

A Consultant's Perspective on EOR Responsibilities

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Why is a Tailings Dam Unique?

- The differences between EOR responsibilities for a typical water dam design/construction and a typical tailings dam design/construction are not widely understood – even among many practitioners
- A typical tailings dam design is a classic example of the Observational Method described by Peck (1969)
 - A lot of people cite the Observational Method, but have never really read Peck’s paper or other papers on the subject
 - Many times the “observational” part of the Observational Method is forgotten after the initial phase of construction occurs – usually by the Owners, but too often even by the engineers who applied the method to their designs
 - Sometimes not explicit in design/construction documents

Some of the challenges...

- The construction timeline is almost always much longer
- The scale is often much larger than for typical water dams
 - Often pressure by Owners to reduce initial CAPEX for foundation investigations – since the construction is phased over several years, it is also possible to phase the investigations
 - One of the major construction materials (the tailings) doesn't exist yet during the design process. Testing on bench-scale materials may not be fully representative. Lab testing of tailings is challenging.
 - Borrow investigations may be incomplete – especially if the dam is constructed of overburden or waste rock. Material may also change dramatically over time.
- Project development staff may understand this, but operations may not appreciate the need for ongoing work by the EOR. Pressures rise when commodity prices drop.

Knight Piesold's Experience

- We have an internal policy that guides decision making on tailings dam design/construction
 - What needs to be done at a minimum to perform as EOR on a greenfield project (i.e., when we get to start at the beginning)
 - Due diligence process to assume the EOR role from another engineer
 - Formal documentation when another EOR takes over from us
- This policy creates challenges internally and externally in communicating what it means
 - These processes do not constitute a performance guarantee
 - They do not absolve us of liability in the event of future problems
 - It is not a means to extract more billable hours (money) from clients

Client Experiences Vary

- A few clients understand and appreciate the value of maintaining the EOR relationship over the life of the project
 - Some clients have developed progressive policies that clarify roles of both the owner and the EOR
- A few clients are distrustful, cynical, or openly hostile to the EOR concept
 - We have lost some work because of our policy
- Most clients are somewhere in the middle.
 - They understand they need to listen to the advice they received from trusted engineering consultants
 - They struggle with decisions of how much to rely on themselves and how much to rely on the Engineer

The Cheese is Moving...

- The Mount Polley and Samarco events have raised awareness (a gross understatement)
- Industry must realize that profitability, social license – in some cases even viability – is at stake if the industry does not get the occurrence of tailings disasters under control
- Insurers and lenders are waking up to their exposures
- A new cadre of leaders is moving up, who take environmental responsibilities very seriously
- If we (the informed) don't provide meaningful contributions, the uninformed (politicians mostly) will make the decisions based on poor science and logic

Example Client Policy

- The site General Manager, as part of his assigned responsibilities from the [Owner]’s Chief Operating Officer, is responsible for ensuring the safe and timely design, construction, and operation of the tailings facilities at his or her site.
- The EoR is responsible for the development of required plans and designs for the TSF, as well as specifications for its construction, operation, monitoring & closure.
- The EoR shall provide oversight to confirm the facilities are constructed, operated, maintained and monitored in accordance with their design intent.
- Design of TSFs require selection and engagement of a specialist third-party geotechnical engineering company. The retained company and its dedicated senior engineer then become the EOR for the TSF. It is company practice, barring extenuating circumstances, that the EOR and selected firm remain active on the TSF file for the life of mine ... The EoR is responsible for the identification and scoping of required site investigations for tailings facilities.
- A change in the EOR during the design, construction, or operational stages of a TSF requires the approval of the Regional Vice President.

Example 2

