Environment Canada / Environnement Canada

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Your file Votre référence
EA0809-004
Our file Notre référence
4709 012 001

October 7, 2011

Chuck Hubert
Environmental Assessment Officer
Mackenzie Valley Environmental Impact Review Board
P.O. Box 938
Yellowknife NT X1A 2N6

Via email

RE: EA0809-004 Information Requests on the Fortune Minerals Ltd. NICO Project Environmental Assessment – Round 1

Environment Canada (EC) has identified a number of questions in connection with the Developer's Assessment Report (DAR) submitted by Fortune Minerals Ltd. Should you have any questions please do not hesitate to contact Jane Fitzgerald at (867) 669-4746 or by e-mail at jane.fitzgerald@ec.gc.ca.

Yours truly,

Lisa Lowman
Senior Environmental Assessment Coordinator
Environmental Protection Operations
Prairie and Northern Region

cc: Jane Fitzgerald - Environmental Assessment Coordinator, EPO
EC Review Team

IR Number: EC-1
Source: Environment Canada
To: Fortune Minerals Ltd.

Subject: Communications tower

References:

- NICO Developer's Assessment Report: Volume 3 - Section 3.10.4

Terms of Reference Section:

- 3.3.7 Wildlife
- Appendix F: Wildlife - #1b

Preamble:

The proponent is planning on building a 46 m tall microwave communications tower. Communications towers and supporting guy wires can pose a collision hazard for migratory birds. Other tall structures and overhead wires may also pose a collision risk to birds. The risk of collisions with communications towers and other tall structures can depend on height, design, lighting and meteorological conditions.

Request:

The proponent is asked to:

1. Describe whether the communications tower will be free standing or supported by guy wires. If guy wires are to be used, please describe mitigation measures that will be used to minimize the risk of bird collisions.
2. Describe whether any lighting will be used on the tower and what type of lights may be used.
3. Provide an inventory of all other tall structures and overhead wires that may pose a collision risk to birds.

IR Number: EC-2
Source: Environment Canada
To: Fortune Minerals Ltd.

Subject: Vegetation clearing

References:

- NICO Developer's Assessment Report: Volume 15 - SON - Wildlife - Table 15.3-1 (pg. 15-67) and Section 15.3.2.1 - Pathways with No Linkage (pg. 15-73)
- NICO Developer's Assessment Report: Appendix 18-II - WEMP - pg. 7

Terms of Reference Section:

- Appendix F: Wildlife - #1a

Preamble:
Many activities that are conducted during the breeding season can result in the inadvertent destruction of the nests and eggs of migratory birds. This "incidental take" of nests and eggs is in violation of the *Migratory Birds Regulations* that, under subsection 6(a), prohibit the disturbance, destruction or taking of the nests or eggs of migratory birds.

The proponent has stated that, when possible, clearing of vegetation would take place outside of the migratory bird **breeding season** (May 15 through 31 July), and that based on this mitigation measure, disturbance or destruction of nests was considered as an effects pathway with "no linkage". It is also stated that "If construction activities must be completed during the migratory bird breeding season, then vegetation and top soil will be removed prior to the **nesting season**".

The draft Wildlife Effects Monitoring Program (DAR Appendix 18-II - WEMP pg. 7) also states that birds nesting on project infrastructure will be identified and monitored.

Request:
The proponent is asked to:

1. Clarify the dates used to define the "nesting season" versus the "breeding season", and the information source used to identify these dates.
2. Identify all vegetation clearing or top soil removal that is likely to take place during the breeding season, and a rationale as to why such activities must be conducted during this period.
3. Identify the specific mitigation measures and follow-up monitoring that will be used to ensure that nests encountered during project activities or found on project infrastructure will be protected from disturbance or destruction.

IR Number: EC-3
Source: Environment Canada
To: Fortune Minerals Ltd.

Subject: Risk to waterbirds from water from contaminated water, sediment, or invertebrates

References:

- NICO Developer's Assessment Report: Volume 15 - SON - Wildlife - Section 15.3.2.1 - Pathways with No Linkage (pg. 15-74 to 15-75)
- NICO Developer's Assessment Report: Appendix 18-II - WEMP pg. 18

Terms of Reference Section:

- Appendix F: Wildlife - #1f,g

Preamble:
Section 5.1 of the *Migratory Birds Convention Act* prohibits persons from depositing substances harmful to migratory birds in waters or areas frequented by migratory birds or in a place from which the substance may enter such waters or such an area.

