

Summary

Name of mine	Hope Bay Project
Ownership	TMAC Resources Inc.
Location	68° 8' 15.3564" N 106° 36' 38.2032" W
Commodity excavated	Gold
Tailings Facility Status	Operational
Overview	<p>TMAC operates one active tailings impoundment area (TIA) at our Doris mine. The TIA has been used for tailings deposition since late 2016 and is currently in use. The TIA currently consists of two (2) dams, the North Dam and the South Dam. Construction of the North Dam was completed in 2012 and construction of the South Dam was completed in 2018. The TIA is used for storage of floatation tailings. The total tailings stream from TMAC's process plant comprises of floatation tailings (approx. 94% of the stream) and detoxified cyanide leach tailings (approx. 6% of the stream). The floatation tailings are considered geochemically benign, i.e. not potentially acid generating (NPAG), with a low neutral metal leaching potential. The current tailings disposal method is subaerial deposition of floatation tailings into the TIA, while the detoxified tailings stream is directed to the underground mine as part of ongoing mine backfilling activities. The TIA has a permitted design capacity of 18 MT. To accommodate this there are three containment Dams; North Dam, South Dam and West Dam. The North Dam has been constructed to its full final height. The South Dam will be constructed in two stages. Stage 1 which has been constructed will accommodate approximately 2.5 MT of tailings (existing capacity). Stage 2 will entail raising of the South Dam, using the downstream raise method, and building the West Dam. This will increase the permitted design capacity of the TIA to 18 MT. The TIA was designed in accordance with industry best practice as defined by the Canadian Dam Safety Association.</p> <p>Weekly inspections of the TIA are completed by site staff. An annual geotechnical inspection is carried out by the Engineer of Record. TMAC maintains a 'Hope Bay Project, Waste Rock, Ore and Mine Backfill Management Plan' and 'Hope Bay Project, Phase 2, Doris-Madrid Tailings Impoundment Area Operations, Maintenance, and Surveillance Manual' that provides the management framework for the TIA and are reviewed annually. Both documents are publicly available and have been approved for use by the Nunavut Water Board with input from intervening parties.</p>

Tailings Information

Tailings Dam Construction type (upstream/downstream /centre line)	Currently there are no dam raises on the north or south dams. Both dams are constructed entirely of quarry rock. The North Dam is a water retaining structure that utilizes a central frozen core to maintain the reclaim pond against its upstream slope. In contrast the South Dam is designed to have tailings deposited off the upstream face to create a beach. Future tailings deposition beyond 2.5 million tonnes (Stage 2) will require the South Dam to be raised with downstream methods to its ultimate crest elevation and the West Dam to be constructed for containment up to 18MT.
Name & location of tailings	TMAC operates one active tailings impoundment area (TIA) at our Doris mine. This TIA was a natural lake, Tail Lake, and was listed on Schedule 2 of the Metal Mining Effluent Regulations (MMER) specifically for use as a tailings facility.
Size	The TIA is approximately 81 ha
Construction materials	North Dam: Frozen core dam with secondary Geosynthetic Clay Liner (GCL) South Dam: Frozen foundation with GCL liner Both dams are constructed entirely of quarry rock.
Type of material deposited in tailings facility	Flotation tailings
Toxicity of deposits in tailings facility	Flotation tailings from all deposits are classified as non-Potential Acid Generating (non-PAG).
Current wall height/ Projected wall height	North Dam Max Height :11m, South Dam Max Height: 6m (Stage 1), 14m (Stage 2). West Dam 5m (Stage 2)
Current crest length	North Dam Crest Centerline Length: 220m, South Dam Crest Centerline Length: 515m
Expected final crest length	No Change to North and South Dam. West Dam Crest Centerline Length: 470m
Year of construction, decommission, life expectancy	The North Dam was constructed during the winter months of 2011 and 2012. The expected design life of the dam is 25 years or greater. Phase 1 of the South Dam was constructed between January and July of 2018 and is designed to remain in perpetuity.
Current and maximum storage capacity	Stage 1 of the TIA is designed to hold approximately 2.5 MT of tailings. Stage 2 will increase the storage capacity to 18 MT.
Safety standards followed in construction	The design has been prepared in accordance with industry best practice, which includes, but is not limited to the Canadian Dam Safety Guidelines, as documented by the Canadian Dam Association (CDA) (CDA 2007, 2013), the Technical Bulletin on Application of Dam Safety Guidelines to Mining Dams (CDA 2014), various Mining Association of Canada guidelines (MAC 2011a, b, MAC 2017) and publications and bulletins published by the International Commission of Large Dams (ICOLD). In addition, in response to the 2014 Mount Polley tailings dam failure in British Columbia, and the 2015 Samarco tailings dam failure in Brazil, the design takes into consideration the key recommendations as outlined in the subsequent Independent Expert Engineering Investigation and Review Panel Report (IEEIRP 2015), as well as the recent BC Dam Safety Regulations (B.C. Reg. 40/2016) and the guidelines for Site Characterization for Dam Foundations in BC (APEGBC 2016).

Details of workers/Third parties/Operations approximate to the downstream area	There is infrequent need for personnel to monitor the dams and locations in the downstream area. There are only short and infrequent periods of time where people are present in the downstream area.								
Seismic activity to date	None								
Seismic Design Criteria (factor of safety / event return period)	<p>The Doris Project falls within the “stable” zone of Canada. This region has too few earthquakes to define reliable seismic source zones. The minimum factors of safety (FOS) that are required to be achieved are defined by CDA (2014). See below:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #e0e0e0;"> <th style="text-align: left;">Component</th> <th style="text-align: left;">Criteria</th> </tr> </thead> <tbody> <tr> <td>Maximum design earthquake</td> <td>Halfway between 1:2,475 and 1:10,000 AEP; PGA of 0.036 g (South Dam) and 0.043 g (west Dam)</td> </tr> <tr> <td>Stability FOS (Static)</td> <td>1.3 during construction 1.5 during operation and closure 1.2 to 1.3 partial or rapid drawdown</td> </tr> <tr> <td>Stability FOS (Pseudo-Static)</td> <td>1.0 during earthquake 1.2 post earthquake</td> </tr> </tbody> </table>	Component	Criteria	Maximum design earthquake	Halfway between 1:2,475 and 1:10,000 AEP; PGA of 0.036 g (South Dam) and 0.043 g (west Dam)	Stability FOS (Static)	1.3 during construction 1.5 during operation and closure 1.2 to 1.3 partial or rapid drawdown	Stability FOS (Pseudo-Static)	1.0 during earthquake 1.2 post earthquake
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Details of raises to date	None to date								
Last inspection date	The last annual inspection by the Engineer of Record was August 2019. Daily, weekly and monthly inspections as specified by the Engineer of Record are conducted by TMAC.								
Annual inspection	Annually, the Engineer of Record undertakes a physical inspection of the TIA. This inspection is carried out in the summer and culminates in a detailed annual geotechnical inspection (AGI) report. The last annual inspection was August 2019.								
Details of ongoing monitoring/surveillance	The surveillance elements for the Doris TIA includes: Visual observation; Instrumentation (thermal, deformation and water balance); Water quality monitoring; and Tailings geochemistry monitoring.								