Environmental Baseline Studies

Comprehensive environmental and socio-economic studies were initiated by Treasury Metals and its consultant team in 2008 to characterize and document the pre-development environmental baseline.. Complete results of these studies are included in the Goliath Gold Project Environmental Impact Statement. Please feel free to speak with Treasury personnel and the study authors during the open house meetings.

Studies completed to support the Goliath Gold Project Environmental Impact Statement (EIS) include:

- Surface Water and Hydrology
- Hydrogeology
- Geochemistry
- Aquatics and Fisheries
- Terrestrial Wildlife
- Terrain and Soils
- Wetlands
- Socioeconomic and Traffic
- Archaeology
- Country Foods
- Noise, Air, Dust, and Light
- Effluent discharge plume study

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gck consulting
EcoMetrix INCORPORATED
DST consulting engineers
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TBT ENGINEERING CONSULTING GROUP
RWDI CONSULTING ENGINEERS & SCIENTISTS
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Valued Components

The Environmental Assessment (EA) process serves as an important decision making tool. The process requires the identification of potential adverse effects that may result from a project and ensures that those impacts are mitigated or avoided. The process also ensures that opportunities are provided for meaningful public and Aboriginal engagement.

Valued components (VC's) are those aspects of the natural and socio-economic environment that are particularly notable or valued because of their ecological, scientific, resource, socio-economic, cultural, health, aesthetic or spiritual importance. The VC's are used to focus the effects assessment for the Project.

The VC's for the Project were determined by the multi-disciplinary team conducting the assessment. Inputs to the process included regulatory requirements, consultation with regulatory authorities, information available from published and unpublished data sources, and biophysical field surveys.

Many of the VC's were derived from the engagement of local stakeholders, citizens, and Aboriginal communities which has taken place over the past four years.

The evaluation of environmental effects associated with the Project followed five steps:

1. Identification of potential Project-related effects.
2. Selection and evaluation of VC's.
3. Identification of potential interactions between the Project and VC's.
4. Development of measures to avoid, minimize, and mitigate potential Project effects.
5. Characterization of residual effects and their significance.

Residual Effects

Treasury evaluated the potential significance of residual effects by examining the level of each residual effect characteristic in the context of existing baseline data, relative literature, and consultation with regulators and other experts.

Based on guidance published by the Government of Canada, residual effects were characterized using the following criteria:

Magnitude – expected size or severity of the residual effect

- Level I – none; Level II –measurable but within range of natural variation; Level III –outside range of natural variation

Geographic Extent – the spatial scale of the residual effect

- Level I –restricted to Project footprint; Level II –extends into local study area; Level III –extends into regional study area

Duration – the temporal scale of the residual effect

- Level I –temporary or not measurable beyond given Project phase (e.g., construction); Level II –could persist up to 10 years after Project initiation; Level III –could persist beyond 10 years after Project initiation

Frequency – how often the residual effect is expected to occur

- Level I –expected to occur infrequently; Level II –expected to occur intermittently; Level III –occurs frequently or continuously

Reversibility – whether or not the residual effect can be reversed once the disturbance or activity has ended

- Level I –readily reversible over a relative short time period; Level II –partially reversible (i.e., mitigation cannot guarantee a return to pre-disturbance conditions); Level III –not reversible

Significance

A determination of the significance of any potential residual effects on VC's resulting from the Project, after the application of all proposed mitigation measures, is a specific requirement of CEAA.

CEAA defines significance as:

The relative importance of an issue, concern or environmental effect, as measured by prevailing standards, regulatory requirements, and social values.

In general, the following logic was then applied:

- If the magnitude is categorized as Level I, then the residual effect is considered not significant regardless of the levels assigned to other effect attributes.
- If the magnitude of a potential residual effect is categorized as Level II or III, a decision tree was used to evaluate significance.

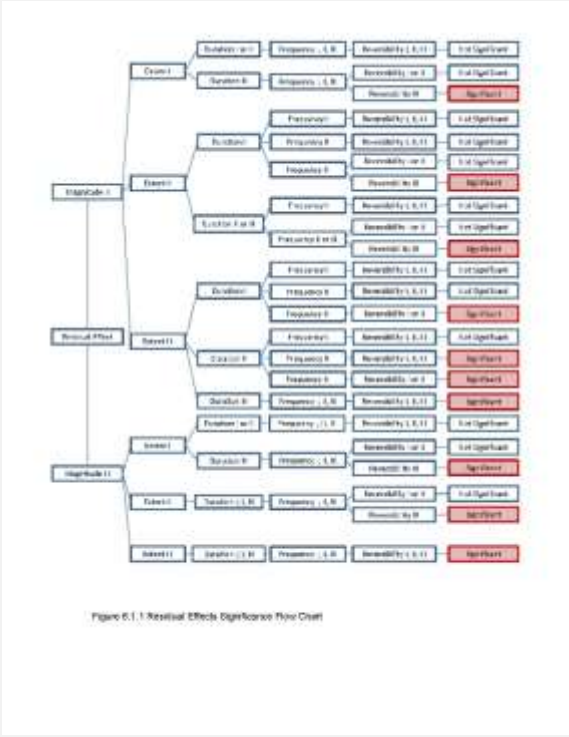

Figure 6.1.1 Residual Effects Significance Flow Chart

No significant effects to Project VC's under normal operations were identified through the EA process.