The proponent has identified that waterfowl may be at increased risk of mortality if they land in the Co-disposal Facility (CDF) and ingest contaminated water, sediment, or invertebrates, especially during periods in which the CDF contains the only open water during spring and fall owing to the heat from tailings. The Flooded Open Water Pit, Seepage Collection Ponds and drainage ditches were also identified as areas of concern for contamination potential. The proponent concluded that this effects pathway had "no linkage", based on a wildlife health risk assessment that considered exposure ratios to contaminants. The wildlife health risk assessment was not included with the DAR.

The proponent has stated that the 5 Seepage Collection Ponds and the Surge Pond will be surveyed twice per week during the open-water season, and that EC will be informed if there is regular use of the Water Management Ponds by waterbirds, or if birds are observed to be unhealthy or found dead.

Request:
The proponent is asked to:

1. Describe anticipated concentrations of contaminants in the CDF, Seepage Collection Ponds, Surge Pond, drainage ditches, and flooded open pit.
2. Provide a copy of the wildlife health risk assessment.
3. Identify thresholds for contaminant concentrations that will be used to trigger adaptive management.
4. Outline mitigation measures that will be used to ensure that waterfowl and other aquatic birds are not exposed to harmful substances that may be found in CDF, Seepage Collection Ponds, Surge Pond, drainage ditches and flooded open pit.
5. Discuss monitoring that will be used to ensure that contaminant levels remain below specified thresholds and to ensure that further mitigation measures necessary to protect waterbirds are effective.
6. Specify the criteria that will be used to determine that waterbirds are making "regular use" of the water management ponds, or that birds are "unhealthy".
7. Clarify whether waterbird use of the CDF will also be included in regular monitoring.

IR Number: EC-4
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Mapping of Waterbird Observations

Terms of Reference Section:

- Appendix A: Existing environment - *Biophysical environment* #8

References:

- DAR Volume 15 - Section 15.2.4.7, Figure 15.2-10 (page 15-51)
- B.J. Fournier and J.E. Hines. 2005. Geographic distribution and changes in population densities of waterfowl in the Northwest Territories, Canada, 1976-2003. Canadian Wildlife Service Technical Report Series No. 433.

Preamble:

The proponent has collected information on waterbird usage in the development area. This information is valuable and can be used to develop mitigation measures to avoid or minimize impacts to waterbirds. For example, if waterfowl are known to concentrate in high numbers on a lake near the development site during the summer, then mitigation measures for aircraft routes can be developed in which the routes avoid flying directly over the lake during the periods when waterfowl typically occur there.

The Proponent has presented waterbird observations on a map of the regional study area (Figure 15.2-10). However, the map simply shows the location of each "waterbird observation" as a coloured circle. There is no indication whether a "waterbird observation" is one bird, a pair of birds, or a group. Bird type or species is not indicated on the map. The coloured circles overlap in some areas, making it hard to get an accurate idea of densities.

A more useful method of presenting the waterbird information would be to use density contour maps (a.k.a. "hotspot" mapping) and present the information by season and bird group/species. Refer to the report by Fournier and Hines (2005) for examples of the density contour technique for waterfowl mapping.

Request:

The proponent is asked to:

1. Provide revised waterbird maps that show areas of different waterbird densities by species or major bird groups (e.g., loons, grebes, ducks, geese, swans, terns) and by season using density contour maps or a similar technique.

IR Number: EC-5
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Waterbird Densities

Terms of Reference Section:

- Appendix A: Existing environment - *Biophysical environment* #8

References:

- NICO Developer's Assessment Report: Section 15.2.4.7, Subsection 15.2.4.7.1 Population Status and Distribution (pages 15-47 to 15-52)
- NICO Developer's Assessment Report: Section 15.2.4.7, Table 15.2-15 (page 15-49) and Table 15.2-16 (page 15-50)
- B.J. Fournier and J.E. Hines. 2005. Geographic distribution and changes in population densities of waterfowl in the Northwest Territories, Canada, 1976-2003. Canadian Wildlife Service Technical Report Series No. 433.

Preamble:

The proponent reported that the total density was 167 adult waterbirds/km^2 of water in the study area and 104.1 adult scaup /km^2 of water. The results appear to indicate very high densities of waterbirds, particularly scaup. However, the densities are given only for the water areas with no indication of the percentage of water in the regional study area.

Waterfowl Breeding Population surveys conducted in late May and early June of each year from 1976-2003 indicate that most areas in the Northwest Territories have less than 15 waterfowl/km^2 and 6 or less adult scaup/km^2 (Fournier and Hines 2005). However, these density estimates are based on total area (i.e., both terrestrial land and water) so a direct comparison with the proponent's results is not possible.

