

GBA's Tailings EoR Task Force Mission, Workshop Objectives & Insurer Concerns Pertaining to Tailings Work

Kimberly Finke Morrison, P.E., R.G.
Morrison Geotechnical Solutions, Inc.
Lakewood, CO



Engineer of Record (EoR) – A Simple & Resolute Concept

- Applied throughout the western world for civil works construction
- A single person responsible for engineering design



The EoR Concept – Challenged

- How can the concept be applied to a transient design? One that implements observational approach with a construction life that covers decades?
- Two recent and significant tailings dam failures have brought the EoR concept into question



TSF ≠ “Conventional” Construction

- Ever-expanding
- Undesirable expense throughout life of mining operations and post-closure
- Can have service lives that transcend generations
- TSFs Ownership transitions
- Affected by a changing “state-of-practice”



Mount Polley TSF Failure (Canada) – August 4, 2014

- Imperial Metal's copper and gold mine near Likely, B.C.
- Occurred within the Perimeter Embankment
- Released 10B liters of water and 4.5 Mm³ of metals-laden tailings
- Catalyst for review of the EoR concept



Samarco's Fundão TSF Failure (Brazil) – November 5, 2015

- Iron ore mine in State of Minas Gerais (JV Vale & BHP)
- Liquefaction flowslide released tailings into town of Bento Rodrigues
- >600 people lost their homes
- 19 people died



GBA's Tailings EoR Task Force

- In late 2015, an employee of a GBA member firm requested guidance from GBA on EoR for tailings
- Creation of Task Force in January 2016 driven by the ever-increasing levels of risk facing member firms performing tailings-related work

Our Mission:

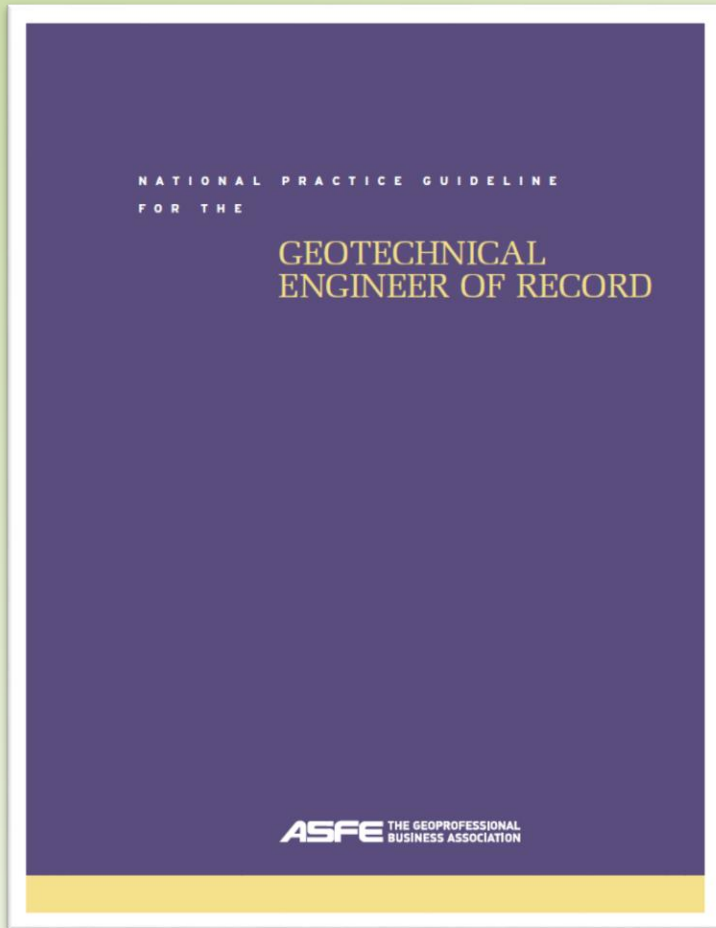
Raise awareness among the GBA member firms that perform tailings storage facility design services of the concerns and issues related to Engineer of Record (EoR) for these ever-changing facilities.

