# GBA Tailings Engineer of Record (EOR) Workshop Breakout Sessions Summary Report

January 26, 2017

Facilitated by:
Bill Kay & Kelly Ward

GBA GEOPROFESSIONAL BUSINESS ASSOCIATION

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# Executive Summary

**The Purpose of this Workshop** was to Identify concerns of filling the role of the Engineer of Record (EOR) for tailings storage facility (TSF) projects.

**Desired Outcomes:**

1. Share examples on how EOR responsibilities are defined, understood and viewed throughout the mining industry
2. Develop guidance for EOR on TSF facilities

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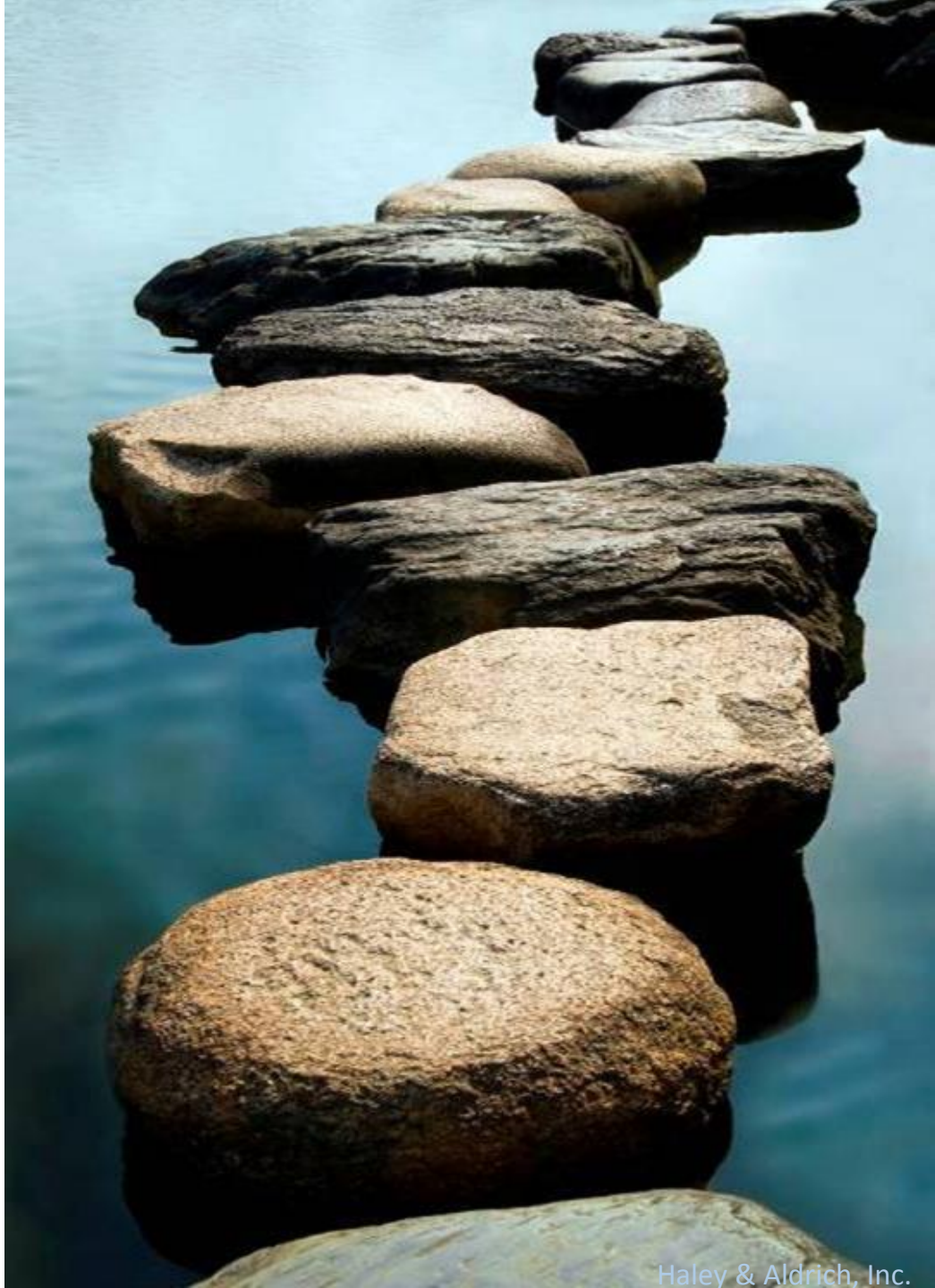
# Workshop Agenda