In order to determine whether the project will result in significant impacts to waterfowl populations, it is important to have an accurate estimate of densities in the proposed development area. The reported densities need to be in a format that allows comparison to other reports of waterfowl densities elsewhere.

Request:

The proponent is asked to:

1. Clarify the size of the Local Study Area (in km^2) and the Regional Study Area (in km^2).
2. Provide waterbird densities of adults and young by km^2 of land (i.e., both terrestrial land and water) rather than just by km^2 of water.

IR Number: EC-6
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Habitat Suitability Model for Waterbirds

Terms of Reference Section:

- 3.3.7 - Wildlife
- Appendix F: Wildlife - #1a,d,g

References:

- NICO Developer's Assessment Report: Section 15.4.6 Waterbirds, Subsection 15.4.6.2 Habitat Quality, Movement, and Behaviour (pages 15-129 to 15-138)

Preamble:

The proponent has presented a Habitat Suitability Model to estimate the change in habitat quality for waterbirds associated with the NICO project and other developments. The habitat model was based on breeding habitat components and considered adjacent terrestrial habitat that could influence breeding conditions.

The findings from the model suggest that 15.4% of the Regional Study Area is good quality waterbird habitat under reference conditions and that the cumulative decrease of good quality waterbird habitat from the NICO Project and other developments in the area would be approximately 2%.

The Habitat Suitability Model is based on a set of assumptions as to what constitutes good quality habitat for waterbirds. The Proponent does not provide any indication as to how accurate these assumptions are. The Proponent has several years of waterbird observations in the Regional Study Area.

Presumably, the waterbirds are choosing the best quality habitat in the area. One would be able to get an indication of the accuracy of the Habitat Suitability Model by comparing the results of the model to the actual observations of waterbirds.

Request:

The proponent is asked to:

1. Use their existing waterbird data to verify the accuracy of their Habitat Suitability Model to determine whether the model presents an accurate assessment of habitat quality.

IR Number: EC-7
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Air quality modelling input and output data

Preamble:
The quality of model predictions is dependant on the quality of the input data used in the model. The selection of model options and the configuration of model domains and grids can also affect the quality of predictions.

To provide confidence in the air quality model predictions provided in the DAR, all input and output data and selected model options and configurations must be reviewed.

Requests:
EC requests that the proponent:

1. Provide all input and output model data files used to generate the air quality predictions presented in the DAR. All input and output files for CALMET, CALPUFF and CALPOST should be provide in a model-ready format.

IR Number: EC-8
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Air quality modeling and monitoring

Preamble:
The CALPUFF modeling results, DAR Section 10.4.2.3, indicate that NO_2, TSP, and $PM_{2.5}$ will exceed ambient air quality standards within and outside of the mine lease boundary. There are also exceedances of TSP ambient standards along the access roads predicted.

Request:
EC requests that the proponent provide the following information:

1. Please provide estimates of the spatial extend of the predicted exceedances of ambient air quality standards within and outside of the mine lease boundary.
2. Please provide frequency of exceedance plots for NO_2 which are similar to the plots provided for TSP (figure 10.4-12) and $PM_{2.5}$ (figure 10.4-9).
3. Please provide details of an ambient air quality monitoring plan to address the predicted exceedances.

IR Number: EC-9
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Metal Deposition

Preamble:
Metal deposition was "determined assuming that the metals were associated with the TSP fraction from combustion, wind-blown dust, and mechanically generated (fugitive) sources" (section 10.4.2.5). The reviewer assumes that this approach involves applying a metal speciation profile to the modeled deposition rates of TSP and fugitive dust. If this is the case, then a spatial plot of TSP and dust depositions should be provided for review.

In Appendix 10.II Regional Air Emissions Sources the following reference is provide for the elemental component (by mass) of fugitive dust:

> *Metal speciation within rock was provided by Fortune in "Appendix IV - results.xlsx". Based on the rock and ore quantities outlined in "Nico Project: Tailings and Mine Rock Co-Disposal Facility FEED study" (Golder 2010) it was assumed that all blasted rock is 26% btw ore and 74% btw waste rock.*

These references should be provided for review.

