Federal Authority Fact Sheet

Troilus Mining Project – Troilus Gold Corp.
Agency file: 83658

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1. Is it probable that your department or agency may be required to exercise a power or perform a duty or function related to the Project to enable it to proceed?

   If yes, specify the Act of Parliament and that power, duty or function.

   No

2. Is your department or agency in possession of specialist or expert information or knowledge that may be relevant to the conduct of an impact assessment of the Project?

   Specify as appropriate.

   As a federal authority, Health Canada provides expertise and information to support the human health impact assessment of projects subject to the *Impact Assessment Act* (IAA). Health Canada does not approve or issue permits or authorizations for the impact assessment of projects subject to the IAA. The manner in which the expertise and information provided by Health Canada are used in the impact assessment process is determined by the review bodies.

   To support a project impact assessment, Health Canada can provide expertise in the following areas:

   - Methodology for performing a health impact assessment
   - Methodology for assessing toxicological (human health) risks
   - Country foods
   - Air quality
   - Drinking and recreational water quality
   - Noise
   - Emergency management for public health protection
   - Radiological impacts
   - Electromagnetic fields (EMFs)

   Health can be affected positively or negatively by many other social, economic and environmental factors.[1] Other organizations may have expertise in human health impact assessment that should be considered in conjunction with the expertise provided by Health Canada. For example, the Public Health Agency of Canada has expertise in social determinants of health. It can provide that expertise through Health Canada on request from the review body.

   For analysis of the health impacts of proposed projects, Health Canada has developed the guides listed below. Intended for use by proponents and their consultants, the guides outline the key elements that Health Canada considers when analyzing impact statements.

[1] Government of Canada (https://www.canada.ca/en/services/health/determinants-health.html) and Institut national de santé publique du Québec (https://www.inspq.qc.ca/exercer-la-responsabilite-populationnelle/determinants-de-la-sante)

Guidance for Evaluating Human Health Impacts in Environmental Assessment:

- *Air Quality*
- *Drinking and Recreational Water Quality*
- *Country Foods*
- *Human Health Risk Assessment*
- *Noise*
- *Radiological Impacts*

For information about EMFs, see https://www.canada.ca/en/health-canada/services/health-risks-safety/radiation/everyday-things-emit-radiation.html**.**

3. Has your department or agency considered the Project; exercised a power or performed a duty or function under any Act of Parliament in relation to the Project; or taken any course of action that would allow the Project to proceed in whole or in part?

   Specify as appropriate.

   No

4. Has your department or agency had previous contact or involvement with the proponent or other party in relation to the Project? (for example, enquiry about methodology, guidance, or data; introduction to the project)

   Provide an overview of the information or advice exchanged.

   No

5. Does your department or agency have additional information or knowledge not specified above?

   Specify as appropriate.

   No

6. From the perspective of the mandate and area(s) of expertise of your department or agency, what are the issues that should be addressed in the impact assessment of the Project, should the Agency determine that an impact assessment is required?

   For each issue discussed, provide a concise, plain-language summary that is appropriate for inclusion in the Summary of Issues.

   Health Canada has identified the following issues based on information presented in the Proponent's initial project description (Golder, 2022) and past environmental assessments of similar projects. This list is not necessarily exhaustive, as other issues related to Health Canada's areas of expertise may be raised during the consultation periods (public and Indigenous) that may be important to consider.

