



MINERA SAN CRISTÓBAL S.A.

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# FAILURE ANALYSIS OF THE NORTH CONTAINMENT BERM WILA K'HARA TAILINGS STORAGE FACILITY

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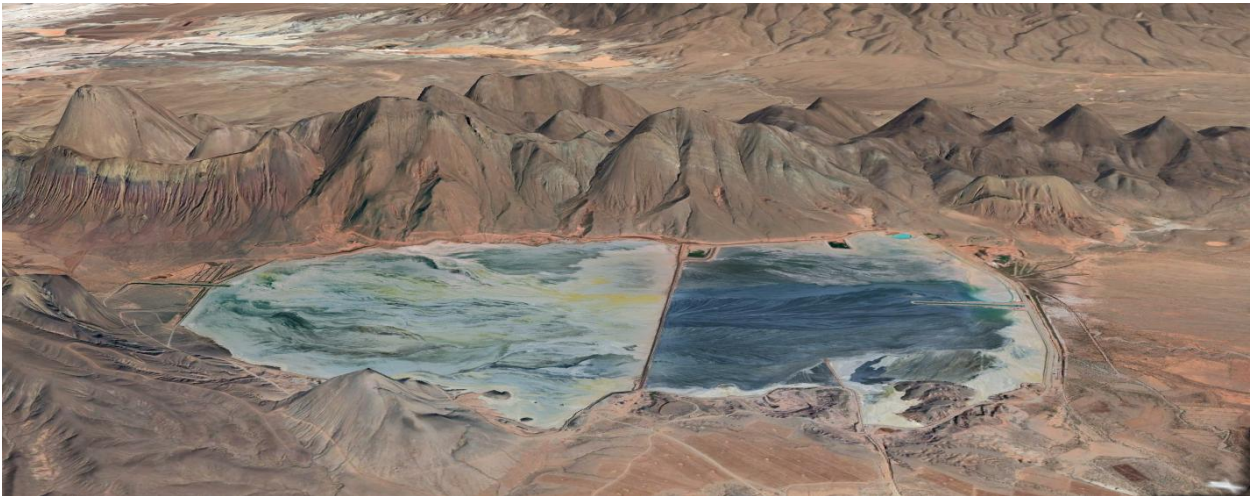
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## 1. Geomorphology

The WK TSF is confined within an endorheic basin with drainage directed internally toward the facility. Around the entire perimeter, any containment breach would discharge against counter-slope topography, providing natural confinement of potential flows.

Under no circumstances would a berm failure release tailings or effluents to rivers or watercourses outside the operational area delineated by the perimeter fence..



*1 Satellite image of WK TSF (reference).*

## 2. Tailings Characteristics

Material characterization: ground-ore slurry, classified as non-plastic to low-plastic silt with clay traces (USCS: CL, ML-CL). Median particle size  $D_{50} \approx 0.030$  mm.

Moisture content: 10–35%. For layers deeper than 2 m, the tailings are considered saturated.

Bulk density: increased from 1.50 to 1.65  $t/m^3$  due to natural consolidation and compaction performed by mud masters (tracked, low-ground-pressure dozers).

### 3. Failure Mode Analysis

Two principal failure modes are considered:

- Overtopping: Unlikely, given low water inventories, high pumping capacity, and the ability to discharge to two independent cells.
- Loss of shear strength: Seismic stability is assessed using a probabilistic method with a 475-year return period. Larger, lower-probability seismic events could adversely affect the stability of containment structures.