Request:
EC requests that the proponent provide the following information:

1. Details on how metal deposition was predicted;
2. Spatial isopleth plots of predicted of TSP and dust deposition rates;
3. Metal speciation profiles for TSP and fugitive dust; and
4. The references noted above in the preamble: "Appendix IV – results.xlsx" and "Nico Project: Tailings and Mine Rock Co-Disposal Facility FEED study (Golder (2010)"

IR Number: EC-10
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Transport of concentrate

Preamble:
The proponent anticipates that 180t of concentrate per day will be shipped from the mine to a processing plant in Saskatchewan via trucks and rail. The concentrate will be loaded into bags at the mine site and trucked to the Hay River railhead where the bags of concentrate will be transfer to rail cars. It is expected that there will be 5 truckloads of concentrate leaving the mine each day.

During the handling and transport of concentrate there is potential for contaminant loading that could adversely impact the environment.

Requests:
EC requests that the proponent provide the following information:

1. The expected chemical composition of the concentrate to be shipped from the mine;
2. The type of truck trailers that will be used to transport the bags of concentrate (e.g. open flat deck or enclosed trailers);
3. Detailed specifications for the bags that will be used to contain the concentrate as well as examples of other mines using these bags to transport concentrate;
4. The alternatives that were considered for transporting concentrate and the reasons why this transport system was selected; and
5. The mitigation and monitoring strategies to minimize the lost of concentrate during the handling and transportation process.

IR Number: EC-11
Source: Environment Canada
To: Fortune Minerals Inc.

Subject: Incineration of sewage

Preamble:
Section 3.11.3.1 of the DAR states that sewage sludge will be incinerated at the mine site.

Sewage sludge should not be burned in batch waste incinerators that are typically used in the north. Sewage sludge has high moisture content and low heat content that will result in increased fuel consumption and lead to poor incinerator performance. Sewage sludge should only be burned in incineration equipment designed for this type of waste. If the proponent decides to pursue sewage sludge incineration, it should provide the Board with the design specifications of the incinerator and a letter from the manufacturer stating that this equipment is suitable for burning this type of waste. The incinerator emissions should be stack tested while incinerating sewage sludge to ensure that the Canada-wide Standards for Dioxins and Furans emissions are achieved. Emissions from sewage sludge incineration must be reported to the National Pollutant Release Inventory (NPRI), under the authority of the Canadian Environmental Protection Act, 1999 (CEPA 1999).

Requests:
If the proponent plans to incinerate sewage sludge, EC requests the following information:

1. Detailed specifications of the incinerator;
2. A letter from the manufacturer stating that the incinerator is designed to incinerate sewage sludge. The letter should include previous stack testing results demonstrating that the incinerator can achieve the Canada-wide Standards for Dioxins and Furans while incinerating sewage sludge;
3. A commitment from the proponent to stack test the incinerator emissions while burning sewage sludge prior to the commissioning of the incinerator.

IR Number: EC-12
Source: Environment Canada
To: Fortune Minerals Ltd.

Subject: Water Quality and Treatment

References:

- NICO Developer's Assessment Report: Appendix 7.V

Preamble:

Based on modelling results presented in figures in Appendix 7.V it appears as though there will be long-term impacts to the composition of several water bodies. Long-term is considered after closure at 22 years. The changes indicated include the following:

- Changes to Nico Lake with long term increase in concentration of: chlorides, potassium, sodium, sulphates, antimony, barium, beryllium, boron, cadmium, chromium, copper, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, uranium, vanadium, and zinc. All concentrations, even though increased above baseline, remain lower than the SSWQ guidelines in the long term as well as the *Metal Mining Effluent Regulations* (MMER), and in most cases the CCME guidelines. However, all are increased from baseline over the long term with cadmium, chromium, mercury, silver and thallium passing the CCME guideline thresholds.
- Changes to Peanut Lake with long term increase in concentration of: chlorides, potassium, sulphates, antimony, beryllium, chromium, cobalt, copper, lead, molybdenum, selenium (to a small degree), silver, thallium, uranium, and zinc. All concentrations, even though increased above baseline, remain lower than the SSWQ guidelines in the long term as well as the MMER, and in most cases the CCME guidelines. However, all are increased from baseline over the long term with chromium passing the CCME guideline thresholds.
- Changes to Burke Lake with long term increase in concentration of: chlorides, potassium, sulphates, antimony, beryllium, chromium, cobalt, lead, mercury, molybdenum, selenium (to a small degree), silver, thallium, uranium, and zinc. All concentrations, even though increased above baseline, remain lower than the SSWQ guidelines in the long term as well as the MMER, and the CCME guidelines.
- Changes to Marium River with long term increase in concentration of: aluminum, antimony, beryllium, boron, cadmium, chromium, copper, iron, lead, mercury, selenium (to a small degree), silver, thallium, uranium, vanadium, and zinc. Currently, baseline data indicates that mercury and cadmium are above CCME guidelines and will remain so with an increase in concentration over the long term. All other parameters will remain lower than the SSWQ guidelines in the long term as well as the MMER and in most cases the CCME guidelines. However, copper, iron and zinc are expected to reach or may slightly exceed CCME limits in the long term as well as mercury and cadmium as indicated.

