TERMS OF REFERENCE

FOR THE PREPARATION OF A

FOCUS REPORT

CGC Inc.- Fundy Gypsum

Miller's Creek Mine Extension
Miller's Creek, Hants County, Nova Scotia

NOVA SCOTIA ENVIRONMENT

April 11, 2008

Introduction

The Miller's Creek Mine Extension Project, proposed by CGC Inc. - Fundy Gypsum (the Proponent), was registered for environmental assessment (EA) as a Class 1 Undertaking pursuant to Part IV of the Environment Act on February 21, 2008.

On March 17, 2008, following a review of information submitted by the Proponent, government agencies and the public, the Minister of Nova Scotia Environment and Labour decided that, to better understand the potential for adverse effects or significant environmental effects, a focus report is required. In accordance with section 13(1)(c) of the EA Regulations, the Minister directed the Proponent to provide a Focus Report to examine potential impacts of the proposed Miller's Creek Mine Extension on surface water; groundwater; species-at-risk; wetlands; and, fish and fish habitat.

The Proponent is required to submit the Focus Report within one year of receipt of this Terms of Reference. Upon submission of the Focus Report by the Proponent, NS Environment (NSE) has 12 days to publish a notice in the newspaper, advising the public where the Focus Report can be accessed for review and comment. A 30 day public review period of the Focus Report follows.

At the conclusion of the 30 day public review, NSE has 25 days to review public, government comments, and provide a Report and Recommendations to the Minister.

The Minister of Environment will have the following decision options, following the review of the focus report:

(S. 18) (a)
- i. the undertaking is approved subject to specified terms and conditions and any other approvals required by statute or regulation;
- ii. an environmental-assessment report is required; or
- iii. the undertaking is rejected.

The following requirements are presented to the Proponent for response in the form of a Focus Report.

1.0 PROJECT DESCRIPTION

Provide a description of the Miller's Creek Mine Extension Project including the following:

- the project location;
- the project boundaries clearly delineated on a map;
- air photos and satellite imagery of the proposed project in relation to the existing Miller Creek mine; and
- any assumptions which underlie the details of the project design, including impact avoidance opportunities.

2.0 OTHER METHODS FOR CARRYING OUT THE UNDERTAKING

Describe other methods/alternatives for carrying out the undertaking, including alternative mine layouts. Provide plans and maps showing alternative mine layouts that have been considered.

3.0 ADDITIONAL INFORMATION

3.1 Groundwater

Provide the following information:

- the approximate locations of off-site wells within 3 km of the proposed pit;
- identify 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.);
- provide a cross-section of the proposed pit showing the existing water table and predicted water table after pit development;

Construct a numerical groundwater model for the proposed pit and surrounding area. Calibrate the model based on existing conditions and discuss how closely the model reproduces the groundwater drawdown at the existing pit. Use the calibrated model to predict potential impacts to groundwater, as discussed in further detail below. The modelling effort must be documented using industry

standards (e.g., ASTM, Anderson and Woessner, 1992), which shall include, but not be limited to, a description of the conceptual model, grid design, boundary conditions, model input data and calibration results. The digital model files shall be submitted to NSE with the modelling documentation.

Using the above referenced groundwater model, provide quantitative estimates of the potential groundwater impacts, including but not limited to:

- 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 predicted cone of depression shall be presented on a figure, which will include the predicted 1 m drawdown contour;
- identify the number and location of water wells lying within the predicted cone of depression;
- predict the extent of potential salt water intrusion effects and identify which drilled wells may be potentially affected by salt water intrusion;
- predict the amount of baseflow reduction at nearby surface water courses and wetlands (expressed as percent reduction in baseflow).
- predict the amount of drawdown in any proposed “conservation areas” and determine what effect the drawdown may have on habitats in these areas; and
- predict the time it will take for groundwater levels to rebound to pre-pit conditions once dewatering has stopped (i.e., how long will it take to fill the pit with water after mining is complete?).

Provide information on mitigative measures that could be implemented to prevent water well problems at off-site water wells. Note that the modification or replacement of impacted wells, or the provision of alternative water supplies, should be viewed as measures of last resort.

3.2 Surface Water

The principle of avoidance of watercourses and wetlands has been acknowledged but does not seem to have been applied. The headwaters of 6 watercourses and 12 wetlands are planned to be within the proposed mine footprint. Provide options for mine development such that water resources will be avoided and protected with vegetated buffers.

Provide information to support predictions and the extent of surface water impacts

from this proposed project, and overall conclusions. Also provide proposed monitoring plans to confirm surface water predictions.

