



SAFETY AND SECURITY OF OUR TAILINGS STORAGE FACILITIES



At First Quantum, we take the design, construction and management of our Tailings Storage Facilities (TSFs) very seriously, from the Board down to the operator level. We have long recognised potential TSF failure as one of the Company’s most significant risks and have conducted regular risk assessments of all our existing and planned TSFs. First Quantum’s Board and management teams remain focused on the importance of TSF design, operation and management.

As CEO and Chairman, I am personally involved and take a close interest in the management and operation of our TSFs, demanding the highest level of expertise throughout the whole process from design to closure. I am updated regularly on the operation of our TSFs and intervene directly as and when necessary. This brief note is to inform stakeholders of our company-wide efforts to ensure that all our TSFs are operating conservatively and well within the accepted guidelines as developed by the world’s leading practitioners.

Philip K. R. Pascall
Chairman of the Board and Chief Executive Officer

April 2019

Location and number of TSFs owned and operated by First Quantum

COUNTRY	ACTIVE	CLOSED
Australia	1	
Canada		9
Finland	1	
Mauritania	3	
Panama	1	
Spain	1	
United States of America		3
Zambia	3	1
Total	10	13

COVER PAGE:
NORTHERN STARTER
WALL CONSTRUCTION
AT COBRE PANAMA



Tailings Storage Facility Design

First Quantum's approach to TSF management is to design TSFs appropriate for local conditions and the material to be deposited.

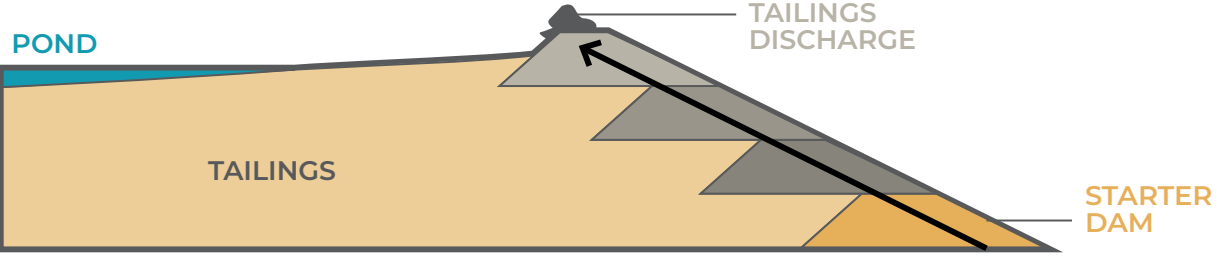
DESIGN

First Quantum's TSFs are designed in accordance with the guidelines of the Australian National Committee on Large Dams (ANCOLD), which conform to the guidelines of the International Council on Metals and Mining (ICMM) and the Canada Dam Association (CDA).

When determining the appropriate type of TSF for a project, it is important to consider local conditions and the physical and engineering properties of the tailings. Generally, tailings from hard rock mines (e.g. copper) behave differently to tailings from other types of mining. Copper tailings typically settle, drain, consolidate and gain strength. In comparison, iron ore tailings are generally weaker, exhibiting high plasticity, high liquidity and high moisture content, therefore behaving quite differently. In hard rock mining, cyclones separate the tailings into a coarse and fine fraction on the embankment during deposition. Preferential deposition of the cyclone underflow onto the embankment creates a free draining, competent and stable construction material while the fine fraction, and the majority of the water delivered with the tailings, flows towards the centre of the TSF. In this way, the embankment remains dry as defined by the phreatic surface (level of saturation) and the embankment stability remains well above the lower design limit.

Based on these properties, First Quantum has adopted two approaches to embankment design. These designs are industry best practice and used widely and successfully in hundreds of mining operations around the world. However, it must be emphasised that regardless of the design and construction, it is important that the TSF is operated in accordance with the design constraints. First Quantum's Board and its engineering staff work with the operators of each TSF (i.e. each project) to manage the facility according to the constraints of the design.

Personnel involved in day to day operations at our TSFs are regularly briefed on the latest developments in TSF design, operation and risk management.



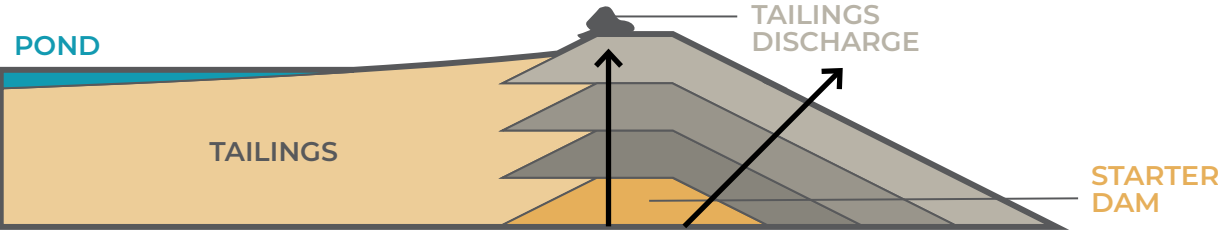
The diagram shows a cross-section of a tailings storage facility. On the left is a 'POND' containing 'TAILINGS'. On the right is a 'STARTER DAM'. An arrow labeled 'TAILINGS DISCHARGE' points from the pond towards the dam. The embankment is shown as a series of stepped layers, indicating the progressive construction of the dam structure.

