Lake Geraldine Dam

Dam Safety Inspection

Report

January 7, 2004

City of Iqaluit

02-0823-0100

Submitted by

Dillon Consulting Limited

Our File: 02-0823-0100

DILLON CONSULTING

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City of Iqaluit
P.O. Box 460
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Attention: Mr. Brad Sokach
Director of Engineering

Lake Geraldine Dam Safety Inspection
Purchase Order No. 018967

Dear Mr. Sokach:

Enclosed is a copy of our 2003 Dam Safety Inspection for the Lake Geraldine Dam.

Should there be any questions, please contact the undersigned.

Yours sincerely,

DILLON CONSULTING LIMITED

Allan D. Murray, P.Eng.
Project Manager

ADM:elz

Encl.

Dillon Consulting
Limited

1. INTRODUCTION

The Canadian Dam Safety Guidelines (DSG) requires that all structures exceeding prescribed height and volume minimums be subject to Dam Safety Reviews (DSR) and Dam Safety Inspections (DSI) at regular intervals.

A DSR is a comprehensive, formal review process that involves completion of checklist items in accordance with the Dam Safety Guidelines. The DSR forms a baseline of dam history, condition, repair requirements, and extensive documentation of monitoring, operating, safety and emergency procedures.

Lake Geraldine Dam requires a DSR every seven (7) years. The first DSR was conducted in 2001.

It is required in the DSG document that in the interval between DSR's, a Dam Safety Inspection be performed on an annual basis. The DSI is a much less comprehensive review, comprising a visual inspection only to identify any changes in condition, or any observed concerns.

The last DSI was conducted in August 2002, followed by a report dated January 9, 2003.

2. BACKGROUND

For a much more detailed historical perspective, refer to the DSR completed in 2001.

The City of Iqaluit derives its water supply from Lake Geraldine, which is retained by a structure consisting of a cast in place concrete gravity dam incorporating a spillway section and a cast in place concrete cut-off wall and embankment. All concrete structures are believed to be founded on rock, and engage rock at their abutments.

Lake Geraldine is a natural body of water in an irregularly shaped basin. It is fed by rainfall and snow/ice melt from a watershed with an area of approximately 385 hectares.

A general arrangement drawing of the dam is provided in Appendix 4 of the DSR.

3. SUMMARY OF PREVIOUS DSI (AUGUST 2002)

1. The visible portions of the concrete structures are generally in good condition with localized scaling and spalling visible. No appreciable changes in the condition of the concrete were noted. The actively seeping shrinkage cracks that were observed in 2001 are, for the most part, unchanged.

2. The rate of leakage through the control joint south of the spillway section has not changed significantly since the 2001 inspection.

3. There was no evidence of distress or overstressing of any portion of the visible concrete structures.

4. Minor corrosion of the 1985 spillway extension frame continues

5. Significantly increased flow was noted at a joint location midway up the dam elevation, at the junction of the spillway section and the south gravity section. This area was reviewed on the upstream face by underwater video.

6. The embankment portions of the dam do not appear to have changed appreciably in slope/stability since the 2001 inspection.

4. SITE INSPECTIONS – MAY 2003 AND OCTOBER 2003

In May of 2003, the dam was visually inspected and was observed to be, in general, in a similar condition as found in August 2002. The only exception concerns item 6, above, where we noted additional slumping of upstream fills. The leaks described in items 2 and 5, above, had been recommended for repair in the previous DSI, along with less active leaks.

In October 2003 the repair work (crack injection) was performed by Bellai. A follow-up inspection in October 2003 confirmed that the dominant leaks and a number of the lesser leaks had been sealed.

5. RECOMMENDATIONS

1. Undertake a Dam Safety Inspection (DSI) in 2004.

2. Assess repair performance.

3. Complete the remaining outstanding items identified in the 2001 DSR document, as follows:

- Complete the non-compliance requirements of Section Nos. 3 and 4 of the DSG;
  - Permanent file
  - Operation, Maintenance and Surveillance Manual
  - Logbook
  - Emergency Preparedness Plan
- Upgrade the embankment portion of the dam - engineering design is required prior to implementation.