Of the 19 watercourses identified in the project area Shaw Brook appears to be the most significant in terms of having continuous annual flows, higher flow rates, and identified water use (agricultural) in the lower reaches. It is also shown in the report to be the watercourse with the greatest percentage of the watershed disturbed by the proposed mine footprint (about 53%), and 1 of 5 streams having headwaters located directly in the footprint. Provide detailed and well defined protection plans as well as monitoring plans to ensure the continued use of this water resource.

Depict items mentioned in text of the EA registration document on maps These items should include:
- the pond in Highfield (page 62) which fire dept uses as a water supply,
- Alison Pond location (page.63),
- Bailey's Quarry location.

Assess the potential for impacts from the proposed project on the ponds and demonstrate how they will be protected.

Provide maps showing property boundaries in relation to the project to enable the selection of monitoring stations and for the assessment of potential down stream effects from the proposed project.

Provide specifics of methods and protocols used in sampling/measuring surface water for quality and quantity, including outlining QA/QC methods and sample preservation measures. Provide this information to allow an assessment of the quality of the data collected.

Provide an assessment and supporting rationale regarding cumulative effects to the multiple streams and wetlands within the project area resulting from the proposed project and related to effects (over time or space) from multiple undertakings or activities in the area that could impact water resources.

Baseline stream flow monitoring frequency may not be sufficient to capture seasonal variations including peak flows and low flows. Text in the EA registration document indicates monitoring on a monthly basis (page 81) while Table B1, Appendix B indicates a frequency of 7 times per year between Dec 2005 and Dec 2006. This data indicates the highest flows on the June sampling date, which is not the time of year when peak flows are normally expected. Since

pre- and post- development comparisons would be based on such baseline data, more frequent, reliable data must be provided. This applies to baseline water quality data as well, where baseline conditions must be better defined.

Interpretation of baseline ambient water quality in streams must use appropriate CCME water quality guidelines as opposed to effluent limits established under pit and quarry guidelines for settling pond discharges (eg. TSS limits proposed) and include suitable graphed and tabulated data.

Provide details of follow-up monitoring plans for water quality and quantity to confirm EA predictions and for assessing the need for improved mitigation measures.

Groundwater / surface water interaction is noted in the EA registration document as an important consideration in assessing mining projects. This would seem particularly important in the context of karst topography. Provide an assessment with supporting rationale as to how long it would take for the series of lakes proposed in reclamation plans to be filled with water and be capable of producing the water supply to down-stream users as proposed. The suggested time line to achieve full reclamation (up to 50 years) would suggest that controlled release of stormwater would be ongoing for an extended period prior to final reclamation and the existence of the proposed lakes.

Provide details of a stormwater management plan which would support the contention that a " continued water supply to the downstream reaches of impacted catchments" could be ensured (page 88, Summary in the EA Registration Document). Provide this information to confirm that this supply could be ensured over the long-term with water use(s) protected.

Stormwater management structures eg. settling ponds are proposed to be designed to "typical design standards" . Provide information regarding their design and operation to demonstrate that both increased peak and reduced minimum flows due to climate change will be addressed.

Relevant existing approvals are typically provided in EA registration documents for reference.

Provide a map showing final project development complete with structures e.g. settling ponds, drainage patterns, watercourses, wetlands, and proposed monitoring stations.

Provide contingency plans to address possible spills and accidental upsets to ensure protection of water resources.

3.3 Species-at-risk

The diversity of species-at-risk and those of conservation concern (including vascular plants and lichens) within the area proposed for development by CGC-Fundy Gypsum is especially rich, as identified by the extensive surveys completed by the Proponent. One Endangered plant listed under the Nova Scotia *Endangered Species Act* (Ram's-head Lady Slipper), and six others listed under the Nova Scotia General Status of Wild Species including two RED listed species (Round Leaved Hepatica and Eastern Leatherwood) and four YELLOW listed species(Canada Buffalo-Berry, Thimbleweed, Yellow Lady Slipper and Black Ash) all occur within the proposed development footprint. Six species of rare lichens are also found within the proposed development area. At least three species of vascular plants not currently listed under the *Endangered Species Act* are strong candidates for legal listing and either have formal status assessments already underway (e.g. Black Ash) or impending (e.g. Round-leaved Hepatica).

A conservation area is proposed by the Proponent that includes setting aside approximately 40 ha of mineable land which is host to an important assemblage of provincially and locally important plant species**.** No evidence is provided, however, to show how the ecological integrity of the conservation area will be maintained. In addition, species-at-risk would be lost with the current layout of extraction areas. A plan that illustrates a clear mechanism for protection must be provided.

Provide a map showing the location of species-at-risk, wetlands/watercourses, and the proposed conservation area relative to the mine footprint layout.