UPSTREAM
Deposition of the cyclone underflow upstream of the existing embankment centre line in lifts using the beached (sub aeri ally deposited) tailings as support. The embankment crest line progressively moves in an upstream direction. The rate of rise of the embankment is typically maintained at less than 2m per year to allow the beached tailings to desiccate and gain strength. This method of construction is used extensively around the world and within the First Quantum group. Properly executed, upstream construction can provide an economical embankment with a high factor of safety.

Kansanshi TSF 1
Upstream construction using cycloned tailings. The TSF was designed to have a rate of rise of less than 2m per year (and in practice is considerably lower than this).

Kansanshi TSF 2
Upstream construction using cycloned tailings. The TSF rate of rise is around 1m per year.

Sentinel TSF
Upstream construction over a 17 km long embankment. The TSF has a rate of rise of 2m per year.



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CENTRELINE
Centreline construction is where the existing embankment crest line is maintained. The majority of the placed cyclone underflow is supported by natural ground on the downstream side of the embankment. This method of construction is often considered, but not proven, to provide a higher factor of safety than upstream construction.

Cobre Panama TSF
Centreline construction is an inherently safe form of construction.



Tailings Storage Facility Operation and Monitoring

We manage our TSFs in accordance with the design and operating conditions and constraints.

OPERATIONAL CONTROLS

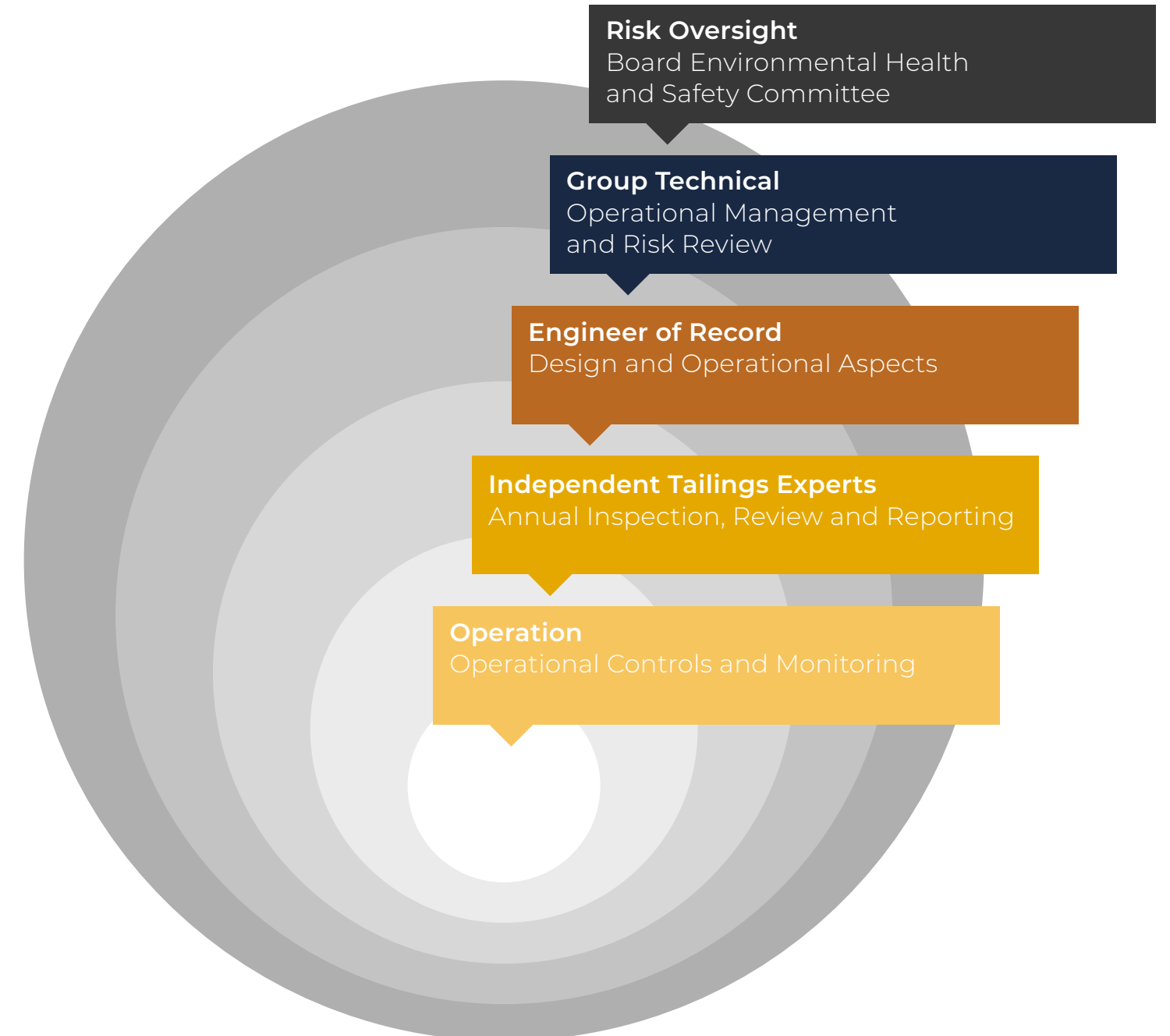
The following operational controls are in place at each of our TSFs:

