

TAILINGS

Effective stewardship

Mike Jacobs from Goldcorp and Resa Furey from MWH Global discuss water and tailings stewardship at Goldcorp's operations

The TSF spillway at Goldcorp's Marlin mine in Guatemala is a dual-purpose facility designed to release excess water from extreme storm runoff. It also allows for controlled discharge when the water meets appropriate standards

Goldcorp considers water and tailings to be two areas that pose significant risk to the success of its mining operations. Without water the company cannot operate, and the communities it operates in cannot survive. Water isn't a resource that the company wants to compete for, so it works to find ways to share water in a manner that serves everyone's needs.

Tailings are a necessary by-product of mining activities and an enduring feature – long after the mining activities cease – at most of the sites. Goldcorp chooses to take a long-term view with respect to both these issues and has implemented two stewardship programmes aimed at further improving operations and avoiding mistakes caused by short-term thinking.

The stewardship programmes cover three key areas:

- Conserving energy;
- Conserving water; and
- Managing geowaste materials such as tailings and waste rock.

Since mining operations are often large users of resources (energy and water) and are responsible for moving large volumes of geowaste materials, these are important issues. Energy and water conservation are covered under Goldcorp's Water Stewardship Strategy, and tailings management is covered under its Tailings Stewardship Program (TSP).

Stewardship is the responsible oversight and protection of some-



thing considered worth caring for and preserving. In keeping with the definition put forward in a paper by Martin et al that was presented at the 2002 Tailings and Mine Waste conference, for Goldcorp's purposes tailings stewardship encompasses design, construction, operation and management of a tailings facility from concept to closure.

The TSP is aligned with Goldcorp's six-pillar framework (grow people, safety, sustainability, safe production, reserves and margins) used to manage the global entity. Since all aspects – or pillars – of the business are important and any one of them can potentially impact performance when not managed well, Goldcorp strives to integrate excellent water and waste stewardship into how it runs its business.

The immediate goal of the TSP is to reduce risks associated with Goldcorp's portfolio of dams and tailings storage facilities (TSFs). Getting there involves identifying what it has, educating staff and adopting best practices to reduce risks and, where possible, costs.

TAKING STOCK

Through annual safety reviews (equivalent to the Dam Safety Review of all dam conditions as defined by the Canadian Dam Asso-

ciation), Goldcorp is using a standardised approach to inspect all of its dams and TSFs while recording concerns related to construction, operation, expansion and reclamation. Reviews are completed by a third-party engineer using a comprehensive list of potential concerns so that issues can be quickly and proactively addressed.

While many of these practices are already in place, administering those practices intentionally and under a uniform stewardship umbrella allows the process to closely align with how the company runs the rest of the business.

For example, mining companies have long had standardised asset-management and maintenance schedules for mine machinery; this same approach and discipline is now also being applied to Goldcorp's waste products and processes.

Comprehensive tailings stewardship looks not only at the stability of the dam but also at how each site's water and geochemical balance contribute to tailings risks – and all of this information is held in a single data repository so that it can be used to inform the company's decisions. Accountability for implementing the TSP is held dually at global and operational levels (mine general manager).

In 2012, a tailings filter plant was commissioned at the Marlin mine, allowing filtered tailings to be used as open-pit mine backfill



LEARN, GROW, TRAIN... REPEAT

As leaders in the industry, it is incumbent on Goldcorp to educate its operators to understand requirements for safe impoundment operations as well as the technical reasoning for the requirements.

All of Goldcorp's active mines will designate a person with appropriate authority and suitable TSF experience to carry out the TSP. Further, this person will be accountable to Goldcorp senior management for the programme's proper implementation.

And it doesn't stop there – sharing these learnings helps the industry as a whole to learn, grow and educate the next generation of operators and managers.

Through this continuous learning, the focus is sharpened on what counts: safe operations and maintenance (O&M) practices for all of Goldcorp's TSFs and dams. Educating the company's staff allows for the implementation of best practices as daily practices, and sharing the learnings will help the industry perform better, benefiting all.

REDUCE RISKS AND, WHERE POSSIBLE, COSTS

Reducing risks often means disposing of geowaste in a manner as cost-efficient and effective as possible. Other times it means adding costs such as additional personnel or installing redundant systems to reduce costs in the long term.

By proactively identifying risks, Goldcorp generally finds opportunities for cost reductions by adopting new technologies, value engineering and making operational improvements.

Furthermore, by understanding risks the company understands the implication of upsets and can proactively reduce the severity of any



The Marlin mine spillway inlet shows the top of the spillway wall and the sluice gates for controlled discharge

upset condition. Managing geowaste must be done in a manner that is not wasteful.

TSP implementation started in July 2015 with the stewardship review (independent engineering reviews) at Goldcorp's operating mines in North and Latin America and will extend to inactive sites beginning in 2016.

Goldcorp is focused on integrating stewardship into its culture and making it part and parcel of its business rather than a box to check. The company's intention is to make tailings stewardship part of its well-run business and to establish practices that, when adopted widely, will help the industry as a whole to perform better.♥

Mike Jacobs is director, water and tailings, at Goldcorp and Resa Furey is mining-market analyst at MWH Global. See: www.goldcorp.com and www.mwhglobal.com

Thickened tailings discharge at Goldcorp's Musselwhite mine in Ontario, Canada. Thickening the tailings allows the mine to recover process water more readily and reduces the height of the dam needed for tailings containment



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