   Key message: The following issues are generally raised for this type of project in this type of environment and should be addressed in the impact statement:

   - Potential contamination of air, water and country foods
   - Potential contamination of the environment and its health effects related to the practice of traditional activities (e.g., fishing, hunting, gathering)
   - Nuisances associated with increased road traffic (e.g., noise, dust)
   - Dust emissions on and off site
   - Noise-induced nuisance and sleep disturbance
   - Consideration of the effects of climate change on health-related valued components, including their baseline condition (e.g., consider the fact that initial air quality may be somewhat worse than it actually is, since forest fires may become more frequent)
   - The risk of accidents or malfunctions that could contaminate air, water and country foods

Human receptors

The initial project description contains little information about the human receptors that could be affected by the project. There are no maps showing land use or the location of Indigenous camps. Three families use the land in the project area for traditional activities (Golder, 2022, PDF p. 184). The project area overlaps with three Indigenous hunting territories (Golder, 2022, p. 19), and a drinking water well used by the Awashish family is located in the project area (Golder, 2022, p. 24).

Key message: The impact statement should describe the locations of all potential permanent/temporary/seasonal human receptors, recreational or ceremonial water bodies, and drinking water sources and indicate the distance between them and the project components that could affect them.

Health effects associated with potential environmental contamination

For a project to pose a human health risk due to exposure to chemicals in the environment, three criteria must be present:

1. The potential for emissions or releases of contaminants of potential concern
2. The presence of human beings (actual or potential)
3. At least one route of human exposure to the contaminants, such as the following:
    i. Inhalation (respiration) of airborne contaminants
    ii. Ingestion of contaminants in foods hunted, fished, gathered and so on
    iii. Skin contact with contaminants (via soil, water, etc.)

Key message: The impact statement should describe the effects of project-related contaminant emissions into the environment (e.g., air and water) on Indigenous peoples' health and land use.

Air quality

Dust emissions generated by the mine site are an important issue for the Indigenous and non-Indigenous authorities and organizations consulted by the Proponent (Golder, 2022, pp. 3, 6, 179, 181).

The Proponent indicates in the project description that the air quality index in the Saguenay meteorological region was good 71.59% of the time (in 2020) (Golder, 2022, p. 21). Health Canada is relying on the expertise of Environment and Climate Change Canada to determine the validity of using this index to assess the site's initial air quality.

Dust, carbon monoxide, nitrogen oxides, and diesel and gasoline exhaust would be the project's main air emissions (Golder, 2022, pp. 43, 44). These substances have health effects, and some of them can travel very long distances (Health Canada, 2017a).

The Proponent does not appear to specify whether the on-site gold purification operations (see the Overall Process Flow Diagram in Golder, 2022, p. 14) may generate airborne emissions of heavy metals, suspended particles and cyanides. The initial project description also does not specify whether the site's lithology is likely to contain crystalline silica. Inhalable quartz particles from dust emissions can be a public health issue.

Key message: It is recommended that health impacts associated with air quality changes be considered and that the assessment cover the following contaminants:

- Nitrogen dioxide (NO_2)
- Sulphur dioxide (SO_2)
- Carbon monoxide (CO)
- Volatile organic compounds (VOCs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Non-point-source dust (e.g., fine particulate matter ($PM_{2.5}$ and PM_{10})) associated with vehicle traffic, ore crushing, blasting, dewatering and wind erosion of tailings sites, etc.
- Metals

- Diesel particulate matter (DPM)[2]
- Secondary pollutants (e.g., ground-level ozone)
- Mining chemicals (e.g., emissions from ammonium nitrate, which is typically used for blasting) and on-site ore processing (e.g., cyanides)
- Inhalable quartz particles (crystalline silica), if any
- Any other contaminants emitted by the project that could have health effects

Particular attention should be paid to the impacts of inhalable dust emissions and diesel and gasoline exhaust.[3]

Key message: The assessment of the health effects of air quality change should cover the following scenarios:
(1) The effects of the baseline condition (the existing condition)
(2) The effects of project emissions only
(3) Future effects (baseline condition + project effects)
(4) Cumulative effects (baseline + project effects + effects of other past or potential projects + climate change effects, if required) It is recommended that the most stringent Canadian ambient air quality standards* be used in the assessment.

* https://ccme.ca/en/air-quality-report

Key message: As a mitigation measure, the Proponent could analyze the feasibility of electrifying some of the mobile equipment and assess the positive effects this could have on human health (e.g., by mitigating air pollution, including air pollution associated with climate change*).