- ❑ GBA & Host Welcome
- ❑ GBA's Tailings EOR Task Force Update
- ❑ Participant introductions and expectations
- ❑ Pre-Workshop Survey Results
- ❑ 9 Industry-wide Presentations
- ❑ Facilitated Breakout Session
  - ➢ Group 1 – TSF Lifecycle - Roles & Responsibilities/Authority
  - ➢ Group 2 – Why EOR & EOR Definition
- ❑ Next Steps
- ❑ Wrap Up



# Workshop Attendees

## GBA Members

Amanda Adams
Tatyana Alexieva
John Baker
Stephen Brown
Brett Byler
Joel Carson
Dean Durkee
Ethan Faber
Gordan Gjerapic
Chris Hatton
Daniel Harpstead
Rick Heckel
Mike Henderson
William Kay
Harvey McLeod
Kim Morrison
Eric Philips
Joergen Pilz
Robert Snow
Kelly Ward
Kevin White

## Non-GBA Members

Mark Abshire
Colleen Crystal
Paul Ridlen
Bryan Ulrich
Ryan Baker
Terry Mandziak
Erik Ketilson
Christina Winckler
Tim Cazier
Eric Scott
Robin Reilley
Lisa Yenne
Leigh Simmons
Jason Hilgers

## Remote Attendees

Jeremy Boswell
Charlie Cobb
Dusty Myers
Lori Spragens
John Roche
Pete Bush
Carmen Melis
Claudio Scognamillo
Jaime Urquidi
Andres Segura
Jose Illanes
Dave Wanner
Clara Balasko
Brent Bronson
Pablo Valdes

