



## **APPENDIX V**

### **CDF AND DIKE DESIGNS**

- V-1 Co-disposal Facility (CDF) Pre-Feasibility Study Design Report Update
- V-2 Pre-Feasibility Design of Dikes
- V-3 Independent Geotechnical and Tailings Review Board (IGTRB) Supporting Documents
- V-3.1 Community and Agency Letters regarding IGTRB
- V-3.2 IGTRB CVs
- V-3.3 IGTRB Report No. 1**
- V-3.4 IGTRB Report No. 2 – Review of CDF Design Report  
WSP Response to IGTRB Review of CDF Design Report  
IGTRB letter response to WSP responses

# Springpole Project Independent Geotechnical and Tailings Review Board

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March 24, 2024

First Mining Gold Corp.  
Suite 2070 - 1188 West Georgia Street  
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Attn: Stephen Lines  
Vice President, Sustainability

**Re: Springpole Project  
Inaugural IGTRB Meeting, November 10, 2023  
Preliminary Comments and Questions**

Dear Steve:

This letter presents preliminary observations and comments of the Springpole Project Independent Geotechnical and Tailings Review Board (IGTRB), following the 1st meeting held in Vancouver November 10, 2023. The purposes of the meeting were to:

- Introduce the IGTRB members and key technical contributors for the Springpole Project.
- Provide the IGTRB with an introduction and status update on the engineering for the project.

Jeff Reinson introduced the project team and meeting objectives. First Mining Gold (FMG) CEO Dan Wilton provided a background description of the company. Presentations were made to the IGTRB including:

- Environmental and communities background - Steve Lines (FMG).
- Summary of the geological setting and resource – Caroline Pienaar (FMG).
- Mine plan - Gordon Zurowski of AGP Mining Consultants.
- Open pit geotechnical - Anton Bloem (SRK).
- Tailings, waste management and water management concepts - Ganan Nadarajah and David Bleiker of WSP.
- Hydrogeological regime and water balance – Simon Gantry (WSP), Ganan Nadarajah and David Bleiker.

Due to time constraints, the IGTRB was unable to meet immediately following the technical information sharing to provide feedback. The IGTRB met on December 14, 2023, to discuss key project concepts. The present letter is intended to provide preliminary comments and identify issues for which the IGTRB

requests additional detail or clarification.

The Springpole Project is a potential low-grade, open pit gold mine located about 110 km NE of Red Lake, Ontario. The project is currently in the Environment Assessment process. A draft EA was submitted in May 2022. Feedback was received on the draft EA and a final submission is scheduled for July 2024. FMG is anticipating EA approval as early as H2 2025. The mine is projected to have a nine-year life, based on daily ore throughputs of up to 30,000 tpd. The indicated gold reserve is about 4.6 M oz., along with silver values.

Exploitation of the Springpole deposit is challenged by its location beneath a lake. Dykes will be required at two locations of the north basin of the lake to allow the open pit to be excavated in the dry. Tailings and mine waste are to be managed in a Co-Disposal Facility (CDF) on an area to the west of the open pit and the processing plant and other infrastructure will be located on land to the east.

Over the life of the mine, the total tonnage of tailings is estimated to be 101 Mt, with 81 Mt of NAG and 20 Mt of PAG tailings. Current material balance estimates are that waste rock will consist of about 146 Mt each of PAG and NAG classifications. The selected concept for the CDF is to use the NAG waste rock to construct embankments to form a North Cell, which would contain all the NAG tailings co-disposed with all the PAG waste rock, and a South Cell to contain the PAG tailings. Water would be ponded in the South Cell Pond to maintain submergence of the PAG tailings and to allow for pumping to the Water Management Pond that will be located near the plant. Process water will be reclaimed from the Water Management Pond to the mill and concentrator plant. The water balance presented indicated that there would be a surplus of water that would need to be treated for release.

The dam section proposed for the South Pond would be a downstream-constructed rockfill embankment with a GCL liner. The perimeter dams for the North Cell would comprise a rockfill Starter Dam, with a limited segment adjoining the South Cell lined with an upstream liner similar to the South Pond, then raised in stages by centreline construction. The rate of rise is estimated to be 6 m/year. An upstream, low permeability zone, formed by a tailings beach, is to be created to maintain saturation of the PAG waste rock. Quantity estimates presented indicated that, since there will be little waste rock available in the pre-production period, about 16 Mm<sup>3</sup> of rock will need to be quarried from an identified source within the CDF footprint for starter dam and site road construction.

