

**Triggers for Response Actions for Argo Headrace Embankment
April 29, 2010**

MDNRE has requested the City develop triggers that indicate potentially hazardous conditions or imminent failure of the Argo Headrace Embankment which will lead to isolation of the headrace embankment from the Argo Pond. These triggers are:

1. Low pond level alarm in the control room at the Water Treatment Plant
2. Piezometric readings
3. Visual signs

The City's response for each of these triggers is described below. The City staff performing visual inspections and responding to alarms are trained in dam safety, surveillance and monitoring, and the Emergency Action Plan for Argo dam.

1. Low pond level alarm.

We continuously monitor Argo pond in real time. The pond level monitor is in the dam control room at Argo. Argo pond is maintained at 773.50ft. Pond elevations of 773.80 ft and 773.20 ft will generate high and low pond alarms in the control room at the Water Treatment Plant which is staffed 24 hours, 7 days a week. A staff member will be dispatched to the dam site when high/low pond level alarm is received in the control room. The staff member visiting the dam will investigate the cause of the low pond alarm including performing visual inspection of the embankment. If the visual inspection of the embankment shows failure of the embankment such as water seeping oozing out or the embankment is breached or other signs listed below under visual signs, headrace will be isolated from the pond by installing the stop-log.

2. Piezometric readings.

Piezometers are read monthly. Following threshold/action levels are established for piezometers:

Piezometer	Action level
B1	771.0
B2	767.50
B4	762.50
B5	764.50
B6	763.0
B7	763.50
B8	763.0
B9	761.2

If any of the monthly piezometric readings reaches its corresponding action level in the table above, the frequency of piezometer readings will be increased to weekly readings. If eight consecutive weekly

readings show a rising trend above the action level, then the headrace will be isolated from the pond by installing the stop-log.

3. Visual signs

During visual inspections, if any of the following conditions are observed at the Headrace Embankment, the headrace Embankment will be isolated from the pond by using the stop-log:

- seepage of water on downstream slope,
- boiling near the toe of the embankment,
- bulging of embankment slope