MEMORANDUM

TO: Helen MacPhail, Nova Scotia Environment

FROM: Sarah MacKay, NS Department of Natural Resources

DATE: November 23, 2009

RE: Proposed CGC Inc. Fundy Gypsum, Miller's Creek Mine Extension

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On October 16, 2009, CGC Inc., Fundy Gypsum submitted a Focus Report for the proposed Miller's Creek Mine Extension Project, Hants County for review in accordance with Part IV of the *Environment Act*.

The purpose of the proposed undertaking is to mine gypsum from a surface mine in Miller's Creek, Hants County. The mine life, including construction, operation and reclamation is anticipated to be in the order of 50 years.

Staff of the Department of Natural Resources (DNR) have reviewed the Focus Report and provide the following comments:

- The time line of the project is long (up to 70 years) and the long-term impacts to ecosystems and species-at-risk cannot be accurately predicted based upon the information currently available. Though the proposed project will not extirpate or cause any species to become extinct from the province or globally in the short-term, the contribution of the project to species loss in the long-term could be quite significant at the provincial scale. Should the project be approved, there will be a need for substantial environmental monitoring.

- The Focus Report Terms of Reference requested the Proponent to provide an assessment of the ecological significance of the Proponent's lands on the Avon Peninsula, within the provincial context. DNR hoped to see the use of existing information to analyze and comment on the ecological significance of this area for Nova Scotia. However, the Focus Report assesses the impact at the species level only. The Focus Report is correct in its statement that karst as a geological structure is not rare in the province. DNR stresses the uniqueness of the CGC lands in terms of species richness and ecological complementarity from the standpoint of multiple ecological values of biodiversity (rarity, richness and representivity). Nowhere in Nova Scotia or in eastern Canada where karst occurs is there known to be as high a level of diversity or rare species within such a small geographic area as the peninsula where this development is proposed.

- The level of botanical inventory provided by the proponent in this environmental assessment is commendable. The inventory work they have done on the peninsula will provide a major contribution to our knowledge about the current status of these species and will aid and inform future conservation, protection and recovery efforts for them in the province.

- The proposed conservation area (CA) would prevent direct disturbance and could prevent the loss of rare plants within that area. The proponent's plans to extract resources over time will enable additional information to be gathered and actions adjusted as needed. Ongoing research and monitoring of flora and water regimes within and external to the CA will be critical for flexible adaptive management to achieve long term maintenance of species and systems on the CGC lands. However, the Focus Report has not been able to fully address the request in the Terms of Reference for results of additional study to determine the required extent of the CA in order to protect species-at-risk and their habitat. Information available to the proponent and professional reviewers at this time does not allow for predictions of long term viability for those rare plants.

- While the hydrologic modeling of the Project's impact to stream flow is detailed and quantitative, the discussion on hydrologic impacts to wetlands and their ecology is qualitative. The lack of quantitative information hinders the assessment of the mitigative options proposed to maintain natural annual and inter-annual hydroperiods for wetlands. For example, the report does not quantitatively examine the implications of the waste piles on surficial runoff and inputs into the "avoided" wetlands. Appendix C does report the waste piles as "impervious" and thus contributing to surficial runoff. However, the runoff from the waste piles is not partitioned into the wetlands impacted by their location such as wetlands 15 and 16. In addition, modeling of predicted post reclamation ground water elevations (figure 4.3-3) indicates the potential for a significant increase in water input and levels for wetland 12 that harbours both red and yellow listed species. There still remains a high level of uncertainty on the long term implications to the proposed CA as the mine develops post 20 years.

- The proponents are relying upon being able to identify actions with a probability of success to mitigate impacts that they can not predict with any level of confidence. For example, at year 20, a groundwater depression of 30 m is predicted for wetlands 15 and 16, and the depression for the area along Shaw Brook which harbours rare plants will vary from 10 - 30 m. This will become more pronounced as the mine is developed to end of life. While the true depression and timing will vary from what is presented (due to the input parameters and modeling method chosen), there are implications to soil moisture, soil seepage to wetlands, and hydroperiods.

- The Ram's-Head Lady Slipper population near wetland 12 is "on the abrupt south-facing slope (~25° slope) immediately north of the wetland." There is no data to support the conclusion that the primary moisture supply for this population is precipitation. Plant communities on sloped sites, particularly in lower slope topographic positions, obtain primary moisture from soil seepage (gravity-driven groundwater flow over less permeable soil horizons). As noted above, at the end of mine life, groundwater drawdown beneath the CA is predicted to be 55 m. In addition, the implications to this population of locating the waste pile along the southern edge of the CA have not been examined for changes in groundwater flow (quality/quantity, as noted previously) nor micro-climate. Alternate waste pile locations or management options that may include a wider buffer distance from the edge of the conservation area may be required.

