DAM SAFETY INSPECTION REPORT

SABIN DAM
DAM ID NO. 513

BOARDMAN RIVER
GRAND TRAVERSE COUNTY
SECTION 27, T27N, R11W

OWNER: Grand Traverse County
400 Boardman Avenue
Traverse City, Michigan 49684-2577
231-946-0921

OPERATOR: Grand Traverse County
Department of Public Works
2650 LaFranier Road
Traverse City, Michigan 49684

HAZARD POTENTIAL CLASSIFICATION: High

INSPECTION DATE: August 20, 2015

REPORT DATE: September 9, 2015

INSPECTED AND PREPARED BY:

James T. Pawloski, P.E.
Dam Safety Program
Water Resources Division
Department of Environmental Quality
2100 M-32 West
Gaylord, Michigan 49735
989-370-1528
INTRODUCTION

The purpose of this inspection report was to evaluate the structural condition and hydraulic capacity of the Sabin Dam as required by Part 315, Dam Safety (Part 315), of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA). This inspection was conducted in response to a request from the dam’s owner, Grand Traverse County. The report is limited to a discussion of observations based on a visual investigation and review of any available previous inspection reports, plans, and data. This report should not be considered an in-depth engineering investigation.

All references to “right” and “left” in this report are based on the observer facing downstream.

CONCLUSIONS AND RECOMMENDATIONS

The Sabin Dam is in satisfactory condition. Conditions at the Sabin Dam have changed very little since the inspection in 2012; therefore, much of the language in this report may be similar or identical to the previous report.

There were no deficiencies observed during the inspection that would lead to the dam’s immediate failure. The dam has adequate spillway capacity under existing conditions.

The following recommended actions should be completed by the dates indicated:

1. Update the existing Emergency Action Plan (EAP) to reflect changes in ownership and any other essential activities in the EAP. Continue to annually review the EAP with the Emergency Services Coordinator for Grand Traverse County and update it as appropriate. In accordance with Part 315, provide a copy of the findings of the EAP review and any plan updates to the Dam Safety Program and the County Emergency Management Coordinator by December 31, 2015.

2. Remove trees and brush from the embankment by December 31, 2015.

The current high hazard rating is appropriate.

PROJECT INFORMATION

The Sabin Dam consists of a 60-foot long left embankment, a 64-foot wide powerhouse, a 52-foot long center embankment, a 32-foot long stop log spillway section, a tainter gate spillway, and a 330-foot long right embankment. The impoundment is approximately 40 acres in surface area at normal water levels.
The embankments are all constructed of sand fill. All structures are founded on sand, gravel, and clay glacial deposits. The right embankment has a maximum height of approximately 20 feet. Between 1985 and 1988, the embankments were raised approximately one foot in elevation.

The stop log section of the spillway has two feet of stop logs above the spillway crest. There are three low-flow outlets with wood lift gates in the stop log section that are no longer utilized. The tainter gate section contains one 18-foot wide by 5.5-foot high steel tainter gate. The gate is operated with a fixed electric cable hoist. An agitator system (aerators) is in place upstream of the tainter gate to prevent ice buildup during the winter season.

The powerhouse is a reinforced concrete substructure with a brick superstructure and contains one power generating unit. The intake structure is integral to the powerhouse and contains the water flow, which discharges directly to the Boardman River just downstream from the powerhouse.

The 2005 Supporting Technical Information Document, authored by Gannett Fleming, Incorporated, which was prepared as a part of the Potential Failure Modes Analysis required by the Federal Energy Regulatory Commission, was used as the primary reference for this report.

**Boardman River Dams Committee**

From 2005 through 2009, a local coalition of interested parties called the Boardman River Dams Committee (BRDC) studied the Brown Bridge, Boardman, Sabin, and Union Street Dams on the Boardman River to determine what the eventual fate of the dams should be. The Brown Bridge, Boardman, and Sabin Dams had been power-producing dams, but power production was discontinued by Traverse City Light and Power, operator of the dams. When power production ceased, the owner requested, and was granted, the surrender of their license issued by the Federal Energy Regulatory Commission, and they were no longer exempted from regulation by state dam safety regulations.