GBA's Tailings EOR Task Force

- Our mandate:
 - Perform outreach to industry, other organizations, and regulatory agencies, as appropriate, for feedback
 - Develop guidance documentation, including defining roles/responsibilities of the EoR and implementation of a transfer process for EoR of TSFs
- Published a GBA Business Brief in late September 2016
- Authored an article for *GEOSTRATA* magazine outlining issues (to be published in Spring 2017 issue)



GBA's National Practice Guideline for the GER



- Published in 1993 (updated in 2008)
- Intended to clarify role of the GER in “**conventional**” design/bid/build construction projects
- *“the geotechnical engineer must provide certain basic services to be considered the GER”*
- Promotes “continuity of service” from design through construction completion

Tailings EoR Workshop – Purpose

(1 of 2)

- Learn from each other through experience and case histories
- Learn from and obtain alignment with other organizations on the issues surrounding EoR for TSFs:
 - United States Society on Dams (USSD)
 - Association of State Dam Safety Officials (ASDSO)
 - Canadian Dam Association (CDA)
 - British Columbia Ministry of Energy & Mines (BCMEm)
 - Canadian Oil Sands Industry
 - Various state agencies



Tailings EoR Workshop – Purpose

(2 of 2)

- Review results of the detailed pre-workshop survey



- Participate in facilitated workshops
- Employees of member and non-member firms of GBA invited to participate for betterment of the industry as a whole

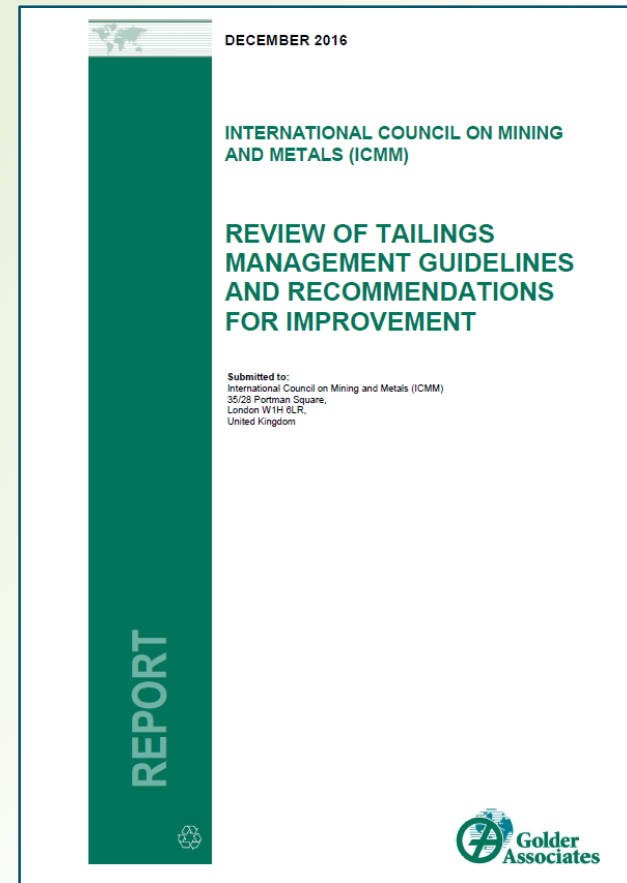
ICMM – TSF Position Statement

In December 2016, released position statement establishing ICMM's framework for the governance of TSFs:

1. Accountability, responsibility, and competency - Accountability for the overall governance of TSFs resides with the owners and operators.
2. Planning and resourcing - The financial and human resources needed to support tailings management must be maintained throughout a facility's life cycle.
3. Risk management - Risk management comprises risk identification, an appropriate control regime – including involving suitably qualified and experienced experts in risk identification and analysis – and verification of performance.
4. Change management - Risks associated with changing management must be assessed, controlled, and communicated to avoid inadvertent compromise of the TSF integrity.
5. Emergency preparedness and response - Processes need to be in place to recognize and respond to impending failure and mitigate the potential impacts.
6. Review and assurance - Internal and external review processes must be in place such that risks can be comprehensively assessed and continually improved.

ICMM's Supporting Report Contains Elements Related to EoR

- Engineer of Record definition:
 - *“The Professional Engineer responsible for ensuring that the tailings facility is designed, constructed, operated and decommissioned with appropriate concern for health and safety and the environment. The Engineer may in some cases be an employee of the mining company.”*
 - *“Design, construction and operation, as a minimum, should take place under the supervision of a suitably qualified team led by an [EoR]. The [EoR] may be changed during the life of the facility but the mine owner must ensure that this process of transition takes place within a structured change management process that ensures the new [EoR] internalizes the background and basis for the design.”*



In the spirit of GBA's tradition
of shared experiences...

