

Dam Integrity Workshop

November, 2015

The Alberta Chamber of Resources, through the Dam Integrity Advisory Committee (DIAC), sponsored a two-day Dam Integrity Workshop in November, 2015. Twenty six technical experts attended, mostly from companies, four from the Alberta government regulators, two eminent geotechnical professors from the University of Alberta.

The first day was spent on case studies, including the experiences of regulators. Two of the case studies had never before been shared: one near miss and one success story about use of detailed monitoring and Quantitative Performance Objectives (QPOs) to safely manage a dyke subject to significant movement. Systemic barriers to open communication between companies and regulators were explored, including lack of clarity on both sides about roles and responsibilities.

The second day was spent using breakout groups to consider three topics:

- Exploring the “engineer of record” concept as the focal point for dam integrity and risk management information
- Understanding and communicating risk - to management, to regulators, to the public
- Identifying weaknesses in current company and regulator practices

The final breakout session was used to brainstorm followup actions to address issues raised by the breakout groups – two dozen potential actions were identified. DIAC has categorized the actions into four themes and will digest this “long list” and prioritize the followup actions. Working committees will be struck, comprising DIAC members, regulator representatives or other government officials as appropriate, and invited individuals with expertise relevant to the working committee goals.

Proposed Follow up Actions (not prioritized)

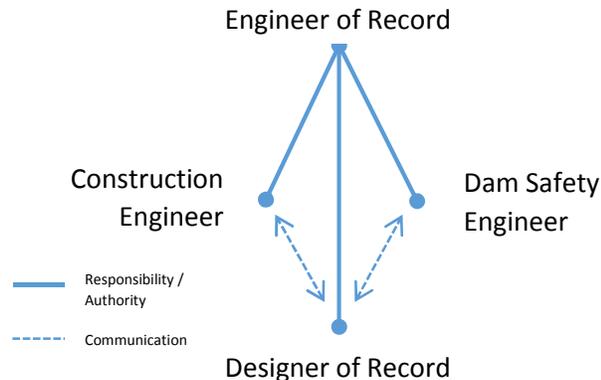
Theme 1: Defining EOR and other key roles

- clarity of responsibilities, essential qualifications, owner commitment, continuity and succession
 - DIAC will co-ordinate/supplement what is being done in new GoA Dam Safety Guideline
- 1.1 Define EOR, DOR, DSE, etc. – clarity of roles and responsibilities – qualifications to fill various roles.
 - 1.2 Owner commitment (e.g. at design application stage) to designating qualified engineer with both responsibility and authority to ensure activities associated with construction, operation and surveillance are in accordance with design
 - 1.3 Improve regulations (and issue directives) to be more specific about QPOs, DSRs, site investigation requirements, auditing, EOR roles, responsibilities and authorities. Requirements for TRB based on dam consequences). Regulator funding/resources (tools & teeth).

1.4 Update dam safety guidelines document:

- a. Define EOR and other key roles and responsibilities, address succession planning and continuity

1.5 Define roles and responsibilities (and embed in regulatory requirement) for Engineer of Record – Designer of Record – Construction Engineer – Dam Safety Engineer



Theme 2: Developing and regularly sharing best practices

- guideline documents, annual workshops, *ad hoc* technical bulletins, peer reviews)

2.1 Develop (non-prescriptive) best practice document for geotechnical design of tailings dams – then run workshops to disseminate best practices

2.2 Annual workshop for dam integrity engineers – share best practices & learnings

2.3 Inter-company peer reviews (MAC style audit/assessment). For tailings systems and facilities. Uses COSIA-style confidentiality/technology sharing framework.

2.4 Advocacy of education opportunities and mentoring for development of HQP and EHQP (e.g. M.Eng. program – ACR should write a letter supporting reinstatement)

2.5 State of Practice manual for oil sands dam design – QPOs – DSR Guideline – site investigation – Design – Surveillance & Monitoring – Risk Reduction to ALARP – BAT – Closure

2.6 Update dam safety guidelines document

- a. Promote MAC membership (mining dams) – corporate awareness
- b. Promote clear facility ownership (analogous to battery limits in process plants)
- c. Promote use of TRBs (protocols, reporting)
- d. QPOs part of dam application (surveillance tied to failure modes)
- e. Promote that proponents provide complimentary funding for regulator to retain additional technical capacity/expertise to review applications.
- f. Promote strong dam safety culture and the need for conformance to design intent from concept to closure

- g. Promote that organizations recognize the need for complete document archives (control via MAC audit). Provide guidance re: documents needed.
- 2.7 Explore the need to expand site characterization at design phase (appropriate with respect to geological setting) - promote via technical bulletin or equivalent
- a. Learnings from updated BC model – applicable to Alberta
 - b. Promote concept of tailings stewardship (refer to Tamara J. keynote)
- 2.8 DIAC follow up with others
- a. Under leadership of regulator, with DIAC support, promote annual attendance at Regulator’s dam safety stakeholder workshop
 - b. Assess DSR technical bulletin to address scope requirements (e.g. deal with dam management issues) – DIAC leadership
 - c. Assessment of tailings technology improvements – in COSIA mandate, but needs DIAC engagement: management of technology being imposed

Theme 3: Thinking clearly and communicating effectively about risk

- Two classes of risk
 - Normal risk – being appropriately managed by normal DMS
 - Heightened risk - heightened awareness and proactive response
- Three audiences
 - Within company
 - Company to regulator
 - Company/regulator to public

3.1 Guidance for company to regulator communication (leading indicators) – changes to design basis – unexpected behavior.

3.2 Standardize risk communication

- a. MAC Annual Tailings Management Review
- b. Formal Risk Assessment
- c. Review Boards
- d. Monthly status report

3.3 State of Practice manual for oil sands dam design – QPOs – DSR Guideline – site investigation – Design – Surveillance & Monitoring – Risk Reduction to ALARP – BAT – Closure

3.4 Encourage regulators to establish formal process for communication/reporting to public about dam safety (e.g. website for background/annual information, template for communicating about incidents)

Theme 4: Supporting regulators in the development of new guidelines and processes, where helpful

- 4.1 Work with dam regulator and AE&P water regulators to open discussion about principles underpinning water release criteria for storm events and for long term site fluid reduction (systems approach)
- 4.2 Improve regulations (and issue directives) to be more specific about QPOs, DSRs, site investigation requirements, auditing, EOR roles, responsibilities and authorities. (Note: more specific ≠ more prescriptive.) Requirements for TRB based on dam consequences. Regulator funding/resources (tools & teeth).
 - a. New dam safety guidelines should include
 - i. Identification of failure modes
 - ii. QPOs
 - iii. Risk mitigation plans
- 4.3 Process for auditing designs that rely on the observational approach – ensure all components of the observational approach are included
- 4.4 Encourage coordination between AE&P and AER to facilitate consistent implementation of new Dam Safety Guidelines
- 4.5 Long term perspective: work with dam regulators and other regulators to open discussion about principles underpinning “de-licensing” of dam structures – align with regulatory framework – broaden applicability to all Alberta dams

Proposed Follow up Process

The intent and wording of the followup actions will be refined by DIAC, high-priority issues and low-hanging fruit identified and working committees struck. Working committees will comprise DIAC members, regulator representatives or other government officials as appropriate, and invited individuals with expertise relevant to the working committee goals.

Value will be added by the DIAC working committees by first understanding and referencing existing definitions and procedures (Alberta Regulations, CDA and MAC), then supplementing as necessary to address Alberta circumstances.

Consideration will be given to initiating an annual best practices workshop, to update all dam integrity practitioners on progress by the Working Committees.