### 4. Water Inventory

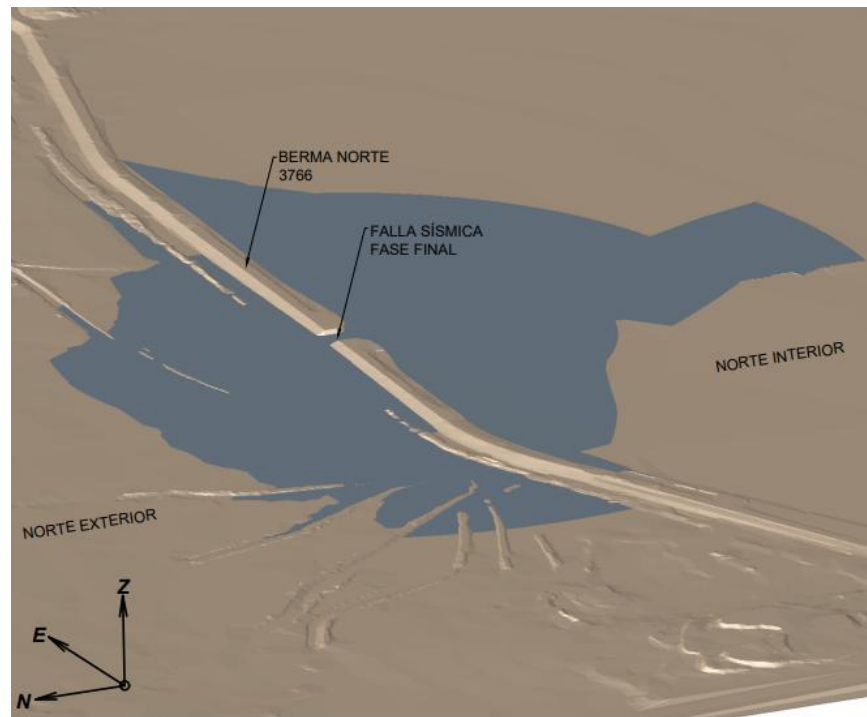
Very low. For most of the year, ponded water covers <1% of the tailing's beaches. Efficient water-return systems pump process water back to the plant. Fine sludges that are difficult to flocculate are not generated, minimizing long-term suspended solids. High evaporation further reduces water inventories and rapidly dries the moist tailings beaches.

### 5. Breach Analysis

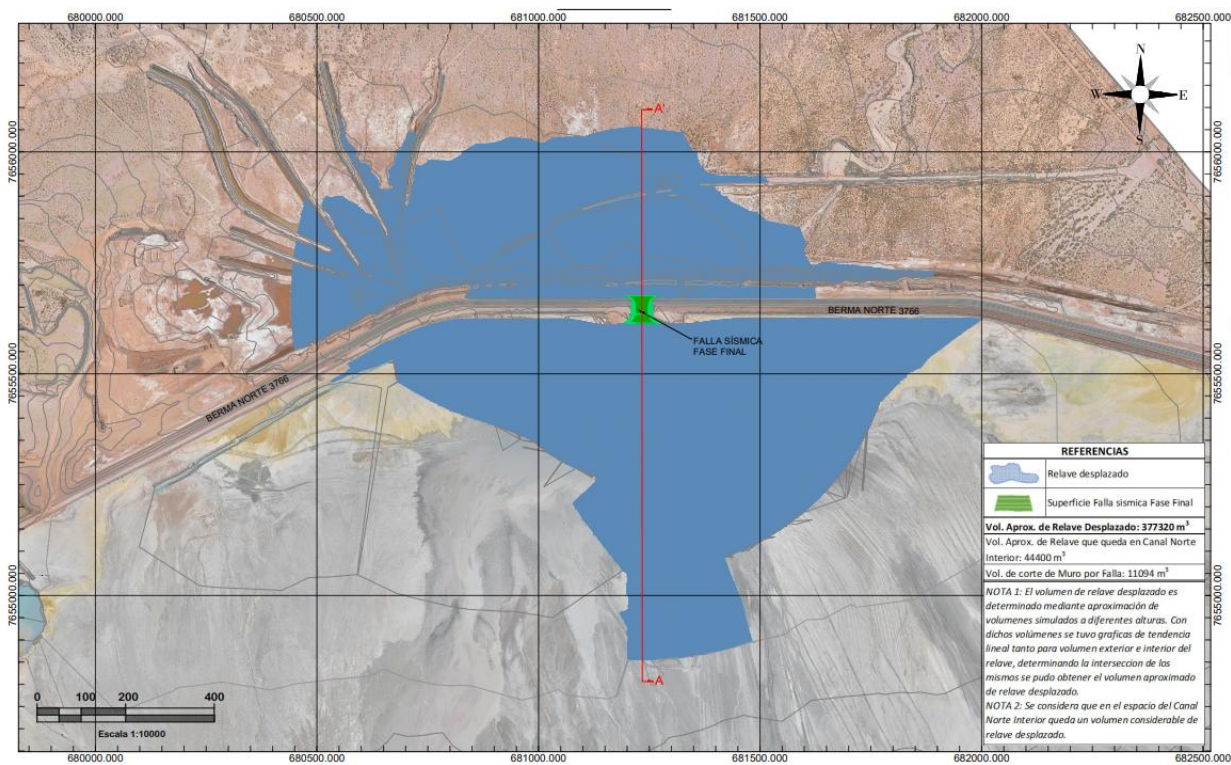
The north berm is the tallest section and intermittently retains process water when discharge is directed to this sector; therefore, its hypothetical failure represents the worst-credible case.

