

STATE OF MICHIGAN



JOHN ENGLER, Governor

**DEPARTMENT OF ENVIRONMENTAL QUALITY**

*"Better Service for a Better Environment"*

HOLLISTER BUILDING, PO BOX 30473, LANSING MI 48909-7973

INTERNET: [www.deq.state.mi.us](http://www.deq.state.mi.us)

RUSSELL J. HAROING, Director

April 2, 1998

City of Corunna  
402 N. Shiawassee Street  
Corunna, MI 48817

Dear Dam Owner:

The enclosed Dam Safety Inspection Report for the Corunna Dam, Dam ID 379, Shiawassee County was prepared by Mr. Paul T. Wessel, of the Department of Environmental Quality (DEQ). The visual inspection and report were completed at your request, under Section 31518(4) of Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Part 451).

The inspection report does not identify any structural or hydraulic deficiencies that present an immediate threat to the dam. However, there are several recommendations outlined in the report which should be completed to maintain the dam in a safe condition.

We do not have an Emergency Action Plan (EAP) on file for your dam. To be in compliance with Part 315, you need to prepare an EAP in conjunction with the Shiawassee County Emergency Management Coordinator and provide our office with a copy of the approved plan.

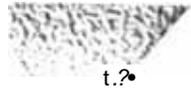
Maintenance work on the dam does not require a permit from the DEQ. However, repair, alteration, enlargement, removal and abandonment activities do require a permit from the DEQ. Excerpts from Act 451 which define these terms are also enclosed.

If you have any questions regarding permit requirements or other matters, please feel free to contact Mr. Paul Wessel, at 517-335-6748, or you may contact me.

Sincerely,

Hope Croskey, P.E., Chief  
Dam Safety Unit  
Land and Water Management Division  
517-335-3174

HC:PTW:bmw  
Enclosures  
cc: Mr. Paul Wessel, DEQ



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## **INTRODUCTION**

The purpose of this inspection is to evaluate the structural condition and hydraulic capacity of this dam as required by Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. This inspection was conducted in response to a request from the owner of the dam, the City of Corunna. The report is limited to a discussion of observations based on a visual investigation and review of any previous inspection reports, plans, and data which are available. 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 Corunna Dam is in poor condition. Based upon observations at the time of the inspection, there were no apparent structural deficiencies that may lead to the immediate failure of the dam. However, the structural condition of the right spillway abutment wall is poor, and additional analysis of this wall should be conducted. The dam is submerged by the design flood. The following recommended actions are listed by priority.

1. A further evaluation of the structural condition of the right abutment wall should be instituted.
2. A structural evaluation of the condition of the overflow spillway should be conducted during a period of low flow over the spillway.
3. An Emergency Action Plan (EAP) should be developed for the dam in conjunction with Shiawassee County Emergency Services.
4. An Operations and Maintenance (O & M) plan should be developed for the dam.

The hazard potential rating for the structure has been reviewed and the "significant" hazard potential rating is still appropriate.

## **PROJECT INFORMATION**

The Corunna Dam was constructed in the mid 1800's to provide power for a mill. The impoundment is currently maintained to provide recreational opportunities for area residents. It is believed that the City of Corunna has responsibility for the operation and maintenance of the dam. The dam consists of a 200 foot wide overflow spillway with a 25 foot wide stoplog bay section located adjacent to the right abutment. The dam has a structural height of 10 feet, a normal of 7 feet, and creates an impoundment with a surface area of 17 acres/

## **SITE INVESTIGATION**

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

The structural condition of the right abutment wall, seen in Photographs 1, is poor. Photograph 2 shows a large section of the wall missing just downstream of the right stoplog gate. Water flows through this void, and apparently exits at the base of this wall, as seen in Photograph 3. Some movement of this wall is suggested by the separation of the inner portion of the wall from the outer portion, as seen in Photograph 4. The center pier of the former powerhouse, seen in Photograph 5, is deteriorated at the water line. While spalled and suffering from efflorescence, the center pier does appear to adequately support the stoplog bays.

As shown in Photograph 6, the left wall of the former powerhouse suffers from concrete deterioration, as well. Cracking of the wall is apparent. However, no displacement of this wall was observed. Repairs to the wall should be completed in conjunction with the remainder of the repairs conducted to this section of the dam.

Photographs 7 and 8 show leakage through the stoplog bays. This leakage is primarily occurring along the stoplog supports and in one case, between two layers of stoplogs. Replacement of the stoplogs may be warranted if the amount of seepage through the stoplogs increases significantly.

Based upon the extent of water flowing over the spillway, a thorough evaluation of the condition of the principal spillway was not possible. No information on the cross section of the spillway or the spillway construction materials was available. As seen in Photographs 9, 10 and 11, flow patterns over the spillway are indicative of crest irregularities. A void is present along the extreme right edge of downstream spillway face, as seen in Photograph 12. Based upon the rectangular shape of this void, it appears this void was a design feature. Water was observed flowing through the spillway at the extreme left edge of the overflow spillway, as shown in Photographs 13 and 14. Whirlpools have been reported just upstream of the embankment crest in the past. These whirlpools give indication of flow occurring through cracks or voids in the overflow spillway. Expansion of voids under the crest of the spillway could lead to settlement of the spillway, eventually jeopardizing the stability of the dam. Further analysis of the spillway should be conducted to determine the extent of voids under the spillway. Based upon this investigation, appropriate repairs should be instituted.

## **STRUCTURAL STABILITY**

The condition of the right abutment area raises concern over the long term structural stability of the dam. Repairs to the right abutment should be completed as soon as feasible. A more detailed analysis of the overflow spillway should be conducted during low water conditions to determine the magnitude of cracks and voids present. Repair or monitoring should be instituted based upon the findings of those reports.

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## **HYDROLOGY AND HYDRAULICS**

The contributing drainage area to the Shiawassee River at the dam is 514 square miles. The design discharge for this dam is the 0.5% chance (200-year) flood discharge which is estimated to be 7,900 cubic feet per second (cfs). Under design flood conditions, the crest of the dam is submerged by several feet, as shown on the flood insurance study for the City of Corunna.. Tailwater submergence reduces the net hydraulic load imposed on the spillway. Modifications to increase the spillway capacity of the structure are not warranted.

## **OPERATION AND MAINTENANCE**

A written O & M plan, outlining procedures for upkeep and operation of the dam, should be prepared for the dam. This plan should be periodically reviewed and updated to reflect changes in O & M procedures.

## **EMERGENCY ACTION PLAN**

The Corunna Dam is a "significant" hazard potential dam. Therefore, an EAP is required for this structure. We do not have a copy of an EAP for this dam on file. The EAP should be prepared in conjunction with the Shiawassee County Emergency Management Coordinator . The emergency management coordinator for Shiawassee County is:

Lt. Eddie Barber  
Shiawassee County Emergency Services  
201 E. McArthur Street  
Corunna, Michigan 48817  
Phone: 517743-3411

## **APPENDIX**

A location map and photocopies of inspection photographs are provided in the appendix. Original inspection photographs are on file with the Dam Safety Unit.