21 November 2006

Graham Flint
Friends of Rural Communities and the Environment (FORCE)
Lawson Park Ltd., Box 15,
RR # 1, Freelton, Ontario
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RE: ST MARYS CEMENT PTTW PROPOSED MOUNTSBERG QUARRY

Dear Graham,

Based on a review of the following documents our comments are provided below:

- Revised Work Plan for the Evaluation of Groundwater Recirculation System *Proposed Mountsberg Quarry* (Gartner Lee Ltd. September 2006)
- Letter to Ministry of the Environment (dated September 28, 2006) from Gartner Lee Ltd. Re: GLL 60702 – Temporary PTTW to Conduct a Series of Pumping Tests, Proposed CBM St. Marys Cement Flamborough Quarry, City of Hamilton, Ontario
- Memo to Stan Holiday, City of Hamilton (dated September 20, 2006) from Stantec. Reference: Potential Effects Associated With Test Pit, Test Wells and Trench Establishment Proposed St. Marys Flamborough Quarry

General Comments in regard to Groundwater Recycling Systems (GRS)

Let me begin by stating we do not agree with the concept proposed by Gartner Lee Ltd. (GLL) of utilizing a GRS in order to permit development of a quarry operating below the groundwater table. In our opinion the use of a GRS is unacceptable when the social and environmental costs of a GRS are considered through full Environmental Cost Accounting (ECA), in addition a GRS does not fully mitigate the impacts of operating a quarry below the groundwater table and there may be serious environmental impacts resulting from a temporary failure of the GRS.

In light of our opinion expressed above we feel the proponent should not be granted a Permit to Take Water (PTTW) to conduct hydrologic tests related to a GRS **prior to** conducting full ECA of the proposed GRS that determines the following: hidden environmental costs; a cost-benefit evaluation; and appropriate environmental metrics associated with operating a GRS for a fully operating quarry. The ECA must consider the need to maintain continuous operation of a GRS, including continuous operation of the GRS after aggregate extraction is completed. The ECA should consider possible worst case scenarios involving a failure of the GRS (*e.g.* due to power failure, equipment failure, declining capacity GRS to recycle due to multiple physical, biological and chemical factors, *etc.*) and the resulting social and ecological impacts. In addition, the GRS, by design "re-circulates" groundwater, suggesting an assessment should be made regarding the number of times any given volume of water may be re-circulated through the GRS and the cumulative effect of re-circulation on the quality of groundwater quality (*e.g.* temperature, dissolved solutes, pH, *etc.*) and the impact of these cumulative changes of groundwater quality to the efficacy of continuous operation of the GRS and the impact of recycled groundwater to surrounding wells, wetlands and surface water, aquatic life, *etc.*.

It should be noted that the proposed GRS trench combined with open boreholes and possibly hydraulically or blasted bedrock fracturing is a dewatering mitigation approach not represented in the literature cited by GLL's September 2006 report (*i.e.* Corcoran, *et al.* January 2005 and Huxley, *et al.* March 2004), nor does the literature referenced make any reference to GRS in dolomite bedrock. In addition, Huxley *et al.* 2004 states the following:

> *As noted earlier, very few case study examples of the use of recharge trenches are available in published literature. The review by Cliff & Smart (1996) is one recent exception, although this dealt only with shallow water table sites (the authors being unaware of any deep water table sites where recharge trenches have been used).*

Comments on PTTW to test effectiveness of proposed GRS

GLL proposes to test the effectiveness of the GRS proposed to mitigate the impact of quarry operations by *simulating* de-watering. The test simulation will pump groundwater from three bore holes (300 mm ID) drilled to a depth of approximately 50 m into bedrock located in an area of the proposed quarry face. In one test groundwater will be pumped from the three bore holes at a combined rate of up to 13,147 m^3/d and discharged directly to Mountsberg Creek. In subsequent tests groundwater will be pumped at rates up to 22,944 m^3/d and discharged to a GRS trench excavated from bedrock (150 m long by 4-5 m wide by 1 m deep). Within the trench groundwater recycling will be enhanced by up to 30 bore holes (150 mm ID) drilled approximately 36 m into the bedrock and if considered necessary the bedrock in the trench will be hydraulically fractured or blasted to further facilitate the re-cycling of water back to groundwater. The average volume of groundwater taking for the PTTW application is 9,700 m^3/d.

The concept of *simulation* suggests the proposed GLL test mimics conditions that may be expected to occur during full operation of the quarry. For this reason the location of bore holes and GRS trench are in the vicinity of the quarry face. The proposed drawdown depth of the ground water level to 30 m does not reach the level of proposed quarry floor of 34 to 37 m. There is no other documentation that further informs how the simulation compares the scale of the proposed *simulation* to actual quarry operation. In order to assess if the proposed simulation is a **true test** of actual quarry operation there is a need to discuss the scale of dewatering required for actual quarry operation under a variety of conditions (*e.g.* seasonal variation, extreme rainfall/snowmelt events, impact of climate change, size of quarry face, *etc.*) and the feasibility of scaling up the proposed test simulation to effectively mitigate dewatering impacts.
Other specific concerns related to the proposed PTTW and GRS test work plan are as follows:

- The GLL work plan states: *The water level response will be monitored through an extensive network of wells, mini-piezometers and staff gauges*. It would be useful to see the location and extent of the proposed monitoring sites on a figure that also showed the location of natural features within the study area;

- There is no assessment of the sensitivity or resilience of natural features located within close proximity of the test site in relation to the magnitude or duration of groundwater and/or surface water level fluctuations or water quality changes that they may be exposed to. This should include an assessment of such factors as seasonal sensitivities of breeding fish and amphibians or times of the year when there is a significant difference in temperature between groundwater and surface water, *etc.*;

- The work plan assumes it will be possible to drawdown the watertable to a level equivalent to actual quarry operation. What contingency is there should this not be possible. Will the test be considered adequate should the drawdown be less than proposed?

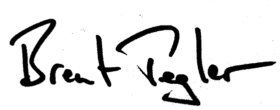
- It may be useful to "tag" water to determine the rate of groundwater recycling and to conduct tests to determine changes in groundwater quality resulting from multiple passes through the GRS;

- Decommissioning of the GRS test system is not discussed;

- The work plan suggests Test 1 will assess a "worst case scenario" for an operating quarry, *i.e.* full face quarry that is being dewatered with no mitigation. However, the proposed scenario does consider operation of a full quarry face during periods of extreme rainfall/snowmelt or drought, or the impact of unanticipated bedrock fracturing associated with quarry operation, *etc.* In addition, will Test 1 run long enough to result the full development of a hydraulic head that may impact wetland water levels located offsite?

- The work plan has not assessed potential long term impacts that may occur as a result of the GRS test, impacts such as alteration to the flow of deep groundwater, shallow groundwater or surface water resulting from the construction of the GRS trench, boreholes or possible fracturing from hydraulic or blasting of bedrock.

Yours truly,



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