- TSF management review and risk oversight by the Environment, Health & Safety Committee of the First Quantum Board
- Quarterly or annual inspections, risk review and reporting by external specialist (Engineer of Record)
- Appointment of competent persons at the mine to manage facility with all reporting directed to the Mine Manager
- Use of approved operating manuals prepared for each TSF
- Regular inspection by the day to day operators with overview from senior management
- Close monitoring of the volume of water held in the TSF with particular attention to embankment freeboard and drainage
- Regular surveys and levelling on all embankments
- Use of drones for aerial surveillance of the TSF
- The installation of sophisticated instrumentation including piezometers (to measure the presence and level of the phreatic surface), slope indicators and settlement gauges to provide a detailed picture of the developing embankment
- Interpretation of piezometric and associated data by external consultants on an annual basis or more frequently if determined by site conditions
- Embankments regularly inspected for erosion, seepage and slumping
- Groundwater quality monitored via peripheral water monitoring bores
- Group technical staff regularly inspects the TSFs and review the operations with mine management. Recommendations are prepared to improve all aspects of the operation of the facilities

CLOSURE

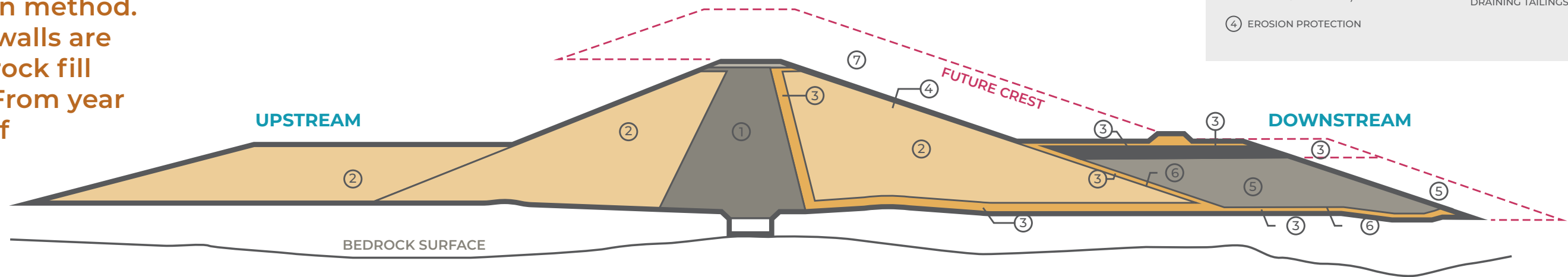
Our closed sites have shown decades of stability and are treated with the same level of scrutiny as our operating sites with ongoing management including regular geotechnical inspections, dam safety risk assessments, monitoring and third party reviews.

Dam Safety Management



Cobre Panama Tailings Storage Facility

The Cobre Panama TSF is raised using the centreline construction method. The embankment starter walls are constructed of earth and rock fill to a high factor of safety. From year 3 of operations the crest of the embankments will be progressively raised using cycloned coarse tailings.