CONFRONTING RISK FOR OUR FIRMS AND OUR CLIENTS:
A TRADITION OF SHARED EXPERIENCE

Mount Polley put industry in a poor light...

Mount Polley mine tailings spill: Imperial Metals could face \$1M fine

Company ordered to stop pollution immediately and provide environmental impact assessment

Mount Polley spill: Testing finds elevated selenium in fish

Higher levels are likely naturally occurring, not a threat to human health, province says

Canada's Mount Polley disaster: experts warned tailings pond 'getting large'

Breach of tailings pond results in 'Largest environmental disaster in modern Canadian history'

AMSJ on August 12, 2014 at 9:00 am



Mount Polley mine spill: a hazard of Canada's industry-friendly attitude?

Samarco put industry in a poor light yet again...

Mud from Brazil dam disaster is toxic, UN says, despite mine operator denials

The UN contradicts claims by Samarco, the operator co-owned by BHP Billiton, that the 60 million cubic metres of waste was no danger to humans

BHP and Vale pay out \$260m over burst Samarco dam in Brazil

Samarco executives accused of homicide by Brazilian police over dam burst

Is Deadly Dam Collapse BHP Billiton's "Deepwater Horizon"?

The worst environmental disaster in Brazilian history could sink the miner.



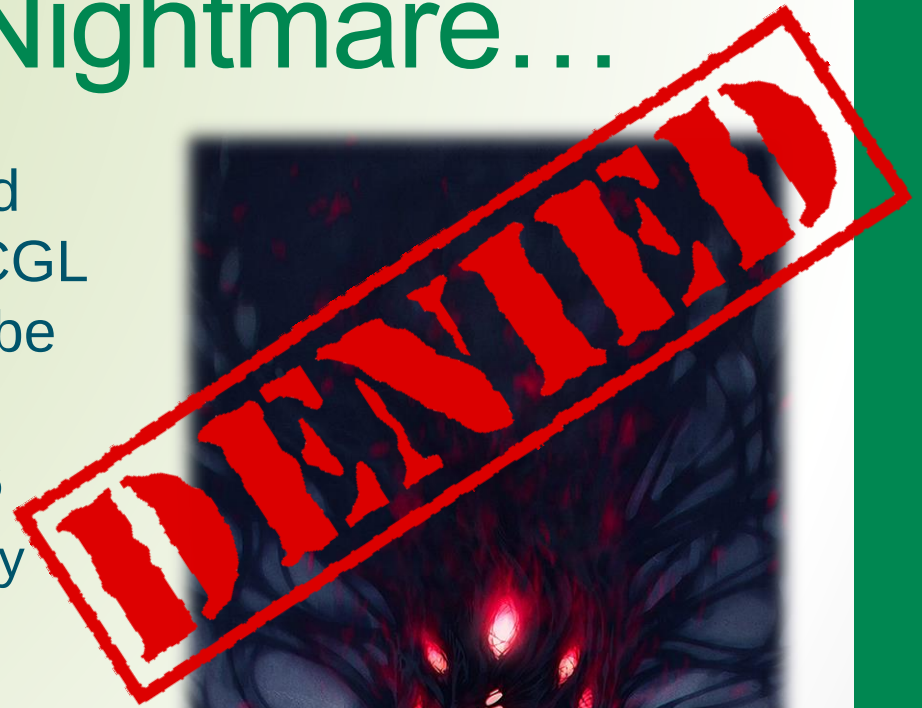
These incidents caught the attention of everyone...

...including the insurance industry!



My Insurance Nightmare...

- In early March 2016, received letter dated 2/12/2016 from CGL insurer that policy would not be renewed:
 - Scheduled to expire 4/4/2016
 - Colorado only requires 45-day notice of non-renewal
- Coverage dropped due to “geotechnical” and “tailings” work
- Denied by >20 insurance carriers prior to finding (inferior) coverage



Nightmare by nakanoart on DeviantArt

Today, let us...

Collaborate.

Work together for a common objective

Cooperate.

Openly share, without any quid pro quo

