



Desmaraisville (Québec)

**ADDENDUM – ANSWERS TO COMEX QUESTIONS AND COMMENTS**

**IMPACT STUDY – GOLD ORE PROCESSING PROJECT FROM THE BARRY AND MOROY PROJECTS AT THE  
BACHELOR MINE PLANT AND INCREASE IN THE MILLING RATE**

**ENV0266-1512-00\_English translation**



GCM Ref. No.: 20-0696-0266  
COMEX Ref. No.: 3214-14-027

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 2021.03.16

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Revision  
**00**

Issue  
**FINAL**

Date  
**2021.03.16**

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## **FOREWORD**

In October 2020, Bonterra Resources Inc. (Bonterra) submitted to *Comité d'examen des répercussions sur l'environnement et le milieu social* (COMEX) a document responding to questions and comments formulated as part of the analysis of the environmental and social impact study of the gold ore processing project of the Barry and Moroy projects at the Bachelor mine plant and the increase in the milling rate of the plant at the Bachelor mine site (Ref: 3214-14- 027).

Some additional studies carried out in the summer and fall of 2020 were being drafted when the document providing answers to questions and comments to COMEX was issued. Thus, this document is intended as an addendum to the questions and answers document submitted in October 2020 and presents all the additional studies carried out with the objective of answering COMEX's questions.

Each of the sections of this document represents the summary of a complementary document which has been inserted in the appendices. The sections include a background reminder of the questions addressed by COMEX and the related response.

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## APPENDICES

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## 1.0 RESTORATION PLAN

As mentioned in the responses to questions Qc-4 and Qc-5 of the COMEX response report, the restoration plan for the Bachelor mine site has been updated in accordance with the Guide for the preparation of the redevelopment and restoration plan (*Guide de préparation du plan de réaménagement et de restauration*) in order to include the restoration of the new infrastructures planned in connection with the gold ore processing project from the Barry and Moroy deposits at the Bachelor site processing plant. The restoration plan is attached in Appendix 1 of this document.

## 2.0 SITE ENVIRONMENTAL STUDY – PHASE I

Question Qc-53 specifies that an environmental characterization study must be provided for all sectors targeted by the proposed expansion, development, construction, or repair work. The characterization study must be carried out in accordance with the Land Characterization Guide (*Guide de caractérisation des terrains*) and take into account the history of use (Environmental Site Assessment – ESA – Phase I).

Thus, in a first step, Bonterra carried out an Environmental Site Assessment (ESA) – Phase I in order to validate the history of use and verify the potential for contamination of the mining area as well as the sectors adjacent to the existing infrastructures included in the study area. The Phase I environmental site study is presented in Appendix 2.

As mentioned in the response to Qc-53, Bonterra wishes to carry out soil characterization work in summer 2021. Before work begins, a soil characterization plan in accordance with the Characterization Guide (*Guide de caractérisation*) will be submitted to the Ministry for approval, in spring 2021.

## 3.0 REPTILES, AMPHIBIANS AND MAMMALS SECTOR INVENTORY REPORT

Questions Qc-56 to Qc-58 raised the lack of inventories specific to herpetofauna, micromammals and bats in the study area.

As mentioned in the answers to questions document, herpetofauna inventories were carried out in August and September 2020 in order to document the species present in the study area. Shingle inventory stations combined with active research transects were located in order to adequately cover the diversity of potential habitats according to the different species of herpetofauna (anurans, squamates, urodeles) likely to be present. The inventory methodology has been validated by the *Ministère des Forêts, de la Faune et des Parcs du Québec* (MFFP) and is based on standardized protocols published by the MFFP.

In addition, an inventory of small mammals was carried out in August 2020. Based on the sampling protocol of Jutras (2005)<sup>1</sup>, five transects comprising pit traps and Victor traps were positioned to cover the diversity of habitats present in the study area (peat bog, marshes, forest stands, logging).

Particular attention was paid to potential habitats for the copper lemming vole and the rock vole, the two status species likely to be present in the study area. It should be noted that these two species were confirmed during the inventories.

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<sup>1</sup> Jutras, 2005. Protocole pour les inventaires de micromammifères. Direction du développement de la faune, Ressources naturelles et de la Faune Québec, 10 pages.

[ftp://transfert.mffp.gouv.qc.ca/Public/Reg16/Protocoles\\_standardises/MRNF\\_ao%C3%BBt\\_2005\\_Protocole\\_inventaire\\_micromammif%C3%A8res.pdf](ftp://transfert.mffp.gouv.qc.ca/Public/Reg16/Protocoles_standardises/MRNF_ao%C3%BBt_2005_Protocole_inventaire_micromammif%C3%A8res.pdf)

Finally, an inventory of bats was carried out in August-September 2020 based on the protocol of acoustic bats inventories for wind turbines (MRNF, 2008)<sup>2</sup>. Four fixed recorders were installed on the site in suitable locations, either at the junction of stands and near bodies of water or open areas.