The modelling present in figures in Appendix 7.V show the short term increases in concentration, with the short term considered during operations and start of closure. The following water bodies are shown with the contaminants that will exceed CCME, SSWQ or MMER limits:

- Changes to Nico Lake with short term increase in concentration of: aluminum exceeding SSWQ guidelines, cadmium exceeding CCME but less than SSWQOs, chromium exceeding CCME with no SSWQOs given and iron exceeding SSWQOs.
- Changes to Peanut Lake with short term increase in concentration of: aluminum exceeding SSWQOs, chromium exceeding CCME with no SSWQOs, iron exceeding SSWQOs, and silver exceeding CCME with no SSWQOs.
- Changes to Burke Lake with short term increase in concentration of: aluminum exceeding SSWQOs, chromium exceeding CCME with no SSWQOs and iron exceeding SSWQOs.
- Changes to Marium River with short term increase in concentration of: aluminum exceeding CCME but not exceeding SSWQOs, arsenic exceeding CCME occasionally but not exceeding SSWQOs, cadmium, copper, and iron exceeding CCME but not SSWQOs, mercury exceeding CCME with no SSWQOs, selenium and exceeding CCME but not SSWQOs.
- It is unclear if these predictions are based on the expected effluent quality from the Wastewater Treatment Plant (WWTP) during operations and the expected effluent quality from the wetlands after closure. This needs to be clarified.
- Water quality predictions have been made for the seepage collection ponds as well as the on-site surge ponds and open pit once it has filled after closure. However, no predictions are presented for effluent water quality from the proposed WWTP or from the wetlands after closure.
- It appears as though the proponent has taken into consideration a number of tailings disposal methods and selected co-disposal as the best option. They have also included strategies for seepage and run-off management that are in compliance with federal guidelines and best management practices.

Request:

The proponent is asked to:

1. Clarify what basis is used for the final water quality predictions for each water body;
2. Provide a description of what the final effluent water quality is expected to be entering and exiting the WWTP;
3. Provide a description of what the final effluent water quality is expected to be entering and exiting the future proposed wetlands area after closure; and
4. Provide an assessment of how the increase in concentrations of the identified parameters will ultimately affect each identified lake and the associated aquatic life.

IR Number: EC-13
Source: Environment Canada
To: Fortune Minerals Ltd.

Subject: Waste treatment and Disposal

References:

- NICO Developer's Assessment Report: Appendix 3.1.5 Mine Rock Classification & Appendix 3.1-1.3.2.2 Metal Leaching Potential

Preamble:

The proponent is suggesting that mine rock containing up to 1000 ppm arsenic be used in construction activities at the site.

The DAR states that: *"The results of geochemical leach testing suggest that it may not be possible to meet the site specific water quality objective for arsenic (0.05 milligrams per Litre [mg/L]) based on operational Mine Rock management alone; even background concentrations of arsenic in Nico Lake exceed the reference criteria. Samples containing even low solid phase concentrations of arsenic leach concentrations in excess of Nico and Peanut lakes concentrations. Most samples containing less than 1000 ppm arsenic do not leach arsenic concentrations in excess of the existing concentrations in the Grid Ponds or the MMER average monthly criterion of 0.5 mg/L."*

This seems to imply that if they are using mine rock with up to 1000 ppm arsenic in construction, there would be significant short-term leaching of arsenic and the 0.05 mg/L target would easily be exceeded. It is also close to exceeding the MMER monthly criterion.

Request:
The proponent is asked to:

1. Respond if they could lower the arsenic concentration for what is considered mine rock suitable for construction.

On a related matter, the proponent is also proposing to dispose of non-hazardous wastes (construction materials, incinerator ash etc) in the Co-disposal Facility, along with tailings and waste rock. This will increase the volume required in the Co-disposal Facility and potentially complicate the design of the impoundments and the disposal schedule.

The proponent is asked to:

2. Clarify if this is commonly done. Also clarify why this is the preferred method of disposal for non-hazardous wastes (as opposed to a separate landfill, for example).