Moving Beyond TSF Monitoring Status Quo – An Introduction to Emerging and Innovative Technologies

Course outline

This interactive course will provide an overview of tailings dam failure modes, instrumentation design and selection and risk-informed TSF management. It also discusses an overview of traditional and emerging monitoring and surveillance technologies.

The course concludes with a summary on an integrated approach for the future management of tailings presented by Vale, base metals.

Attendees also participate in interactive small-group exercises on best practices for instrumentation selection and data interpretation. There is also a one-hour hands-on workstation, during which the attendees have an opportunity to interact with all speakers and learn more about each new technology presented in the course, learn more about Vale and Rio Tinto's approach for tailings management, and the expertise provided by consultants such as WSP.

The course concludes with a panel discussion on the opportunities and challenges of instrumentation selection, and implementation including new technologies.

Expected Learning Outcomes

- Strengthening current practices in the global mining community through the evolution of TSF stewardship to risk-informed, performance-based processes and engagement of multiple stakeholders
- Rio Tinto's experience on instrumentation design considerations to suit failure modes.
- Vale's integrated approach to technology scanning and prioritization and a needs-based site assessments that results in operating-level roadmaps to prioritize and mitigate critical risks; new to the mining industry and derived from other industries.
- Hands-on workstation for a deeper dive into the presented new technologies and one-on-one discussions with speakers from Vale, Rio Tinto and WSP
- Learn about new technologies:
    a. Modular subsurface geotechnical monitoring using Distributed Fibre Optics Sensing Technology (DFOS) for early detection of seepage, deformation and potentially seismic risk, along with case studies. Explore how DFOS can detect anomalies in the dam structure early on, enabling proactive intervention. Learn how DFOS can be used for rapid dam breach notification.
    b. Gain a deeper understanding into how MUD® (Mapped Underworld Dimension) advances satellite measurement of deformation on the surface, subsurface and underwater. Through case studies, learn how MUD® detects patterns of change on the dam's unobserved "wet" side to provide operators with a predictive 3D change model to mitigate risk at facilities anywhere in the world, with a single, standardized technology.

c. Learn about ERT (Electrical Resistivity Tomography) and G.Re.T.A. system: understand the methodology, the new application for long-term monitoring and the possibility of recognizing seepages or fractures in the dam body. Explore the case studies and the management and visualization cloud software that can integrate measurements from different outcomes (piezometers, meteorological station, etc.).

- Share your view and hear the experts' view through a panel discussion.

Agenda

Begin	End	Topic
8:00	8:05	Introducing agenda and speakers
8:05	8:45	Risk-Informed monitoring of TSF performance – a GISTM guided evolution- **WSP**
8:45	9:35	DamPulse Integrated seepage, deformation, and seismic monitoring (DAS, DTS, DSS)- **Silixa**
9:35	10:00	Coffee break
10:00	10:30	Instrumentation design considerations to suit failure modes- **Rio Tinto**
10:30	11:00	Interactive exercise 1- Dam instrumentation and monitoring
11:00	12:00	Mapped Underworld Dimension (MUD®) - **Auracle**
12:00	13:00	Lunch
13:00	13:50	ERT and G.Re.T.A. system- **LSI LASTEM**
13:50	14:20	Interactive exercise 2- Dam instrumentation and monitoring
14:20	14:45	Bringing the Future of Tailings to Life - An Integrated Systems Approach- **Vale**
14:45	16:00	hands-on workstations, speak with presenters and other participants- with coffee and snacks
16:00	17:00	Panel discussion Opportunities & challenges of instrumentation selection & new technologies
17:00	19:00	drinks and appetizers at a nearby pub

Speakers

1. **Patrick Sean Wells, WSP**
2. **Theo Gerritsen, Rio Tinto**
3. **Greg Puro, Vale**
4. **Zara Anderson & Jon Furlong, Silixa**
5. **David McLelland, Jody Polk, Auracle**
6. **Greta Tresoldi, LSI LASTEM**
7. **Panelist:** Sean Wells, Theo Gerritsen, Greg Puro, Julie McLelland, Greta Tresoldi