The BRDC entered a split recommendation: either remove the three power-producing dams, or continue to study them further to reenergize them. They also recommended maintaining and modifying the Union Street Dam. The owners of the dams, the City of Traverse City (Brown Bridge and Union Street) and Grand Traverse County (Boardman and Sabin) each resolved to remove the dams, with the exception of Union Street. The BRDC continues to be involved with this process and is preparing to retain design and construction professionals to implement the removal decisions made by the community.

In 2011, the Sabin Pond was drawn down approximately six feet in preparation for eventual removal of the dam.
SITE INVESTIGATION

The following discussion of the dam’s physical condition and appurtenances is based on observations and photographs obtained on the date of the inspection.

The embankments are in good condition, as shown in the attached photographs. There were no indications of settlement, sinkholes, or other deficiencies in the embankments. There is some light brush and small trees beginning to encroach on the embankment. These should all be removed by December 31, 2015, and as it develops. The embankment should be maintained in a grass-covered condition.

The stop log section of the spillway is in fair condition, as shown in Photographs 7 and 8. There is significant concrete spalling. The spalling should normally be addressed, due to a loss of the concrete section and structural integrity. However, since the decision has been made to remove the dam in the near future and the impoundment has been drawn down, it is not necessary to implement minor repairs on the structure at this time. If a decision were made to re-impound the water, then corrective action would be necessary.

The overflow spillway is in good condition, as shown in Photographs 6 and 9. The tainter gate was fully open on the date of the inspection and is in good condition. The concrete surfaces of the spillway chute are all in good condition.

The powerhouse intake structure is in good condition, as shown in Photographs 3 and 4. The trash racks are functional.

The powerhouse also appears to be in good condition overall, as shown in Photographs 2, 3, and 11. Some minor spalling is evident on the downstream face of the powerhouse. However, since the dam is scheduled for removal and the spalling is limited, no action is necessary at this time.

STRUCTURAL STABILITY

Based on the conditions observed during the field inspection, the dam appears to be stable. No further structural stability analysis is warranted at this time.

HYDRAULICS AND HYDROLOGY

The total drainage area of the Boardman River at the dam is 268 square miles, and the contributing drainage area is 211 square miles. The design discharge for this dam is the one-half percent flood discharge, which is estimated to be 1,900 cubic feet per second (cfs).
The existing spillway capacity is estimated to be approximately 3,600 cfs, with no freeboard. Therefore, the dam has adequate spillway capacity. Spillway calculations are included in a Mead & Hunt report, 1991 Spillway Design Flood Studies.

**OPERATION AND MAINTENANCE**

Grand Traverse County Department of Public Works operates and maintains the dam. A written Operations and Maintenance Plan is on file.

**EMERGENCY ACTION PLAN**

Since this dam has a high hazard potential rating, an EAP is required. An EAP is on file with the Dam Safety Program, but it was prepared by Traverse City Light and Power and reflects their organization and operation. The EAP should be updated by Grand Traverse County personnel and reflect the change in ownership and any other activities contained in the EAP. The EAP should be reviewed and updated annually.

In accordance with Part 315, Grand Traverse County must provide a copy of the findings of the EAP review and any plan updates to the Dam Safety Program and County Emergency Management Coordinator by December 31, 2015.

**APPENDICES**

A location map and inspection photographs are included with this report.
Photograph 1 – Powerhouse access road and left embankment.

Photograph 2 – Powerhouse viewed from the left abutment.
Photograph 3 – Powerhouse intake and spillway entrance.

Photograph 4 – Closer view of the powerhouse intake.
Photograph 5 – Spillway walkway.

Photograph 6 – Spillway stop log section entrance.
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Photograph 7 – Downstream face of the spillway stop log section.

Photograph 8 – Downstream face of the spillway stop log section.
Photograph 9 – Spillway viewed from the deck.

Photograph 10 – Powerhouse viewed from downstream.
Photograph 11 – Left downstream training wall.

Photograph 12 – Right downstream training wall.
Photograph 13 – Right embankment viewed from the right abutment.

Photograph 14 – Downstream face of the right embankment – original spillway foundation.