Provide an assessment of the ecological significance of the Proponent's lands on the Avon Peninsula, within the provincial context.

Provide the results of additional study to determine the required extent of the conservation area in order to protect species-at-risk and their habitat. The size of the conservation area shall be formally agreed upon with NSE and DNR, Wildlife Division.

Specifically, provide information on plans for (1) species-at-risk/habitat conservation with long-term requirements for evidence based scientific research and monitoring, (2) operations management, and (3) reclamation to ensure significant habitats and species-at-risk (including RED and YELLOW listed species) are protected in perpetuity. The geographic focus of all three planning documents should be the eastern region of the proposed development area including wetland #12 and all company lands to the east.

(1) The species-at-risk habitat/conservation planning shall contain detailed description(s) of the physical environment where rare organisms are located including a study design that incorporates an array of test wells for long-term hydrological monitoring. Habitat/conservation planning should be defined on a ten-year time line with standardized annual counts/surveys of individual plants/lichens. Close collaboration with established botanists from universities is recommended to clearly define limitations of the current knowledge surrounding the resilience, population ecology and life history of rare vascular plants and lichens in the plan.

In addition, investigate the potential for private land conservation by consulting with local landowners to determine if the conservation area can be expanded to include neighboring properties.

(2) Operations management planning should provide a clear, concise, phased schedule of proposed extraction activities on the company lands surrounding those lands where rare species, or those at risk are found. Proposed extraction time lines need clear geographic reference in space and time with maps to clarify an acceptable approach that will enable completion of scientific research requirements identified and contained in habitat/conservation planning.

(3) Reclamation planning must address knowledge deficiencies and uncertainties surrounding proposed practices to buffer impacts on species-at-risk and their habitats. Specifically, address appropriate distance/widths (amount of undisturbed habitat) and necessary reparation(s) to maintain effective, functional habitat and the time phase in the project's operational development. Reclamation planning should provide details and an experimental framework to evaluate effectiveness of reclamation practices to repatriate native vegetation.

3.4 Wetlands

All alterations to wetlands are significant, and proponents must apply the mitigative sequence to activities which may impact wetlands. The first step in this sequence is avoidance of wetlands, followed by minimization of unavoidable impacts, and then compensation.

The Proponent has identified 16 wetlands within the project area, and 12 will be fully or partially lost with mining. Impacts to wetlands 10 and 12 can be avoided with slight changes to the southern boundary of the pit. Several wetlands (2, 3, 4, 15, 16) will be lost or impacted by the placement of the stockpiles on the east side of the project area. These impacts can be avoided if the footprints of the stockpiles are reduced, such as by moving overburden west across Ferry Road to the Bailey Quarry, which will be undergoing reclamation. An analysis of wetland avoidance options is particularly relevant for the largest wetland (#1). Alterations made to the pit location to avoid impacts to endangered species or species of conservation concern are not sufficient justification to alter a wetland, as species *and* their habitats are both of importance.

Given the proximity of more than 40 endangered Ram's-Head Lady Slipper plants to wetland #12, and the high potential for adverse effects resulting from changes to topography, vegetation and hydrology, DNR recommends that wetland #12 be fully captured within the conservation area and additional modelling using on-site data be undertaken to assess mitigation options to ensure plant survival.

Undertake a quantitative assessment of the proposed project's impacts to surface and groundwater inputs to streams and wetlands, identify mitigative options to maintain natural annual and interannual hydroperiods for streams and wetlands, and provide monitoring protocols to assess the efficacy of the mitigative options in a manner acceptable to NSE and DNR.

Apply the mitigative sequence for wetland conservation to each wetland identified within the project area.

Provide a thorough analysis of avoidance options and associated impacts to ecosystems and project viability for review and acceptance by NSE and DNR.

3.5 Fish and Fish Habitat

The following information shall be collected and presented in a manner that is acceptable to Fisheries and Oceans Canada and NSE:

All streams that may be affected by the project must be assessed, at multiple points, for fish and fish habitat by qualified aquatic scientists. Ponds that may be affected must also be assessed;

Assessment of aquatic habitat must include identification of physical units (ie, riffles, pools, and runs), in-stream cover, substrate composition, stream depth and width, overhead cover and water colouration;

The presence of fish of each stream must be noted;

Provide a map showing assessment points and GPS coordinates.

3.6 Reclamation Plan

Provide a detailed site reclamation plan, as this will significantly influence long term survival and function of species and systems in this unusual habitat type (refer to 3.3 Species-at-risk, (3) Reclamation planning).

4.0 FOCUS REPORT SUMMARY AND CONCLUSIONS

This section of the Focus Report shall summarize the overall findings and conclusions of the study.