



Environment and Labour

Halifax, Nova Scotia

PO Box 697

B3J 2T8

Tel:
(902)
424-5300

Fax:(902) 424-0503

Our File Number:
40100-30-109

MEMORANDUM

TO: Helen MacPhail, Environmental Assessment Officer

FROM: John Drage, Hydrogeologist

COPY: David Briggins, Manager Water & Wastewater Branch

DATE: March 5, 2008

SUBJECT: Environmental Assessment
Miller's Creek Mine Extension

I have reviewed the Environmental Assessment (EA) document, dated February 2008, for the above referenced project. My comments below focus on groundwater resources and water wells.

1. There is insufficient information in the EA document to determine the extent and magnitude of potential groundwater impacts associated with the proposed project. More specifically, quantitative estimates should be provided on: the predicted groundwater flow rate to the proposed pit; the predicted extent of the groundwater cone of depression caused by the proposed pit dewatering operations; the number and location of water wells lying within the predicted cone of depression; and, the amount of baseflow reduction predicted at nearby surface water courses and wetlands.

The presence of the existing and historical quarry operations at the Miller's Creek site, which has been operated since 1956, provide an excellent opportunity to obtain information about how groundwater has responded in the past in this area to open pit operations with dewatering. This information should be assessed, and the observed groundwater cone of depression at the existing quarry should be used to help make predictions about the proposed project.

2. Other information that should be provided to assess the potential impacts on groundwater includes the following: approximate locations of off-site wells; discussion of the number of wells located within various radial distances of the proposed pit (e.g., radii of 500 m, 1,000m, 1,500 m, etc); a cross-section of the proposed pit showing the existing water table and predicted water table after pit development; discussion of whether or not the pit will extend below the water table and if so, how far below the water table; and, a description of the scientific basis used for determining the proposed water supply policy area in Figure 6.3-2 (the discussion should include the basis for determining the water supply policy area boundary on the east and south-east side of Ferry Road).

3. The EA document outlines a plan to compensate water well owners if they experience water quality or quantity problems and their wells are shown to have been affected by the proposed mine extension. However, the document does not discuss mitigative measures that could be implemented to prevent water well problems prior to compensation. Note that the modification or replacement of impacted wells, or the provision of alternative water supplies, should be viewed as measures of last resort.

4. On page 15 of the EA document, it is indicated that concerns have been raised about the potential for the mine to cause salt water intrusion to the local aquifer. A quantitative assessment of the potential for salt water intrusion should be completed to address this concern. This assessment should include a discussion of the potential for saltwater intrusion to affect drilled wells in the area.

5. On page 92 of the EA document, the hydraulic conductivity of seven on-site monitoring wells is presented. It is stated that the hydraulic conductivity from these wells is low, and that this is advantageous because it indicates that the cone of depression from pit dewatering will not extend as far from pit boundaries. Please note that the on-site monitoring wells appear to be lower permeability than many of the drilled wells in the area. The NS Well Logs Database (2007) contains records for approximately 48 drilled wells in the area. Approximately half of these drilled wells have yields that suggest higher hydraulic conductivity than the seven on-site monitoring wells. Two of these wells have reported yields of 100 gallons per minute. Note that one of these high yield wells was drilled for the Canadian Gypsum Company in 1956 as a water supply well.

6. On page 92 of the EA document it is stated that groundwater sample results from August 2006 are presented in Table 6.3-1. Please note that there is no Table 6.3-1 in the EA document.

7. On page 92 of the EA document it is stated that seven wells were equipped with data loggers to measure hourly water levels. Please note that Appendix C presents water level data for six wells, not seven.