

# RED MOUNTAIN UNDERGROUND GOLD PROJECT

## VOLUME 5 | CHAPTER 30

### MONITORING AND FOLLOW-UP PROGRAMS

## Table of Contents

<b>30</b>	<b>Monitoring and Follow-up Programs .....</b>	<b>1</b>
30.1	Introduction .....	1
30.2	Scope and Objectives.....	2
30.3	Applicable Legislation and Guidelines .....	3
30.4	Adaptive Management Approach.....	3
30.5	Planned Monitoring and Follow-up Programs.....	3
	30.5.1 Aquatic Effects Monitoring and Follow-up Program .....	3
	30.5.2 Site Water Monitoring and Follow-up Program .....	4
	30.5.3 Tailings Monitoring and Follow-up Program .....	4
	30.5.4 Wildlife Effects Monitoring and Follow-up Program .....	5
30.6	Reporting .....	7
30.7	Roles and Responsibilities.....	8
30.8	References .....	9

## 30 MONITORING AND FOLLOW-UP PROGRAMS

### 30.1 Introduction

Management and Monitoring Plans (EMPs) for the Project are designed to minimize effects on the biophysical and socio-economic environment. EMPs addressing the Project's Construction, Operation, Closure and Reclamation, and Post-Closure Phases are described in Volume Chapter 29. In addition to and as part of to permit and licence requirements, a variety of compliance monitoring programs and follow-up programs will likely be required for the Project. The Agency defines compliance monitoring as verifying whether required mitigation measures were implemented as described in the EMPs or associated technical appendices. Compliance monitoring is undertaken to ensure that mitigation measures are appropriately applied according to requirements laid out in authorizations, including those listed as part of the EAO may issue for the Project. The systematic implementation of mitigation measures or best management practices (BMPs) is appropriate in situations in which environmental effects of the Project are well understood and mitigation strategies have been standardized or successfully implemented in the past.

Although compliance monitoring achieves the objective of ensuring that mitigation measures are implemented, compliance monitoring on its own does not replace the requirements for a follow-up program. Unlike compliance monitoring, a follow-up program involves monitoring the response of environmental and socio-economic receptors with the purpose of determining whether a desired outcome is achieved and, if not, applying an adaptive management approach to develop and test strategies until a successful approach is identified. Follow-up programs are a mandatory consideration of a comprehensive study under CEAA 2012. Specifically, section 19(1)(e) of CEAA 2012 states that the environmental assessment of a designated project must take into account "the requirements of the follow-up program in respect of the designated project."

For completeness and simplicity, IDM will work towards consolidating relevant compliance monitoring and follow-up program requirements under discipline-specific environmental and socio-economic effects monitoring and follow-up programs, where appropriate. Chapter 29 identifies anticipated monitoring and reporting obligations. This chapter provides a description of planned monitoring and follow-up programs for the Project to the extent possible at this stage of Project design and development. Comprehensive monitoring and follow-up programs would be developed in consultation with federal government agencies, provincial government agencies, and Nisga'a Nation, as represented by Nisga'a Lisims Government (NLG), to ensure the monitoring and follow-up programs meet applicable provincial and federal permits and authorizations and consideration of community interests.

## 30.2 Scope and Objectives

As per the Operational Policy Statement for Follow-up Programs under CEAA 2012 (Agency 2011), the objectives of implementing a follow-up program are to:

- Verify the accuracy of the conclusions of the EA of a designated project; and
- Determine the effectiveness of any measures taken to mitigate the adverse effects of the Project.

The intent of the monitoring and follow-up programs would be to meet and/or exceed regulatory requirements as stated in Project permits, approvals, and authorizations. A monitoring and follow-up program will be developed for some environmental and/or socio-economic components that are considered to be at greater risk of effects relative to others, are more likely to not respond as predicted to IDM's proposed mitigation measures, or do not have applicable standards. A monitoring and follow-up program will be designed for specific at-risk components to:

- Compare results of monitoring with predictions in this Application for an Environmental Assessment Certificate / Environmental Impact Statement (Application/EIS);
- Determine the effectiveness of mitigation measures;
- Aid in detecting unanticipated adverse effects; and
- Identify the possible need for adjustments through adaptive management or post-construction requirements.

A follow-up program is essential to identifying whether mitigation measures or monitoring methodologies need to be modified or adapted as the Project proceeds in order to continue to be effective and to address previously unanticipated adverse effects. Follow-up programs can also help support the overarching Environmental Management System to manage and mitigate the effects of the Project.

To date, monitoring and follow-up programs are proposed for the following five assessment topics as there may be an enhanced risk of residual adverse effects on a valued component (VC):

- Aquatic Effects Monitoring and Follow-up Program;
- Site Water Monitoring and Follow-up Program;
- Tailings Monitoring and Follow-up Program; and
- Wildlife Effects Monitoring and Follow-up Program.

### 30.3 Applicable Legislation and Guidelines

The monitoring and follow-up programs would follow applicable legislation and guidelines, including:

- CEAA 2012;
- Operational Policy Statement: Follow-up Programs under the Canadian Environmental Assessment Act (the Agency 2011); and
- BCEAA.

