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
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

<table>
<thead>
<tr>
<th>GBA Members</th>
<th>Non-GBA Members</th>
<th>Remote Attendees</th>
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<tbody>
<tr>
<td>Amanda Adams</td>
<td>Mark Abshire</td>
<td>Jeremy Boswell</td>
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<td>Tatyana Alexieva</td>
<td>Colleen Crystal</td>
<td>Jaime Urquidi</td>
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<td>John Baker</td>
<td>Paul Ridlen</td>
<td>Charlie Cobb</td>
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<td>Stephen Brown</td>
<td>Bryan Ulrich</td>
<td>Dusty Myers</td>
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<td>Brett Byler</td>
<td>Ryan Baker</td>
<td>Lori Spragens</td>
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<td>Joel Carson</td>
<td>Terry Mandziak</td>
<td>John Roche</td>
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<td>Dean Durkee</td>
<td>Erik Ketilson</td>
<td>Pete Bush</td>
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<td>Ethan Faber</td>
<td>Christina Winckler</td>
<td>Carmen Melis</td>
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<td>Gordan Gjerapic</td>
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<td>Claudio Scognamillo</td>
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<td>Chris Hatton</td>
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<td>Daniel Harpstead</td>
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<td>Rick Heckel</td>
<td>Tim Cazier</td>
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<td>Mike Henderson</td>
<td>Eric Scott</td>
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<td>William Kay</td>
<td>Robin Reilley</td>
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<td>Harvey McLeod</td>
<td>Lisa Yenne</td>
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<tr>
<td>Kim Morrison</td>
<td>Leigh Simmons</td>
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<td>Eric Philips</td>
<td>Jason Hilgers</td>
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<td>Joergen Pilz</td>
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<td>Robert Snow</td>
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<td>Kelly Ward</td>
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<td>Kevin White</td>
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### Sponsors:
- BGC USA, Inc.
- D'Appolonia
- Morrison Geotechnical Solutions, Inc.
- Kleinfelder
- Klohn Crippen Berger
- Haley & Aldrich, Inc.
Participant **Expectations** for this workshop

- Feedback on EOR meaning
- Input for members
- Input to update GER document
- Discuss EOR as individual, company, both
- CIBA lead in EOR definition
- Defining State of Practice re: EOR
- Collaborate - CIBA/USSD/et al
- Identify risks and influence to regulatory oversight
  - EOR Roles, Responsibilities
  - Input from others
- How to educate the owners

**Be a Sponge**
- Clarify "community" concerns + set direction
- Smart 7 -> Liability + Insurance (Busin Risks)
- EOR team vs. individual
- Succinct definition to provide Clients
- US + Canada organization share common agreement
- Contractual aspects
  - In-country vs. out-of-country
- Liability without definition (EOR)
- Report on this workshop
- Strategic business risks

**Understand orgn. differences + consolidate**
- Changing responsibilities thru life cycle
- EOR into Tails Mgmt System
- Understand concerns with regulators + Owners
- How to engage Owners in this guidance

- **PL** Covered in Workshop
- **PL** Move to Parking Lot
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

<table>
<thead>
<tr>
<th>DESIGN</th>
<th>Operation</th>
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<tbody>
<tr>
<td>Design</td>
<td>Inspection/Testing</td>
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<td>Cost Est. Plans &amp; Specs</td>
<td>Engineering</td>
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<td>Permit</td>
<td>State/Int.</td>
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<td>Site Investigation, Analysis &amp; Reports</td>
<td>Design Engineer</td>
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<td>OBJ/TAS</td>
<td>Design Engineer</td>
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<tr>
<td>Env. Impact &amp; Protection</td>
<td>Design Engineer</td>
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<td>Risk &amp; FIRECA</td>
<td>Design Engineer</td>
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<tr>
<td>EAP</td>
<td>Design Engineer</td>
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<td>Closure Plan</td>
<td>Design Engineer</td>
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<td>Regulatory Reporting</td>
<td>Design Engineer</td>
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<td>Designating Design Team (in support of EDR)</td>
<td>Design Engineer</td>
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<td>Action Threshold Levels</td>
<td>Design Engineer</td>
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<td>Financial Assurance</td>
<td>Design Engineer</td>
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Const (CAPEX) | Const (CAPEX) | Const (CAPEX) | Const (CAPEX) |
| TDQA | Design Engineer | Renovation | Regular |
| Instrumentation | Design Engineer | Renovation | Regular |
| Construction Report of As-Built | Design Engineer | Renovation | Regular |
| Construction Management | Design Engineer | Renovation | Regular |

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

See Attached Original RACI Document
In some cases, more than one role identified on this slide may be combined into a single role.
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
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
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
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
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?
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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