The sectoral inventory report for reptiles, amphibians and mammals is presented in Appendix 3.

#### **4.0 COMPLEMENTARY VEGETATION INVENTORY SECTOR REPORT – GLOBAL STUDY AREA**

Question Qc-60 asked Bonterra to provide the field inventory sheets used to delimit the wetlands in the area. The field sheets of the inventories carried out in 2018 by the firm T2 Environnement were therefore presented in Appendix Q60 of the answers document.

However, as part of the vegetation characterization carried out in the final effluent discharge sector, as requested by COMEX at question Qc-61, GCM noticed certain discrepancies between the diagnostics carried out by T2 Environnement in 2018 and field observations reported by GCM biologists in the summer of 2020. Thus, in order to ensure consistency in the diagnostics of wetlands at the scale of the biophysical study area near the impact study, validation points in wetlands likely to be affected by the project, north of the Bachelor-Barry road, were also carried out.

The supplementary vegetation inventory sector report attached in Appendix 4 details the results of the validation of wetland diagnostics carried out following the additional vegetation characterization carried out in summer 2020. This report is a complement to the vegetation inventory report in the mining effluent sector attached to Appendix 5 (see next section).

#### **5.0 SUPPLEMENTARY INVENTORY SECTOR REPORT OF VEGETATION IN MINE EFFLUENT SECTOR**

As mentioned in the previous section, question Qc-61 required that a characterization be carried out in the final effluent discharge sector. In addition, question Qc-62 specified that according to the satellite images provided in Appendix 4-4 of the impact study, the "Typha Marsh" could be interpreted as the coast and not the wetland. The COMEX therefore asked Bonterra to specify whether, during the inventories carried out in June 2018, the water level was still too high to allow walking in this marsh and to discuss in this case the possibility of considering this area as being a loss of water environment rather than a loss in wetland. In addition, question Qc-63 asked Bonterra to provide the "Shapefiles" of the various wetlands that have been delimited, the "Shapefile" of the complete sampling points and verification points as well as the "Shapefile" of future installations.

Also, question Qc-74 specified that in the event that the method of restoration presented is no longer retained (conservation of water bodies), the feasibility of other mitigation or compensation measures will have to be discussed.

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<sup>2</sup> MRNF, 2008. Protocole d'inventaires acoustiques de chiroptères dans le cadre de projets d'implantation d'éoliennes au Québec, Ministère des Ressources naturelles et de la Faune, Secteur Faune Québec. 10 pages.  
<https://mffp.gouv.qc.ca/documents/faune/protocole-chauves-souris.pdf>

In addition, question Qc-63 asked Bonterra to provide the "Shapefiles" of the various wetlands that have been delimited, the "Shapefile" of the complete sampling points and verification points as well as the "Shapefile" of future installations.

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A characterization of the final effluent sector was carried out by GCM in September 2020. The results of this characterization are discussed in the sectoral report of additional vegetation inventory in the mining effluent sector attached in appendix 5. It should be noted that a characterization of the "Typha Marsh" was carried out at the same time as the characterization of the vegetation of the final effluent, and is an integral part of the sectoral report attached in Appendix 5.

The update of the "Shapefiles" of the various delimited wetlands, the "Shapefile" of the sampling points, and the verification points, as well as the "Shapefile" of future installations are provided in Appendix 5 (digital version only) .

In response to question Qc-74, the conservation of the body of water in the tailings pond was not retained as a restoration scenario. A project sheet for the compensation of wetlands is presented in Appendix 6 of this document. Bonterra will also work with the communities of Waswanipi, Desmairaisville and Lebel-sur-Quévillon to find one or more projects to compensate for additional wetlands.

## **6.0 DETAILED DUST CONTROL PLAN**

In order to control dust emissions, Bonterra presented in the impact study several air quality control measures (QA1 and QA6) and management of ores, waste rock, tailings, and overburden (GM5). However, as requested in question Qc-68, the COMEX asks to elaborate on the planned mitigation measures concerning these aspects by presenting a detailed dust control plan.

Thus, a detailed dust control plan has been completed and is attached in Appendix 7 of this document. The latter includes recommendations resulting from the atmospheric emissions modelling completed in 2021 by IMAUSAR Inc. (see Section 11.0).

## **7.0 GHG BALANCE**

Certain mitigation measures related to greenhouse gas (GHG) emissions were presented in the impact study, either on pages 5-181 and 5-182 of Volume 1, as well as on page 23 of Appendix 4-1 of Volume 2. The COMEX asks, through question Qc-69, that we quantify the GHG emission reductions expected in connection with the implementation of mitigation measures. The COMEX specifies that a plan for the implementation of mitigation measures, as well as a monitoring plan thereof, must be developed and presented in the impact study, in addition to evaluating the implementation of additional mitigation measures. In addition, questions Qc-96 to Qc-107 ask for more details on GHG emissions. In addition, questions Qc-96 to Qc-107 ask for more details on GHG emissions.