Significant effects may result in the highly unlikely event that an accidental release of contaminants to waterways occurs. The following posters identify the measures Treasury has put in place through design, mitigation and monitoring to prevent accidental releases to the environment.

Accidents and Malfunctions

A major component of the EIS process is the identification and assessment of potential accidents and malfunctions that could occur throughout all phases of the Project. Treasury understands the risks associated with the Project and is committed to operate the Project to the highest standards in safety, environmental control, security, and operations and maintenance.

Accidents and malfunctions were identified using a Failure Mode and Effects Analysis (FMEA) methodology. An FMEA is a comprehensive risk analysis procedure used to identify and characterize potential accidents and malfunctions (i.e., failure). The methodology evaluates the likelihood of an occurrence and the severity/magnitude of the failure.

Preventative procedures were identified to minimize impacts to the identified VCs, as well as contingency/emergency response procedures and follow-up monitoring for each potential failure identified.

Three categories of potential failure were selected for a more in-depth environmental assessment:

Spills/Releases to Land and Water

- Safeguards to prevent accidental spills or releases to the environment have been designed into the Project including secondary containment, best maintenance and operating practices, and operator/driver training in spill prevention and response.
- Vehicular accident while carrying hazardous materials is the greatest risk. Speed limits will be posted on-site and penalties for infractions will be imposed.
- An Emergency and Spill Response Plan will be developed for the site and spills will be reported as per regulatory requirements.

Sodium Cyanide Releases to Land, Water, and Air

- The Project incorporates an industry standard in-plant cyanide destruction process designed for the safe detoxification of residual cyanide present in process water going to the TSF. This system complies the International Cyanide Code as well as federal and provincial regulations and guidelines.
- System design, coupled with operating and maintenance best practices will ensure the plant will be operated within regulatory compliance limits established in Canada and Ontario, and/or recommended by the International Cyanide Management Institute.
- Approved transportation containers and appropriate vehicles will be used to transport sodium cyanide to site. Transport companies will follow the Transportation of Dangerous Goods regulatory requirements.
- All ore processing will cease when the cyanide destruction process is down for maintenance or an unplanned failure.

Accidents and Malfunctions

Health and Safety Expectations and Objectives:

- All injuries are preventable; every task can be performed without injury.
- Management is accountable for health and safety performance.
- All employees are responsible and accountable for their personal safety.
- Treasury Metals is committed to achieving full compliance with all applicable legal requirements and company standards.
- Promote and develop strong leadership, safe behaviours and personal accountability through employee involvement in continuous improvement processes.
- Maintain a workplace free of the effects of alcohol and other drugs of abuse.
- Promote health and safety at work, at home and in our communities.
- Recognize, reward and support excellent safety performance.

TSF Failure

- The TSF will be designed to meet or exceed all regulatory standards; with safeguards in place to minimize or prevent a potential breach.
- Best Management Practices in operations, maintenance, and surveillance will be implemented to ensure the safe and reliable operation of the TSF. Some elements of this process will include continual monitoring of the TSF levels, daily visual inspections of the seepage collection system, daily and annual dam maintenance, annual safety and surveillance inspections, and routine dam safety audits.
- A hypothetical model was created to better understand the environmental consequences of a highly improbable failure, which allowed Treasury to develop mitigation measures to reduce or eliminate any potential impacts to the environment and/or human health should such an event take place.
- TSF failure was incorporated into the Emergency Preparedness Plan (EPP) for the Project. This includes the stoppage of systems inputting to the TSF, containment of tailings along with removal and re-deposition into the TSF once it is reinstated and approved for use, and EPP implementation training for employees.

In addition, natural hazards that could potentially affect the Project were considered including extreme flooding, natural fires, earthquakes, tornadoes and climate change.

Cumulative Effects Assessment

CEAA defines cumulative effects as:

The effect on the environment which results from effects of a project when combined with those of other past, existing and imminent projects and activities.

CEAA 2012 requires that the EA of a designated project evaluate any cumulative environmental effects that may result from the designated project in combination with the environmental effects of other physical activities that have been or will be carried out.

It also states that a cumulative environmental effects assessment of a designated project must include future physical activities that are certain and should generally include physical activities that are reasonably foreseeable.

For the purposes of the Project's cumulative effects assessment, Treasury focused on potential cumulative effects on the existing environmental and socioeconomic baselines relative to identified projects and activities that are predicted to occur (or are reasonably foreseeable) in the next 10 years. Three spatial scales were evaluated: Local Study Area and Regional Study Area (primarily biophysical) and a 40-km radius centred on the open pit (primarily socioeconomic).

Current or potential future projects related to mining and exploration, forestry, electricity, transportation, and municipal development were considered. With the exception of forest operations and small scale municipal developments, no projects are anticipated within the cumulative effects study area.

With the decline of other industries in the region, the Project is expected to result in net-positive effects on regional economic metrics such as employment, training, personal income, local spending, and business opportunities. The cumulative effects assessment did not result in increased adverse effects on any other Project VC's.