

## **SUMMARY OF SUBMISSION ON LAND USE COMPATIBILITY GUIDELINE**

The draft guideline does not deal with issues created by pits and quarries that are within sourcewater protection zones. In particular the guidelines do not recognize the vulnerability to pollution that is created when below watertable operation of a pit or quarry breaches an aquitard overlying an aquifer supplying drinking water.

The Guidelines should specify that the depth of excavation permitted in a below watertable pit or quarry within a sourcewater protection zone must be limited to the upper surface of any aquitard present at the site.

## **EXPERT OPINION ON THE IMPORTANCE OF AQUITARDS FOR AQUIFER PROTECTION**

The importance of aquitards to minimizing the vulnerability of aquifers was stressed in the experts report to the Walkerton Inquiry produced in 2001. This report later became the technical basis for the provisions of the Clean Water Act. In the words of the experts:

*“The extent and the integrity of aquitards providing natural protection, as well as dilution and natural attenuation, play important roles in determining the vulnerability of an aquifer..... Aquitards can play an important role in protecting aquifers from contamination. However, this protective capacity depends critically on the integrity of the aquitard, which can be compromised by the presence of windows (openings), manmade penetrations such as abandoned boreholes, and fractures in the aquitard (Howard and Gerber, 1997; Martin and Frind, 1998). In the case of large openings, the protective capacity can be completely lost..... The mapping of aquitards including their characteristics is therefore as important as the mapping of aquifers.*

This expert opinion on the vital role of aquitards in determining the vulnerability of aquifers was repeated in a 2004 Research Report of the American Water Works Association titled Role of Aquitards in the Protection of Aquifers from Contamination: A State of the Science Report. (The lead authors of this report – John Cherry and Beth Parker – are now at the University of Guelph’s G360 Groundwater Research Institute which recently received a \$10 million gift to advance groundwater research)

The 2004 research report reached these conclusions about the importance of aquitards in reducing the vulnerability of aquifers:

*Aquitards are critical to protecting water supply wells from contamination. In general any well constructed with no aquitard between a contamination source and the well screen (or open borehole) is at great risk.*

*Hydrogeologic and engineering studies conducted when designing water supply wells*

*should strive to collect sufficient data on adjacent aquitards to allow a reasonable assessment of vulnerability to contamination and prevent well designs that cross connect or breach aquitards.*

*With respect to the protection that aquitards offer for water supply wells finished beneath them, assessments of the risk or probability of contamination will be appropriate, meaningful, and useful only if the likely contaminant pathways through the aquitard are identified and characterized.*

### **EXAMPLE – NEED FOR PROTECTION OF THE VINEMOUNT AQUITARD**

The Vinemount aquitard is a bedrock layer that protects the underlying Middle Gasport aquifer from which some City wells draw water. The Dolime Quarry operation has already excavated the Vinemount layer over a small portion of the quarry floor. Continued operation of the quarry to the licenced depth of excavation would allow the quarry to remove all of the Vinemount layer within the 35-ha extraction area.

- The Minister of Natural Resources and Forestry determines the allowable depth of excavation as part of licencing. In setting the allowable depth the Minister is required to ***“minimize adverse impact on the environment in respect of aggregate operations”*** and to have regard to ***“any possible effects on ground and surface water resources including on drinking water sources”***
- The Walkerton Inquiry Report recommended that sourcewater protection policies should ***“include a program for identifying and properly decommissioning abandoned wells, excavations, quarries, and other shortcuts that can introduce contaminants into aquifer”***

Given the requirements of the Aggregate Resources Act and the commitments made to implement the Walkerton Inquiry recommendations the Minister of Natural Resources and Forestry must order preservation of the Vinemount Aquitard in the Dolime Quarry and restoration of the existing breach during rehabilitation of the quarry prior to surrender of the licence.