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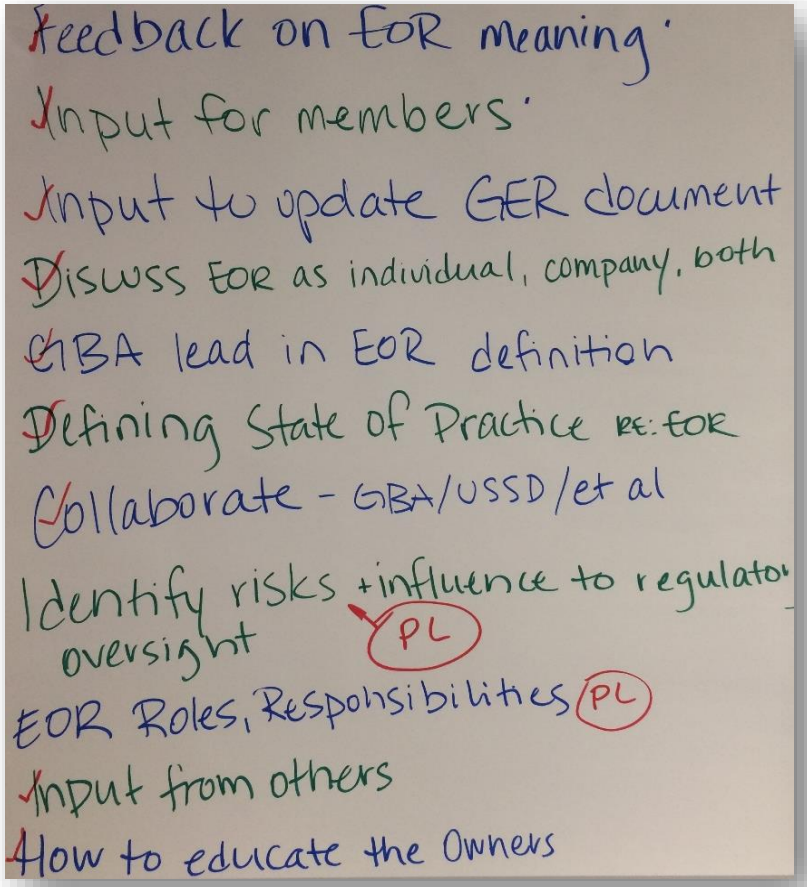
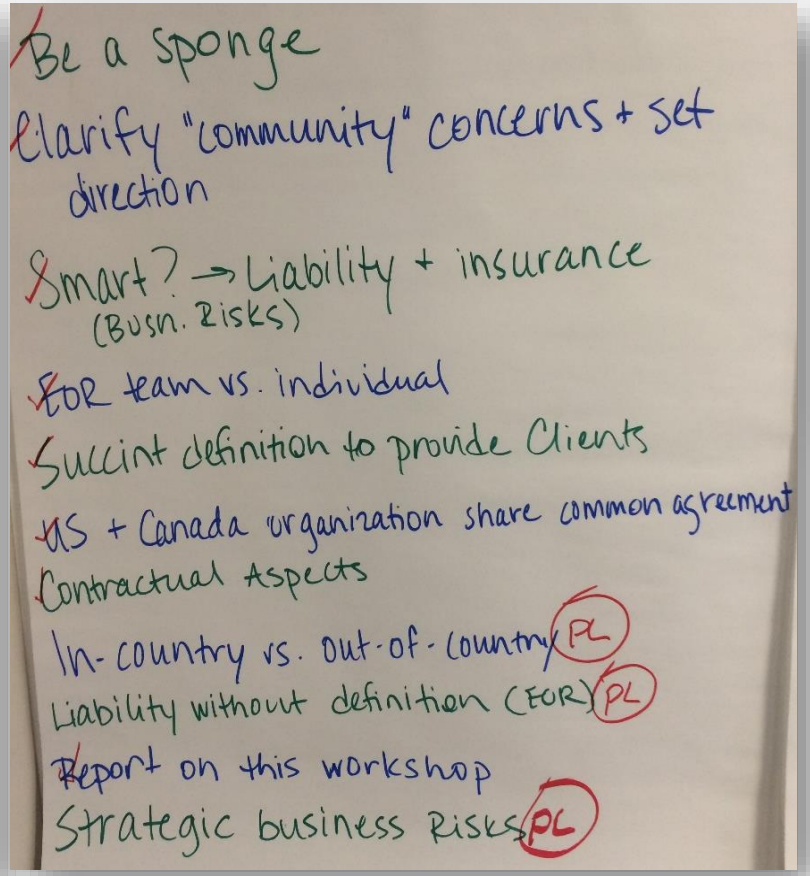
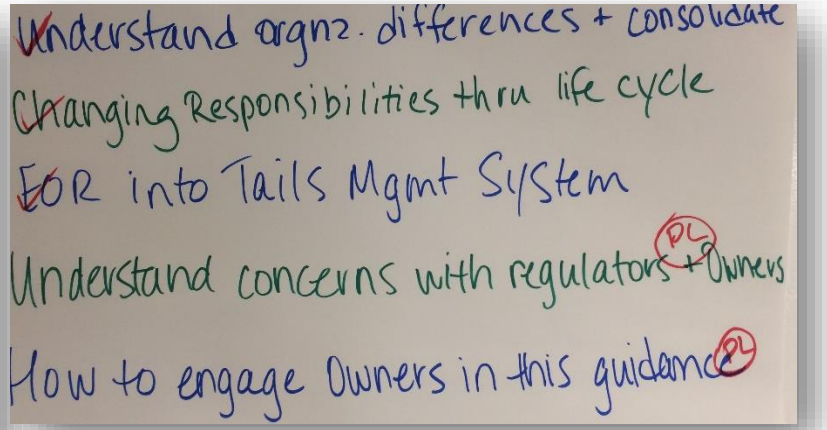
BGC USA, Inc.
D'Appolonia
Morrison Geotechnical Solutions, Inc.
Kleinfelder
Klohn Crippen Berger
Haley & Aldrich, Inc.

# Participant Expectations for this workshop




✓ Covered in Workshop

PL Move to Parking Lot

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# Topics Covered by Breakout Group 1

Roles and Responsibility Internal vs. External

TSF Lifecycle

Authority

# The group developed a RACI's to clarify & set expectations

**LEGEND:**

- **R - Responsible** for performing the task
- **A - Accountable** for completion/results
- **C - Consulted** prior to or during the task
- **I - Informed** of key aspects of process