The IGTRB has the following comments and questions regarding the concepts presented for the CDF:

- In the IGTRB's view, a straightforward arrangement to distribute slurry tailings by spigoting around the perimeter of the North Cell and placing PAG waste rock in the centre of the North Cell should be the base case. Haul road access to the PAG disposal could be via the Divider Dyke between the South and North Cells. This arrangement would provide wide sections of low permeability tailings surrounding the PAG waste deposit to maintain saturation of the PAG rock.
- The IGTRB recognizes that engineering for the co-disposal facility is at the EA stage and looks forward to future information sharing on how the NAG tailings and PAG waste rock are proposed to be co-disposed. If a mixing concept is considered it will be important to define how the tailings and waste rock streams are to be disposed in the North Cell. Numerous such strategies have been

proposed for other projects at smaller scales which clearly point to the need for investigation of a co-mingling mix design with the NAG tailings and PAG waste rock to optimize blends for barrier and cover/closure designs to manage Acid Rock Drainage and Metal Leaching (ARD/ML) from the CDF. It is also recognized that the bulk of these investigations will necessarily need to occur during the early stages of operations as the materials will not be available for testing until mining and processing have started. As such, the IGTRB supports the startup concept of distributing slurry tailings around the perimeter of the North Cell and placing the PAG waste rock in the centre of the North Cell, thus ensuring that all materials are fully contained within an engineered structure with adequate drainage and seepage control elements to ARD/ML are properly managed.

- As part of the feasibility level engineering, consideration should be given to bench scale testing to support development of co-mingled mix designs with the NAG and PAG waste streams of tailings and waste rock to optimize blends for barrier and cover/closure materials that prevent and control Acid Rock Drainage and Metal Leaching (ARD/ML).
- While the IGTRB is supportive of the concept for raising the North Cell embankment by centreline construction, it is noted that with an anticipated rate of rise of 6m/year this construction will be challenging. As such, as part of the Feasibility Study engineering, more engineering and staging detail will be required to demonstrate how the centreline raise will be constructed. Key considerations include: how will the zone of low permeable material (tailings) be sourced and placed? How will this be incorporated with the tailings beach? As part of the Feasibility Study design, the IGTRB requests that additional details be developed to demonstrate how the centreline raise will be constructed. A potential methodology for centreline construction may be to raise the crest in a near-continuous fashion, with perhaps 1 m or 2 m lifts thus simplifying filter placement. A vertical filter could be placed by excavating a trench down through each lift of NAG rock to raise the filter zone. To minimize the need to place fill over the tailings beach, tailings could be filled right up to the crest of each lift with minimal freeboard. Flood freeboard would be provided by the slope of the tailings beach and in the South Pond. Frequent tailings distribution line moves would be required.
- In the meeting, the IGTRB was informed that the water balance was based on full saturation of the tailing voids but not of the PAG waste rock voids. If this is the case, the water balance should be corrected to include saturation of the PAG waste. It is likely that with this correction the water balance may indicate a deficit rather than a surplus. This would have the advantage of perhaps not needing a water treatment plant. It may also, on the other hand, lead to higher makeup water needs. The potential for water shortage in a drought period should be investigated.
- The material balance of NAG and PAG waste rock depends on a good understanding and interpretation of the geochemistry. The IGTRB looks forward to a presentation on the NAG/PAG definitions and the sensitivity of these interpretations to the material balance. This information will be vital in the design of chemical stability with co-mingled mixtures. Sourcing and scheduling suitable rockfill for the starter and ongoing raises should be defined to an FS level. From the

information provided, it appears that only waste rock sourced from the east side of the pit may be suitable for construction, therefore other borrow sources will need to be considered for the project.

- The hydrogeological setting of the CDF appears favourable. The site is underlain by bedrock with a shallow overburden cover, in the order of 2 m on average. The bedrock beneath the CDF is interpreted as a fairly homogeneous mass, composed of mafic to intermediate metavolcanics and massive lava. The presence of a small inland lake at the CDF location indicates relatively low permeability. During operation the open pit will act as a groundwater sink. Surface seepage interceptor ditches with pumped sumps will be key to protecting water quality of the lakes.
- WSP requested that IGTRB comment on the adequacy of the planned site characterization program. From our brief review, the program appears to be comprehensive, however the IGTRB requests additional detail be provided regarding the geochemical characterization work to date. There may be some opportunity for economy if overburden is shallow in which case some drillholes could be eliminated in favour of test pits.
- During the meeting WSP stated that a depth of 4 m of water would be maintained in the South Cell. What is the reason for this? It is unlikely that tailings would become acidic if exposed for a short period of time. A much higher density may be achieved if the tailings were discharged subaerially. Could the South Cell be operated with a minimal pond volume?

The East and West Dikes are proposed to be constructed of rockfill with slurry wall (cement-bentonite / plastic concrete) cut-offs as the preferred methodology. The IGTRB supports this concept. The proposed next phase of site investigation, consisting of geophysical surveys and boreholes, appears appropriate.

The open pit rock mass appears to have been satisfactorily characterized to FS level, with the exception that there is insufficient data for the southern extension of the pit. A significant driver for the slope design (and economics) is the extent and quality of the “sand zone”. There are only a handful of coreholes in the south end of the pit, and of those, only a few penetrated this zone. While sufficient for current EA purposes, further delineation is needed to support an FS level design.

The IGTRB looks forward to further discussions with the design team. It will be critical to carry out review at relatively frequent intervals as the design concepts are being finalized.

Yours truly,

**Springpole Project Independent Geotechnical and Tailings Review Board**



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Mayhem Creek, LLC.

Springpole Project Independent Geotechnical and Tailings Review Board  
Meeting #1 – November 10, 2023  
March 24, 2024

A handwritten signature in blue ink, appearing to read 'W. G. Wilson', with a long horizontal flourish extending to the right.

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