### 30.4 Adaptive Management Approach

The Agency's Operational Policy Statement on Adaptive Management Measures under CEAA 2012 notes that a strategy or plan should be developed that identifies when or how adaptive management measures can be used. Adaptive management is an effective tool for minimizing the effects of the Project, and it forms an integral part of a successful follow-up program. For the Project, if a monitoring and follow-up program indicates that environmental or socio-economic performance reaches a predetermined threshold (e.g., the point when the condition of the feature becomes unacceptable), or when new issues arise, corrective action will be undertaken to prevent further effects. Such action or change would continue to be monitored through the monitoring and follow-up program to ensure that the anticipated response has been achieved.

IDM's adaptive management approach is further outlined in Volume 5, Chapter 29.

### 30.5 Planned Monitoring and Follow-up Programs

#### 30.5.1 Aquatic Effects Monitoring and Follow-up Program

The Aquatic Effects Management and Response Plan (AEMRP) detailed in Chapter 29 outlines an Aquatic Effects Monitoring Program (AEMP) that would be established to monitor the receiving aquatic environment during Project activities, such as construction of infrastructure and operation of the mine, including discharge of effluent. Water quality and flow monitoring is an integral component of aquatic effects monitoring, and thus the AEMP will include monitoring of surface water quality, hydrology, sediment quality, benthic invertebrates, and fish. The results from the monitoring will be used to determine the efficacy of protection and monitoring measures and provide opportunity for adaptive management at the Project, should it be required.

The AEMP has been designed to meet the commitments of the Application/EIS, as well as Environmental Effects Monitoring studies that are required under the Metal Mining Effluent Regulation (MMER) and as part of the provincial *Environmental Management Act* discharge permit conditions.

At a high level the monitoring program will include:

- Monitoring streams at locations potentially affected by the Project and at reference areas well away from Project activities;
- Monitoring surface water quality and quantity, sediment quality, and aquatic biology;
- Monitoring fish populations and fish tissues;
- If effluent (as defined in the MMER regulations) is discharged to the environment, then additional sampling for MMER requirements will be conducted (e.g., effluent characterization, acute toxicity testing, site characterization studies including surface hydrology, and sublethal toxicity testing);

Details of the AEMP, including study areas and sample locations, along with monitoring components are provided in the AEMRP (Volume 5, Chapter 29, Section 29.5).

### 30.5.2 Site Water Monitoring and Follow-up Program

The Site Water Management Plan detailed in Volume 5, Chapter 29, Section 29.18, outlines the Site Water Monitoring Program that would be established to monitor surface water and groundwater quality and quantity during Project activities, such as construction of infrastructure and operation of the mine, along with closure and post-closure monitoring of surface water.

At a high level the Site Water Monitoring Program will include:

- Monitoring of implemented BMPs, including inspection to confirm effectiveness of implemented erosion control measures and other mitigation measures;
- Monitoring of surface water and groundwater quality and quantity; and
- Monitoring of water management facilities during the Operation Phase.

Details of the Site Water Monitoring Program including monitoring locations, parameters, and frequency for surface water and groundwater are provided in the Site Water Management Plan (Volume 5, Chapter 29, Section 29.18).

### 30.5.3 Tailings Monitoring and Follow-up Program

The Tailings Management Plan detailed in Volume 5, Chapter 29, Section 29.22, outlines the tailings monitoring and follow-up program that would be established to monitor, inspect, and report on the performance of the Tailings Management Facility (TMF).

Geotechnical instrumentation will be installed in the TMF embankments and foundation during construction that will be utilized during the Operation, Closure and Reclamation, and Post-Closure Phases of the Project.

Geotechnical instrumentation will be provided during the Project Construction, Operation, and Closure and Reclamation Phases to monitor the TMF and may include:

- Pond level indicator in the TMF supernatant pond;
- Water management pond inflow weirs;
- Survey and surface movement monitoring monuments; and
- Flow monitoring for embankment and foundation drains.

The groundwater monitoring wells and select geotechnical instrumentation will be retained during the Post-Closure Phase for use as long-term dam safety monitoring devices. Post-closure monitoring will also include annual inspection of the former TMF and ongoing evaluation of water quality, flow rates, and instrumentation records to confirm design objective for closure have been met.

The instrumentation will be used to monitor and assess embankment performance and to identify any conditions different to those assumed during design and analysis. Amendments to the ongoing design and/or remediation work can be implemented to respond to the changed conditions, should the need arise. Key control and monitoring subject areas will include:

- Construction controls, including the use of a construction management program;
- Performance monitoring inspections of the TMF, including instability indicators, stability monitoring, tailings deposition, water management and control, and quality of effluent;
- Monitoring of flow rates and water quality in the foundation drains;
- The adequacy of the water cover as a dust control to minimize onset of metal leaching / acid rock drainage; and
- Quality assurance and quality control (QA/QC) measures for ongoing monitoring and inspections.

The future operational management system manual will clearly document the procedures for operating, maintaining, monitoring, and inspecting the TMF along with the roles and responsibilities of relevant staff. Regular inspections will include:

- Daily inspections by the Mine Supervisor; and
- Weekly inspections or after a major storm event or change by the TMF Qualified Person.

