



What can an owner do to keep tailings dams safe in the Philippines?

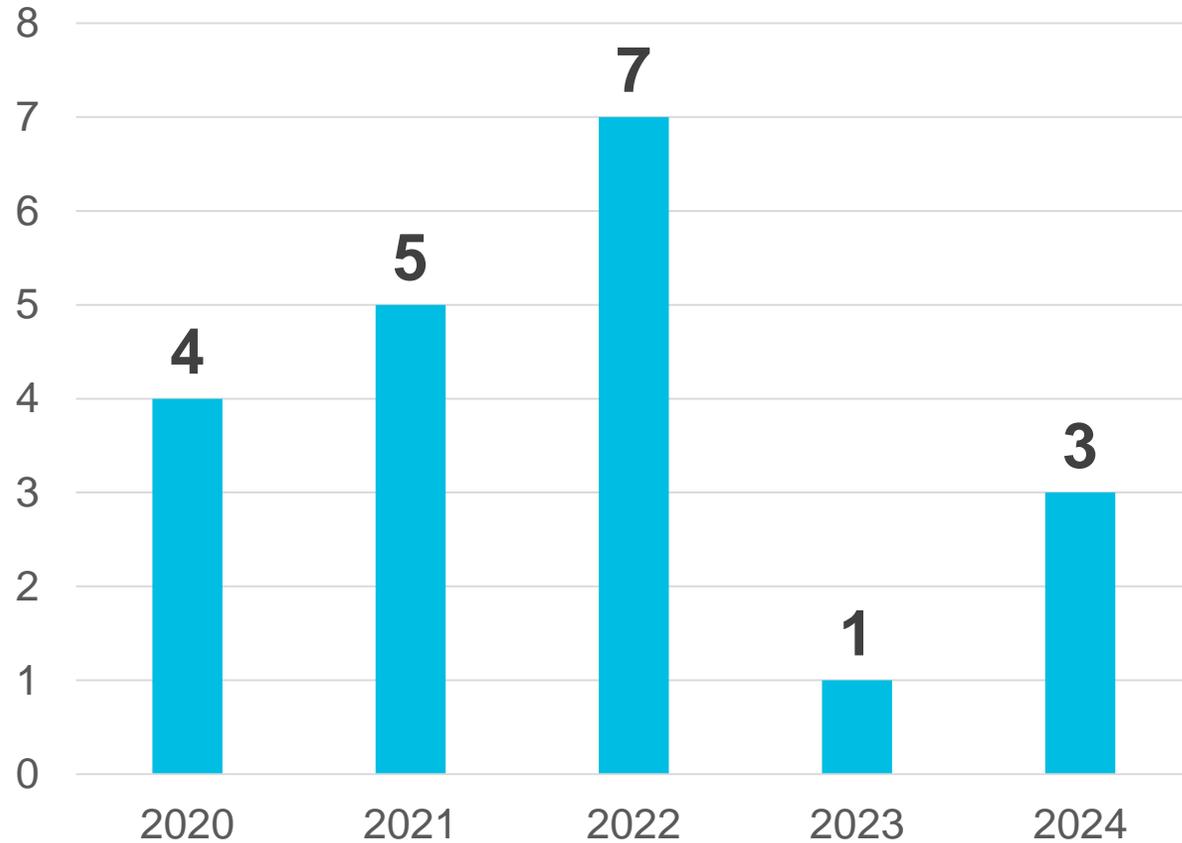
→ Anjan Kundu
Senior Technical Director and Business Group Leader, Tailings and Mine Waste