Thus, the GHG balance sheet was reviewed by ACS EnviGeo Solutions Inc. and is attached in Appendix 8. This also presents detailed answers to the questions addressed by COMEX in connection with the GHG assessment. It should be noted that questions Qc-69, Qc-96, Qc-97, Qc-100 and Qc-102 were answered instead in the sections below, grouped by theme.

### **7.1 Mitigation Measures (Qc-69)**

Bonterra is committed to developing a GHG emission reduction and offset plan. This plan will include a reforestation plan that will be established in collaboration with the communities of interest. Steps have already been taken with the Waswanipi community to identify potential reforestation areas. If necessary, the search radius could be extended to the municipalities of Chibougamau and Lebel-sur-Quévillon. It should also be noted that it is planned to reforest certain areas of the mine site during the reclamation phase, i.e. the roads, the industrial area (building sector, parking lots, etc.) and the overburden storage area, for a total of 154,678 m<sup>2</sup>.

In addition, the GHG emission reduction and compensation plan includes a compensation project for the loss of environments, for a total of 2,878 m<sup>2</sup>. This project involves the creation of a pond and the revegetation of an already impacted area located near a borrow pit and adjacent to a peat bog.

The GHG emission reductions associated with the reforestation and wetland compensation project have been incorporated into the updated GHG balance presented in Appendix 8. This update was performed by ACS EnviGeo Solutions Inc. The follow-up of the mitigation measures has been included in the preliminary monitoring and follow-up program presented in Appendix 9. This program will be improved according to the GHG emission reduction and compensation plan that will be developed.

### **7.2 Energy recovery (Qc-96)**

When a sufficient quantity of wood is accumulated, Bonterra initially planned to grind it and reuse it as a base for revitalization or send it to a biomass valorization company. In question Qc-96, it is specified that an assessment of GHG emission reductions must be completed in relation to this wood energy recovery.

After revision, the uncontaminated waste wood will be used for in-situ recovery, but not for energy recovery. Indeed, this approach has been used successfully in the past. In 2019, Bonterra has contracted a specialized company to shred the uncontaminated waste wood. The wood processed into chips (approximately 600 m<sup>3</sup> of chipped wood) was used for stabilization and erosion control in sloping areas, as well as to test this type of amendment for final restoration in natural conditions.

Bonterra wishes to continue to apply this approach to the reclamation of uncontaminated wood residues. Thus, when a sufficient quantity of wood is accumulated, Bonterra plans to hire a company to grind the wood on site.

### **7.3 Transportation (Qc-97 et Qc-100)**

Question Qc-97 addresses the possibility of using electric vehicles to reduce GHG emissions. Currently, a conventional fleet (diesel) is preferred because it limits Bonterra's exposure to technological risks. Indeed, to date, electric trucks are not yet widely used in open pit operations and there are concerns about the technology's suitability for the winter climate of Northern Quebec. Moreover, the long distance between the Bachelor and Barry sites (approximately 110 km) and its location in an isolated region raise an issue in terms of vehicle battery autonomy and safety in case of non-start-up.

However, technology is advancing rapidly and it is possible that more efficient electric trucks will become available. Therefore, although the scenario of a conventional diesel fleet is retained at this stage, Bonterra is considering the feasibility of introducing electric or cleaner energy vehicles to the existing fleet.



In addition, as mentioned in the response to Qc-77 of the October 23, 2020 response document, Bonterra had considered automated truck convoys of up to four trucks, with only one individual driving the first truck, to optimize trucking frequencies and associated nuisances.

However, as this technology is currently poorly documented and used in the region and the road safety of the territory's users could be at stake, Bonterra has abandoned this project for the time being. Nevertheless, Bonterra is keeping this possibility in mind for the future, and when the proper functioning of this technology can be demonstrated, Bonterra will consult with the various users of the territory to discuss this new trucking technique, and will present the results in a request for modification to the ministries. Therefore, there are no immediate plans to evaluate the GHG emissions of the automated trucking convoy, as requested in question Qc-100.