* "The health impacts of climate change on First Nations, Inuit, and Métis peoples are far-reaching, with disproportionate impacts on their communities, including food and water security and safety, air quality, infrastructure, personal safety, mental health and wellness, livelihoods, culture, and identity." (Health Canada, 2022, p. 12)

Drinking and recreational water quality

Preservation of water quality and quantity, access to drinking water, and access to surface water for traditional activities are important to the authorities and organizations consulted by the Proponent (Golder, 2022, p. 3, PDF p. 116, PDF p. 181).

Changes in groundwater and surface water flow may affect current or potential sources of drinking water. Health Canada is relying on Natural Resources Canada's expertise regarding the project's potential hydrogeological impacts (groundwater flow). Surface water quality may also be affected by dust deposition, erosion and sedimentation, and liquid discharges (Health Canada, 2017b). Changes in groundwater and surface water quality could affect health.

A well in the project area is used by the Awashish family (Golder, 2022, p. 24). However, the Proponent does not specify whether other drinking water sources and/or water bodies used for recreational or ceremonial purposes could be affected.

Key message: It is recommended that health impacts associated with potential changes in drinking and recreational water quality (e.g., for traditional activities) be considered. The assessment should identify all sources of drinking water and all water bodies used for recreational or ceremonial purposes and specify whether Indigenous users are consuming treated or untreated water. Particular attention should be paid to the project's potential impacts on the quality of the well water used by the Awashish family.

According to the initial project description, surface water quality at the mine site would be affected by various heavy metals, such as aluminum, cadmium, copper and zinc (Golder, 2022, p. 22, PDF p. 241). Arsenic and lead, also frequently detected in mine wastewater, are two other heavy metals of concern for public health.

[2] Diesel particulate matter generally consists of fine particulate matter ($PM_{2.5}$) and ultrafine particulate matter (UFP), which are released directly or formed secondarily via gaseous precursors in exhaust and evaporative emissions. Diesel exhaust (DE) contains known or suspected carcinogens, and the very small size of DE particles contributes to their efficient delivery to the deep lung (Health Canada, 2016, pp. 2-3, 7).

[3] For more information, see this infographic:https://publications.gc.ca/collections/collection_2018/sc-hc/H129-88-2018-eng.pdf.

Key message: The assessment of the project's health impacts associated with changes in groundwater and surface water quality should cover the following contaminants:

- Aluminum
- Cadmium
- Copper
- Zinc
- Arsenic
- Lead
- Cyanides*
- Any other contaminant that could have health impacts

* The Overall Process Flow Diagram shows that a cyanidation unit is planned (Golder, p. 14). Although cyanide in mine wastewater is unlikely to have adverse effects in humans, its presence in the water is still a concern because of its high toxicity.

Since the groundwater upstream of the tailings facility is naturally acidic (Golder, 2022, p. 24, PDF p. 241), assessment of the potential for acid mine drainage (AMD) may be important. Health Canada is relying on Natural Resources Canada's expertise on AMD. Although AMD is not an immediate health hazard, the solubilization of heavy metals that subsequently end up in waterways is likely to cause problems further downstream, either through the consumption of country foods that have bioaccumulated the metals or through the consumption of drinking water that has not been treated to remove them.

Key message: Particular attention should be paid to assessing the potential for acid mine drainage and its potential health impacts.

Country foods and other traditional resources

"Increased safety of traditional activities in restored areas (design of facilities)" is an important issue for Indigenous authorities and organizations consulted by the Proponent (Golder, 2022, p. 6).

Contaminants in the water, air or soil may be absorbed into food that is trapped, fished, hunted, harvested or grown for subsistence or medicinal purposes (Health Canada, 2017c). Access to country food is very important as it is a significant food source for Indigenous people and contributes to improved food security (Chan, 2019). The presence of a mine site and associated infrastructure (especially access roads and tailings storage areas) is also likely to disrupt daily living patterns and diminish the quality of recreational or cultural use of the natural environment.