- Projections for the filling of the pits at end of mine life of 47 and 24 years were dependent upon all of the predicted groundwater input being used for this purpose. During mine operation, groundwater flowing into the mine is discharged to mitigate the loss of water through disruption of the drainage basin. It is acknowledged by the proponent that monitoring and extraction of water necessary to maintain streams and wetlands will be required over the life of the quarry, and may be required for a much longer time period and thus affect the projected time required to fill the pits.

- DNR assumes that CGC has undertaken a thorough analysis of wetland avoidance options and project viability, but the information provided in Section 4.4.5 is limited. The information presented is what the company has indicated as their preferred option. 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.

- As a point of clarification, the statement that wetland ecosystem impacts are expected to be minimal using the percentage of wetland within project footprint or catchment area as a measure is incorrect. While wetland loss (5.16 ha) in catchment 66 is only 1.3% of the catchment area, this loss does represent approximately 71% of wetland area within the Shaw Brook catchment. Wetland loss has only been examined at the site level, and not how the wetlands collectively contribute to watershed function. An intensive monitoring program conducted over the full project area within a shorter approval period (e.g. 20 years) would reduce the uncertainty associated with impacts to ecosystems.

- The information provided does not fully support the contention that the mining operations and practices will have no population level impact on the plants and lichens found within the proposed conservation area (notwithstanding the acknowledgment that some portion of yellow lady slippers and some other rare

plants and lichens within the development footprint will be lost). The Focus Report outlines a tentative plan for monitoring and research for species of conservation concern and those at-risk. DNR agrees with the intent, but suggests this needs to be further developed with input from DNR, species recovery teams, scientists and other experts. DNR is willing to work closely with CGC to design and implement a long-term research and monitoring program that is scientifically credible, provides results upon which to base adaptive management decisions, and is flexible to emerging issues.

- In the period following the Environmental Assessment Registration and the Focus Report's TOR, bats and a known hibernaculum have become an issue in DNR's review of this project. The conservation concern for both Little Brown bats and Northern Long-eared bats is significant. Catastrophic loss of bats has occurred throughout their range in northeastern North America in the last two years (White-nose Syndrome), causing the nearly complete extirpation of bats within areas of their former distribution. Thus, the importance of conserving bats throughout their historical range where they still exist is more important than ever. Information obtained this year confirmed the presence of a hibernaculum within the development footprint, though outside the proposed conservation area. The hibernaculum was discovered by a local resident and it was subsequently confirmed by a zoologist with the NS Museum and a DNR regional biologist. A detailed survey is required to confirm the number of bats using the hibernaculum. Activities associated with mines, such as that proposed by CGC, which can involve blasting, water flow changes, etc can affect conditions within a bat hibernaculum and mitigation would be needed. DNR will require a setback for the proposed development from the hibernaculum, and adherence to appropriate guidelines to prevent disturbance. Collaborative inventories of the development area and adjacent lands by DNR, the Museum, and other bat experts with the company would allow a determination of the significance of the area for bats.

- The recently discovered bat hibernaculum within the proposed development footprint should require the following points of mitigation:
  1. Full protection of the existing site with appropriate operational setbacks and practices (i.e. blasting only during non-winter months) when bats are not in the cave.
  2. Additional inventory both within and immediately outside the project area to establish importance of the project area for overwintering hibernacula that may be affected by project operations.
  3. Consideration of phased operations (ie. not the entire project footprint) to ensure that all relevant information can be obtained before an area within the project footprint is worked to ensure impacts on the known hiberancula are minimized or eliminated.

- The Project Description and the design process were explained with plans and

aerial photos. Detailed mine plans will be required should the project go forward with the proper approvals.

- Surface mining the deposit is the most feasible method to extract this mineral resource economically and safely. The alternative mine layouts shown from the conceptual design to the current proposal for this project follow accepted engineering principles.

- The Reclamation Plan concepts were presented in the registered environmental assessment document (February 2008) and detailed plans for progressive reclamation will need to be provided in the Industrial Approval application process. CGC Inc. has a history of reclamation projects and has recently partnered with Ducks Unlimited Canada for some wetlands in the Windsor area. DNR and Nova Scotia Environment will be involved in the approval of any proposed Reclamation Plans for the Mine Extension.

- The Department of Natural Resources supports the development of the Province's gypsum resources when such development is conducted in an environmentally and socially responsible manner.