - d) Stone Wall Downstream at House: Good for line and grade, but leakage was noted. The wall is used to isolate the principal spillway overflow from flowing under the house.
 - e) Stone Wall Right End: There was a stone wall located on the right end of the downstream side that was in good condition.
4. Low Level Drain:

- a) Old Penstock: The old penstock serves as the low-level drain. It appeared to be in fair condition, but had no operating mechanism and leakage was present. A plate appeared to be welded on to the upstream end of the pipe. An operator stem was noted under the old control house which is now a camp. It appeared to be offset from the main pipe and possibly goes to a second pipe.

HYDROLOGY AND HYDRAULICS:

The drainage area of the site is about 12980 acres or 20 square miles. The pond area at normal pool is 427 acres with storage of 3900 acre-feet. At the top of the dam, the pool area would be about 463 acres with storage of 4800 acre-feet. The spillway design capacity is about 1250 cubic feet per second.