The initial project description contains little information about traditional activities (hunting, fishing, trapping, gathering, cultural sites, rituals, etc.) carried out in areas potentially affected by the project. Three families from the Cree community of Mistissini apparently engage in traditional activities (e.g., hunting) in the area (Golder, 2022, p. 19; PDF p. 184). According to the initial project description, three hunting territories used by these families converge on the project site (Golder, 2022, p. 19). A number of beaver live near the site (Golder, 2022, PDF p. 181).

Key message: It is recommended that assessment of the project's health impacts associated with changes in the quality of country foods and other traditional resources be considered.

Noise

Noise generated by the project could be an issue (Golder, 2022, PDF p. 116).

The existing noise environment at the project site is dominated by nature sounds. The sources of anthropogenic noise are Troilus Gold's exploration activities and land users' hunting, fishing and trapping activities (Golder, 2022, p. 21).

Health effects on human receptors may vary depending on the time (night/day) and duration of the activity (Health Canada, 2017d). In this project, noise levels may increase because of drilling, blasting, machinery, and heavier traffic on and off site. This noise could have health impacts.

Key message: It is recommended that the assessment of the project's impacts address health impacts due to noise (including an analysis of potential effects on sleep).

Accidents and malfunctions

The risk of a hydrocarbon spill is an important issue for the authorities and organizations consulted by the Proponent (Golder, 2022, p. 6).

In the event of an accident or failure, there may be a direct or indirect impact on human health through exposure to contaminants released into the air, soil or water and through the consumption of country foods. The potential for accidents or malfunctions (tailings ponds, waste rock piles, accumulation areas) may also generate public concern.

Key message: The impact statement should address the health effects of potential accidents and malfunctions. It should contain the relevant information (e.g., in an emergency response plan) for prompt, effective notification and protection of the public.

Health impact assessment and gender-based analysis plus (GBA+)

Key message: The impact statement should consider a health determinants approach (a health impact assessment) to capture the project's positive and negative effects on socio-economic, social and health conditions. It should address community concerns about environmental, socio-economic and social impacts (e.g., housing needs, impacts on tourism activities, distribution of economic benefits, social cohesion, racism).

Key message: The impact statement should contain disaggregated information[4] and a gender-based analysis plus (GBA+)[5] to provide insight into about how the project might have different health impacts for different groups of people. In particular, the analysis would provide an understanding of the different impacts that the project might have on the health of women, children and other vulnerable groups, including from a cumulative effects perspective.

The project description states that there would be a temporary construction worker camp for up to two years, and that a permanent camp for workers would be constructed (Golder, 2022, p. 12). These camps may result in a variety of socio-economic impacts that could affect health, including impacts on the safety of Indigenous girls and women.[6] However, the Proponent believes that the presence of these camps should not have any impact (e.g., increased prostitution or violence) since the mine site is far from populated areas (Golder, 2022, PDF p. 70).

Key message: It is recommended that the impact statement address the health effects associated with the presence of fly-in/fly-out workers.

Cumulative impacts

Key message: Assessment of cumulative impacts may be important, particularly since the project site was mined between 1996 and 2010 (Golder, 2022, p. 8) and since the mining operations apparently generated some issues (e.g., dust and fine particle emissions from the tailings facility (Golder, 2022, PDF p. 69)).

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Title of responder

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Date

[4] "The Importance of Disaggregated Data": https://www.ccnsa-nccah.ca/docs/context/FS-ImportanceDisaggregatedData-EN.pdf
[5] "What is Gender-based Analysis Plus": https://women-gender-equality.canada.ca/en/gender-based-analysis-plus/what-gender-based-analysis-plus.html
[6] *Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls*, 2019.

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