#### 7.4 Use of Explosives (Qc-102)

During the review of the GHG balance and the atmospheric dispersion modelling, the quantities of explosives required were again reviewed and modified. The answer to question Qc-102 must therefore be replaced by this:

“As summarized in the table on page 1 of Appendix 1-1 (Wood, 2019)<sup>3</sup>, the plant's processing capacity will be increased to 2,400 tons/day. The underground mining rate of ore from the Bachelor mine will be less than 600 tons/day, while the extraction rate from the Barry underground mine will be 1,800 tons/day. As the extraction of ore from the Barry mine was not included in the impact study, only the extraction rate from the Bachelor mine was considered in the explosive calculation presented. The anticipated ore/waste rock ratio will be 3 tons of ore to 1 ton of waste rock for the Bachelor mine, for a waste rock and ore extraction rate of approximately 803 tons per day. The explosives utilization factor was reviewed by Bonterra based on operating data from the Bachelor mine. Thus, a weighted powder factor of 1.12 kg/ton of material extracted was established. Consequently:

- Bachelor ore and waste rock extraction rate: 800 tonnes/day
- Explosives rating factor: 1.12 kg/tonne of material mined (ore and waste rock combined)
- Number of annual operating days: 365 days

$$803 \frac{\text{tons}}{\text{day}} \times 365 \text{ days} \times 1.12 \frac{\text{Kg}}{\text{ton}} = 328\,368 \text{ kg of explosives}^4$$

<sup>3</sup> Wood, 2019. Impact study - Gold ore processing of the Barry and Moroy projects at the Bachelor and Moroy site and increase in the milling rate. Volume 1: 291 pages and appendices. Wood, 2019.

– Volume II: Appendices - Appendices of Chapters 1 to 8. Appendix 1-1: Guideline for the Bachelor Mine Plant Processing Project for Barry Mine Ore by Metanor Resources (July 2017).

<sup>4</sup> It should be noted that the calculation result does not exactly result in 328,368 kg of explosives; this is due to the rounding up used. In particular, the weighted powder utilization factor has been rounded off.

## **8.0 REVISION OF THE PRELIMINARY SURVEILLANCE AND MONITORING PROGRAM**

In question Qc-75, COMEX asked to provide a more comprehensive follow-up approach than that presented on page 8-289 of the EIA (Environmental Impact Assessment), concerning the movement of trucks transporting ore on the Barry-Bachelor road. In order to ensure that these measures responded to users' concerns, these monitoring methods have been incorporated into the revision of the preliminary monitoring and follow-up program attached to Appendix Q75 of the document providing answers to questions and comments submitted in October 2020.

As mentioned in questions Qc-86 and Qc-87, a preliminary emissions monitoring program must also be provided by Bonterra and must include all the mitigation measures planned to reduce atmospheric emissions as part of the project (in particular the dust emission management plan). The methods for monitoring GHGs and atmospheric emissions have therefore been added to the preliminary monitoring and follow-up program in order to ensure the effectiveness of the planned mitigation measures.

The revised version of the preliminary monitoring program integrating air emissions monitoring is attached in Appendix 9.

## **9.0 SENSITIVE ELEMENTS SUMMARY CARD**

In question Qc-83, COMEX asks Bonterra to provide a scale mapping, clearly indicating the various sensitive elements located near the project site, including, in particular, the village of Desmaraisville. This should also include elements that are important to Cree users (in particular the lakes mentioned in the EIA (Environmental Impact Assessment), such as *lac aux loutres*, *lac Waswanipi*, and *lac Parent*.

A summary map of sensitive elements (general view) as well as a map of sensitive elements in close-up view are available in Appendix 10 of this document.

## **10.0 HYDROLOGICAL MODELLING AND TRANSPORT OF CONTAMINANTS**

In response to questions Qc-90 to Qc-93, a hydrological and contaminant transport modelling report was prepared and is presented in Appendix 11.

This report deals with the simulation of the worst-case scenario by considering only the current natural conditions (without the layer corresponding to the tailings laid out in the form of pulp) and by applying an appropriate hydraulic load. This report also includes a more realistic scenario taking into account the waterproofing measures planned by Bonterra. In response to question Qc-91, the report includes modelling of the transport of contaminants, such as cyanide. Finally, in order to meet the requirements of question Qc-92, the revised modelling report includes a discussion on the calibration of the digital model, summary tables detailing the origin of the data used, as well as a graph showing the correlation between the Piezometric data measured and modelled. The representativeness of the model is also discussed.

### **11.0 MODELLING AIR EMISSIONS**

An air dispersion modelling update report is presented in Appendix 12 of this document. This report makes it possible in particular to answer the elements resulting from questions 108 to 133 and 135 to 136 of the COMEX.

Note that Appendix G of the Atmospheric Dispersion Modelling Report (calculation files, material safety data sheets (MSDS), modelling results graphics and AERMOD model output files) is presented in digital version only.

### **12.0 HEALTH AND SAFETY PROCEDURE**

With reference to question QC-134, a separate health and safety procedure is being developed in order to add coordination procedures with the health system in the event of incidents with a high number of victims that could require evacuation of patients by ambulance or by air. In addition, this procedure will be developed by taking care to consult the Cree Board of Health and Social Services of Baie-James and the health services of Lebel-sur-Quévillon.

The health and safety procedure will be submitted to COMEX as part of the authorization request.