## DESIGN

| | CEO/Owner | Designer (of Record) | EOR | Tailings Operation Mgr/ TSF Qualf. Person/ Dam Safety Manager | Review Board | Independent Dame Safety Reviewer | Regulator |
|---|---|---|---|---|---|---|---|
| | Internal | External (typical) | External (typical) | Internal | External | External | External |
| Design | | | (Designer) | | | | |
| Cost Est / Plans & Specs | | | (Designer) | | | | |
| Permits | | | (Designer) | | | | Approval |
| Site Investigation, Analysis & Reports: Tailings Charac.; | | | (Designer) | | | | |
| OMS Manual | | | (Designer) | If designated during design phase | | | |
| Env. Impact & Protection | | Dam Portion | (Designer) | | | | |
| Risk & FMECA | | | (Designer) | | | | |
| EAP | | | (Designer) | | | | |
| Closure Plan | | | (Designer) | | | | |
| Regulatory Reporting | | | (Designer) | | | | |
| Designating Design Team (in support of EOR) | | | (Designer) | | | | |
| Action Threshold Levels | | | (Designer) | | | | |
| Financial Assurance | | | (Designer) | | | | |

## Const (CAPEX)

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CQA | | | (Designer) | | | | |
| Instrumentation | | | (Designer) | | | | |
| Construction Report of As-Builts | | | (Designer) | | | | |
| Construction Management | | | (Designer) | | | | |

## Operation

| | CEO/Owner | Designer (of Record) | EOR | Tailings Operation Mgr/TSF Qualf. Person/Dam Safety Manager | Review Board | Regulator | Independent Dam Safety Reviewer |
|---|---|---|---|---|---|---|---|
| | Internal | External | External (typical) | Internal | External | External | External |
| Inspection & Monitoring Routne Inspections (daily, weekly, etc.) | | | | | | | |
| Operations (Tailings Placement) Tailings Management | | | | | | | |
| Managing critical controls Instrumentation | | | | | | | |
| Dam Safety Program — DSIs | | | | | | | |
| Dam Safety Program — DSRs | | | | | | | |
| Closure Plan Updating | | | | | | | |
| Environmental Management | | | | | | | |
| Change in Operation | | | | | Major Change | Major Change | |
| Permitting | | | | | | | |
| Periodic Site Investigations | | | | | | | |
| Risk & FMELA | | | | | | | |
| Training Programs | | | | | | | |
| Succession Plan | | | | | | | |
| Design Changes | REPEAT FIRST 4 TASKS FROM DESIGN | | | | | | |
| Major Modifications/Sust. CAPEX | REPEAT CONSTRUCTION CAPEX TASKS | | | | | | |

## Closure

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Monitoring | | | | | | | |
| Closure Plan | | | | | | | |
| Const./ CQA | | | | | | | |
| DSI | | | | | | | |
| DSR | | | | | | | |

See Attached Original RACI Document

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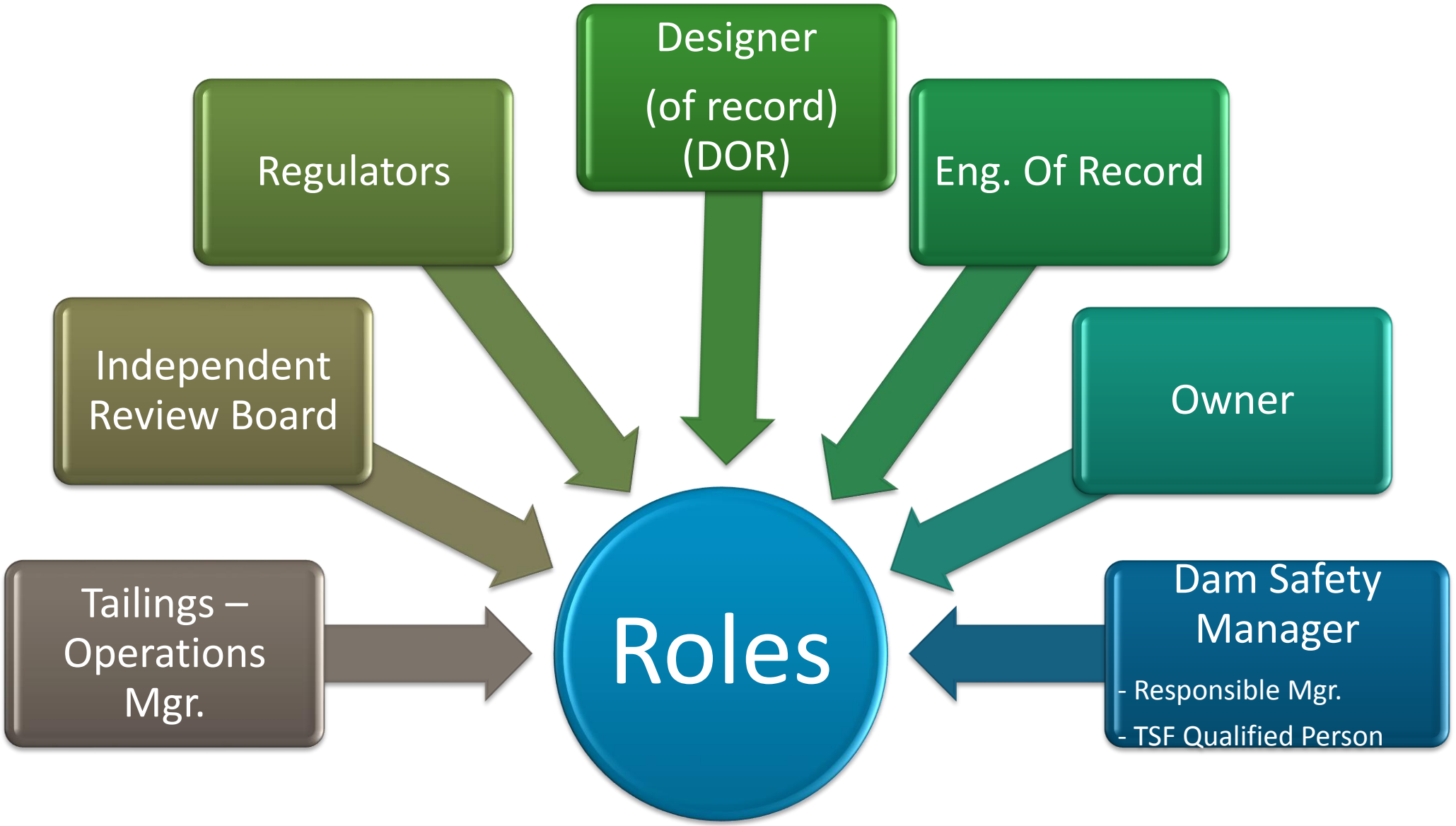