Additionally, the Engineer of Record will conduct annual dam safety inspections .

### 30.5.4 Wildlife Effects Monitoring and Follow-up Program

The Wildlife Management Plan detailed in Volume 5, Chapter 29, Section 29.26, outlines Wildlife Effects Monitoring Program that will be established to provide information and to direct actions in minimizing potential effects of the Project on wildlife and wildlife habitat.

The Wildlife Effects Monitoring Program will be developed based on the following objectives:

- Monitor wildlife use of the Project area;
- Monitor and verify potential effects related to the Project;
- Monitor and evaluate the effectiveness of mitigation measures;
- Identify unanticipated Project-related effects;
- Discern Project-related changes from natural variability; and
- Inform adaptive management measures.

The monitoring program is intended to be separated into two components: facility monitoring and species-specific monitoring. Facilities monitoring focusses on monitoring and assessing the effectiveness of the wildlife management controls within site. Species-specific monitoring is intended to monitor selected VC species and determine if the Project-related effects are as predicted in the Application/EIS.

At a high level, the Wildlife Effects Monitoring Program activities would include:

- Recording and reporting on bird surveys (including raptor nest monitoring) conducted prior to vegetation clearing, including observations of bird nest sites, correspondence with regulatory agencies, and any monitoring or additional mitigation undertaken;
- During the amphibian breeding period, inspection of ponds and wetland areas prior to construction or disturbance activities for observations of amphibian congregations and breeding sites and recording and documenting any inspections, observations, and additional mitigations undertaken;
- Regular inspection of construction fences or flagged no-disturbance buffers around identified important wildlife habitat or features;
- Regular inspection of waste disposal facilities for non-compliance and potential wildlife attractants or wildlife occurrence;
- Recording and reporting on wildlife mortality, incidents, accidents, or near misses, documenting any correspondence with regulatory agencies, and documenting any additional mitigations undertaken;
- Recording and monitoring of use of Project infrastructure by wildlife for security habitat, daily activities, or nesting purposes;
- Developing a wildlife observation reporting procedure and form and maintaining an on-site log of wildlife observations; and
- Developing and implementing efforts of employee education and environmental awareness, including bear interaction mitigation measures.

Monitoring of species occurrence will occur at the local level by Project personnel documenting incidental observations of wildlife (i.e., wildlife sighting and incident

reporting). Where development of species-specific monitoring programs is required, monitoring programs will be developed in consultation with various stakeholders, Aboriginal Groups, and regulatory agencies prior to commencing the Construction Phase.

Additional details of the Wildlife Effects Monitoring Program, including general monitoring components and frequency, are provided in the Wildlife Management Plan (Volume 5, Chapter 29, Section 29.26).

## 30.6 Reporting

The results of the follow-up programs will be reported in a technical summary report at a frequency to be agreed upon in consultation with provincial and federal government agencies. Reporting under individual EMPs will be undertaken according to the schedule outlined in those plans and any associated permit conditions. The follow-up report will summarize how mitigation measures were implemented and will comment on the effectiveness of these measures in reducing environmental and socio-economic effects of the Project. It will also identify areas where adaptive management strategies were applied, whether those measures were effective, and if alternate measures were needed to reduce the effects on the environment.

Unless further guided by permit conditions, the follow-up reports will:

- Describe and assess the effectiveness of the methodology and actions taken to implement the follow-up program;
- Provide results of the related EMPs to assist in tracking and verifying environmental trends and in verifying the accuracy of Application/EIS conclusions related to significance;
- Describe and assess the effectiveness of any additional mitigation measures taken to eliminate or reduce effects unforeseen by the Application/EIS but identified by monitoring carried out as part of either the standard EMPs or follow-up program;
- Identify any emerging negative trends likely attributable to the Project identified by monitoring, carried out as part of the standard EMPs, or follow-up program;
- Describe proposed revisions to the follow-up programs to address emerging negative trends or to adjust monitoring programs, if required; and
- Verify the accuracy of the conclusions of the Application/EIS.



## 30.7 Roles and Responsibilities

IDM will ultimately be responsible for developing and implementing the various monitoring and follow-up programs. As described in Chapter 29, IDM would appoint individuals to positions that would play key roles in environmental management and monitoring of the Project. The Mine Manager would be responsible for ensuring implementation of and compliance with all environmental policies, plans, and programs. His/her support team would be assigned areas of responsibility to meet all requirements of the environmental monitoring and follow-up programs.

## 30.8 References

*Canadian Environmental Assessment Act*. 2012. S.C. 2012 c.19 s.52.

*Environmental Assessment Act*. 2002. C.43.

*Environmental Management Act*. 2003. SBC 2003. C. 53.

Metal Mining Effluent Regulation. 2002. SOR 2002-222.

Canadian Environmental Assessment Agency (the Agency). 2011. Operational Policy Statement Follow-up Programs under the Canadian Environmental Assessment Act. <https://www.ceaa-acee.gc.ca/default.asp?lang=En&n=499F0D58-1&pedisable=true>