MATERIAL TYPES	
① CORE/IMPERVIOUS (SAPROLITE)	⑤ ROCKFILL
② EMBANKMENT SHELLS (SAPROLITE AND WASTE ROCK)	⑥ FINE ROCKFILL
③ FINE FILTER (CHIMNEY DRAIN / DRAINAGE BLANKET)	⑦ COARSE FREE DRAINING TAILINGS
④ EROSION PROTECTION	

DESIGN

- The three key risk areas addressed in the TSF design were:
 - Seismic** - foundation weakening, filter system disruption, liquefaction
 - Climatic** - decant structure or spillway failure, filter blockage, extreme rainfall
 - Operational** - failure to maintain freeboard
- TSF design was subject to internal and external review by DE Cooper and Associates (DECA) and Klohn Crippen Berger (KCB). DECA has been involved in the design and ongoing management of TSFs of all types around the world for over 45 years. KCB has over 60 years' experience in the design and construction management of many of the largest tailings storages in USA, Canada and elsewhere including storages of similar design and in similar environments to Cobre Panama
- TSF Seismic risk was reviewed by two reputable organisations, Geo Consultores

S. A. and the Geoscience Institute of the University of Panama, to confirm potential loadings and design values

- Factors of safety used in design are in accordance with recommendations provided by the Canadian Dam Authority (CDA) and internationally accepted
- The same construction method has been used successfully in similar climate, tectonic and ambient conditions, e.g. Hidden Valley (PNG), in high rainfall areas and Highland Valley and Gibraltar (Canada) and Kennecott (USA), all in tectonically active zones

CONSTRUCTION

- DECA will approve the TSF Construction Report in the role of Engineer of Record

OPERATION

- The design of the TSF provides for the northern and eastern embankments to be raised progressively using the 'centre line' method of embankment construction where the coarse free draining tailings are

placed downstream of the embankment centreline and the balance of tailings deposited into the storage. The design provides for cyclone overflow to be sub-aerially deposited into the storage. Under normal operations a 600 m long beach will be maintained upstream of the embankments. This is intended to prevent water from ponding directly against the upstream faces of the embankments and hence minimise the amount of water which must be drained from the embankments

- The average annual rainfall at the TSF site is around 4.5m and the catchment area is approximately 20km². Captured rainfall and water released from the settling tailings will provide the primary source of water for the Mill. Significantly more water will be collected in the TSF than is required by the Mill, requiring that water is continuously discharged to the downstream environment. Permits to allow for this discharge are in place. The majority of the excess water will be discharged via a penstock and tunnel constructed through

the western abutment of the northern embankment. The penstock and tunnel system is designed to allow the controlled discharge of water captured during the 1:100 year storm event. Backup for the tunnel is provided by the large capacity pumps designed to return water to the Mill. The discharge from these pumps can be redirected to discharge downstream if necessary. As with all major storage facilities, the TSF will be equipped with an emergency arrangement designed to prevent the embankments from overtopping

- Construction and operation of the TSF will be under the control of an experienced and dedicated management team reporting directly to the General Manager. Regular audits will be carried out to confirm the management practices put in place to control the operation are being followed
- The following aspects will be monitored using a combination of direct measurement (dm) and remote devices (rd)

capable of reporting in real time:

- Production of cyclone underflow (dm)
- Quality of underflow (dm)
- In situ density of placed underflow (dm)
- Pool level and freeboard (rd)
- Pool water quality (rd)
- Embankment settlement gauges (rd)
- Embankment piezometric sensors (rd)
- During the operating life of the TSF a professional engineer will be appointed to audit construction activities and maintain Construction Record Reports to the required standard
- A specialist tailings consultant will be retained to conduct regular TSF inspection and reporting
- Reports on the TSF will be presented to the First Quantum Board for review and approval



Certain of the information contained in this document constitutes “forward-looking statements” within the meaning of the Private Securities Litigation Reform Act of 1995 and forward-looking information within the meaning of applicable Canadian securities legislation. Such forward-looking statements and information include statements regarding operational controls and procedures at First Quantum’s TSFs and the planned TSF for the Cobre Panama project. Often, but not always, forward-looking statements or information can be identified by the use of words such as “plans”, “expects” or “does not expect”, “is expected”, “budget”, “scheduled”, “estimates”, “forecasts”, “intends”, “anticipates” or “does not anticipate” or “believes” or variations of such words and phrases or statements that certain actions, events or results “may”, “could”, “would”, “might” or “will” be taken, occur or be achieved. First Quantum undertakes no obligation to update forward-looking statements or information as a result of new information after the date of this document except as required by law.

First Quantum’s operations, including the TSFs at each of its projects, and results are subject to a wide variety of risks, including those set out under the heading “Risk Factors” in First Quantum’s annual information form, which is available under First Quantum’s profile at www.sedar.com. With respect to risks related to First Quantum’s TSFs, see in particular the risks outlined under the heading “Environmental, Health and Safety Risk Factors”.

More detailed descriptions of the tailing storage facilities for each of First Quantum’s material mineral properties, being the Kansanshi, Sentinel, Ravensthorpe and Cobre Panama projects, are available in the respective technical reports prepared in accordance with National Instrument 43-101 – Standards of Disclosure for Mineral Projects, which are available under First Quantum’s profile at www.sedar.com.



www.first-quantum.com