***In some cases, more than one role identified on this slide may be combined into a single role.***

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# Topics Covered by Breakout Group 2

Why EOR

Definition of EOR

Quals Ind. Vs. Firm

(Contracts, Risk, Insurance, Owner Buy in)

# Why EOR - Justification

- Good design – quals, risk, continuity
- Continuing involvement of responsible engineer
- Manage observational approach
- Diverse team that owner may not be able to provide
- For Stakeholders
- QA – participate throughout
- To document work, including recommendations and corrective actions
- Prepared to respond to adverse conditions; recognizing that recent failures had EORs
- Address continuity

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# EOR Definition

- Per dam/facility
- One supervisory individual supported and informed by a team of similar and separate technical disciplines
- Named EOR individual is employed by firm with financial resources to cover liability (contractual)
  - ➢ flexibility should exist to be in Owner company
- Include limiting statement of “Standard of Practice” or “Reasonably Safe” etc.

# Qualifications

- 10 yr. relevant experience minimum
  - More as complexity a/o scale increases
- PE – in jurisdiction working in as applicable/international recognition of issuing body or standards
- Relevant experience means:  TSF design/const/ops
- 5 yrs. Managing multi-discipline projects in tailings/TSFs

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# Why EOR?

- Reduce risk for failure, unplanned release
- 3rd party review function
- Provide leadership across disciplines
- Increase credibility of mining industry
- Show social responsibility
- Bring outside TSF experience to share knowledge, BMP, etc. for better design/ops
- Provide technical basis for Owner/insurance/bond/backers to understand risk profile

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# The group created a list of items to be done at a later date

## PARKING LOT

- Develop guidelines on “tailings practitioner” for relevant experience
- An EOR who moves on..to new firm or becomes “1-man show” and associated insurance “tail coverage”
- Define “common terminology” for EOR, DSM/E, etc.
- Hazard Potential Classification
- Identify risks & influence to regulatory oversight
- EOR Roles and Responsibilities (further elaboration)
- In-country vs. Out of country
- Liability without established definition (EOR)
- Strategic Business Risks
- Understand concerns with regulators & owners
- How to engage owners in this guidance

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# Next Steps

- Document results of workshop
- Team to develop Draft
- Distribute slides
- GBA to coordinate with others
- Need owners input
  - Workshop?
  - Present draft for review?
  - Conf. call w/ major mining companies?

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# Thank you to our host, sponsors, facilitators and participants

Dense agenda, impressed it all got done

Survey was a great idea

# Questions or Comments? Contact Us.


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