Both tailings and supernatant water released by a failure of the North Berm (specifically near the North Inner Channel sector) would remain within the operational area and not overtop the perimeter fence separating the facility from communal lands. Consequently, no population centers or public infrastructure would be placed at risk.

The anticipated tailings flow behavior, given a failure of the North berm in the North Inner Channel sector, is depicted as follows:



3D perspective: indicative breach area of the North Berm (reference).



Mapped area potentially affected by a North Berm failure (reference).

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Summary of deposited volumes of tailings and supernatant water:

	SCENARIO	DISPLACED VOLUME	ELEVATION
		m <sup>3</sup>	m a.s.l.
1	Discharge to the opposite South Cell <b>with no</b> stored rainfall.	377,320.00	
2	Discharge to the North Cell with stored process water (decanted tailings water).	440,000.00	3,758.60
3	Discharge to the North Cell with stored process water (decanted tailings water) and stored downstream rainfall during a low-precipitation year.	791,323.00	3,759.20
4	Discharge to the North Cell with stored process water (decanted tailings water) and stored downstream rainfall during a very rainy year.	1,628,599.00	3,760.00

## 6. Consequence Classification for the Wila K'hara TSF

In accordance with ICMC classification guidelines, the incremental losses associated with a hypothetical failure of the MSC tailings containment berm are categorized as LOW.



Dam Failure Consequence Classification	Potential Population at Risk	Risk Potential Loss of Life	Incremental losses		
			Environment	Health, Social and Cultural	Infrastructure and Economics
<b>Low</b>	None	None expected	Minimal short-term loss or deterioration of habitat or rare and endangered species.	Minimal effects and disruption of business and livelihoods. No measurable effect on human health. No disruption of heritage, recreation, community or cultural assets.	Low economic losses: area and infrastructure or services. < <b>US\$1M</b>
<b>Significant</b>	1-10	Unspecified	No significant loss or deterioration of habitat. Potential contamination of livestock/fauna water supply with no health effects. Process water low potential toxicity. Tailings not potentially acid generating and have low neutral leaching potential. Restoration possible within 1 to 5 years.	Significant disruption of business, service or social dislocation. Low likelihood of loss of regional heritage, recreation, community, or cultural assets. Potential for health effects.	Losses to recreational facilities, workplaces, and infrequently transportation routes. < <b>US\$10M</b>

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<b>High</b>	10–100	Possible (1–10)	Significant loss or deterioration of critical habitat or rare and endangered species. Potential contamination of livestock/fauna water supply with no health effects. Process water moderately toxic. Low potential for acid rock drainage or metal leaching effects of released tailings. Potential area of impact <b>10 km<sup>2</sup> – 20 km<sup>2</sup></b> . Restoration possible but difficult and could take <b>&gt; 5 years</b> .	<b>500–1,000</b> people affected by disruption of business, services or social dislocation. Disruption of regional heritage, recreation, community, or cultural assets. Potential for short-term human health effects.	High economic losses affecting infrastructure, commercial facilities and communities. Moderate relocation/compensation of communities. <b>&lt; US\$100M</b>
<b>Very High</b>	100–1,000	Likely (10–100)	Major loss or deterioration of critical habitat or rare and endangered species. Process water is highly toxic. High potential for acid rock drainage or metal leaching	<b>1,000</b> people were affected by disruption of business, services or social dislocation for more than one year. Significant loss of national heritage, community or cultural assets. Potential for significant long-term human health effects.	Very high economic losses to important infrastructure (e.g., highway, industrial, municipal facilities), high relocation/compensation to communities. <b>&lt; US\$1B</b>





			effects from released tailings. Potential area of impact <b>&gt; 20 km<sup>2</sup></b> . Restoration or compensation is possible but very difficult and requires a long time ( <b>5 years to 20 years</b> ).		
<b>Extreme</b>	> 1.000	Many (>100)	Catastrophic loss of critical habitat or rare and endangered species. Process water is highly toxic. Very high potential for acid rock drainage or metal leaching effects from released tailings. Potential area of impact <b>&gt; 20 km<sup>2</sup></b> . Restoration or compensation in kind is impossible or requires a very long time ( <b>&gt; 20 years</b> ).	<b>5,000</b> people have been affected by disruption of business, services or social dislocation for years. Significant national heritage or community facilities or cultural assets destroyed. Potential for severe and/or long-term human health effects.	Extreme economic losses affecting critical infrastructure or services (e.g., major industrial/municipal facilities for dangerous substances), very high relocation/compensation to communities and very high social readjustment costs. <b>&gt; US\$1B</b>