ANMSEC – Minerals Industry Symposium
21 November 2024





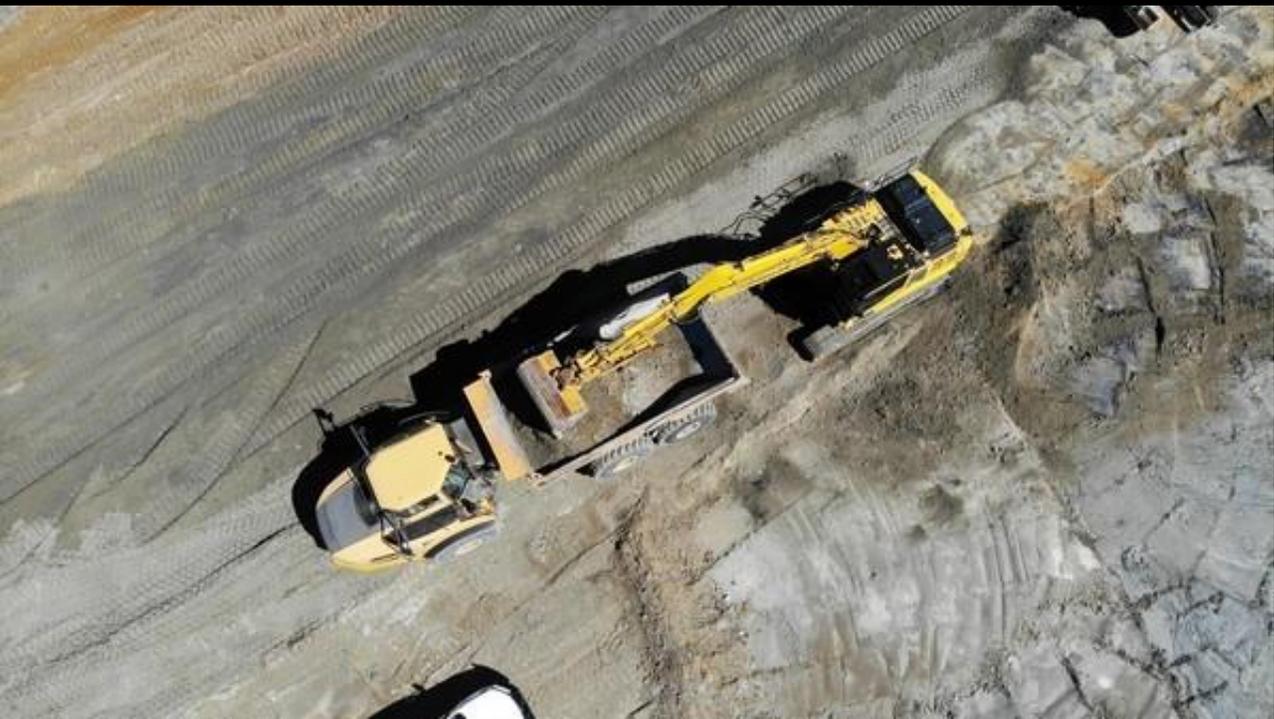
Is this the end after 2019?



Source: <https://www.wise-uranium.org/>

Last documented one is on 13 June 2024 in Chile.

A good DEED can go a long way



Available guidelines

- ➔ ANCOLD (2019) Guidelines on Tailings Dams
- ➔ Global Industry Standard on Tailings Management (GISTM 2020);
- ➔ Canadian Dam Association (CDA) Technical Bulletin: Application of Dam Safety Guidelines to Mining Dams (2014)

What ARE the good governances?

- A dedicated Accountable executive (AE)
- Dedicated Responsible Tailings Facility Engineer (RTFE)
- Engineer of Record (EoR)



Overall, a trusted partnership between the asset owner and an engineering firm.

Lots of acronyms—all relevant

OMS

**Operations,
Surveillance
and Maintenance**

LOF

Life of facility

ERP

**Emergency
Response Plan**

TMP

**Tailings
Management Plan**

TMS

**Tailings
Management System**

PRCP

**Progressive
Rehabilitation and
Closure Plan**

Progressive rehabilitation and closure

- We must think about the end before we begin any tailings facility design, construction and operation.
Cost effective, social and environmental responsibility, regulatory compliance.

Technology and Innovation

→ We have come a long way...

Instrumentation monitoring

- ← People taking reading with handheld instruments
- Remote monitoring and alarm system

Land deformation monitoring

- ← People surveying on site with survey instruments
- Use of drone and satellite Imagery



Be on site without being on site

- ← People travelling significant distance (a challenge for remote site)
- Site at the doorstep through Virtual Reality

Quality Assurance using AI

← People entering the data in spreadsheet and plotting

→ Use of automation and digital intelligence to analyze all data in a minute, resulting to efficiency gains, accuracy improvement and real time monitoring

Farming of tailings on site

← People driving equipment on site – sometimes health and safety risk

→ Automated equipment optimizing performance and reducing health and safety risk—trial in progress

Emergency response for tailings deposition

→ Digital Twin in modeling all pipeline, pumping system for complex operation and remote decision making

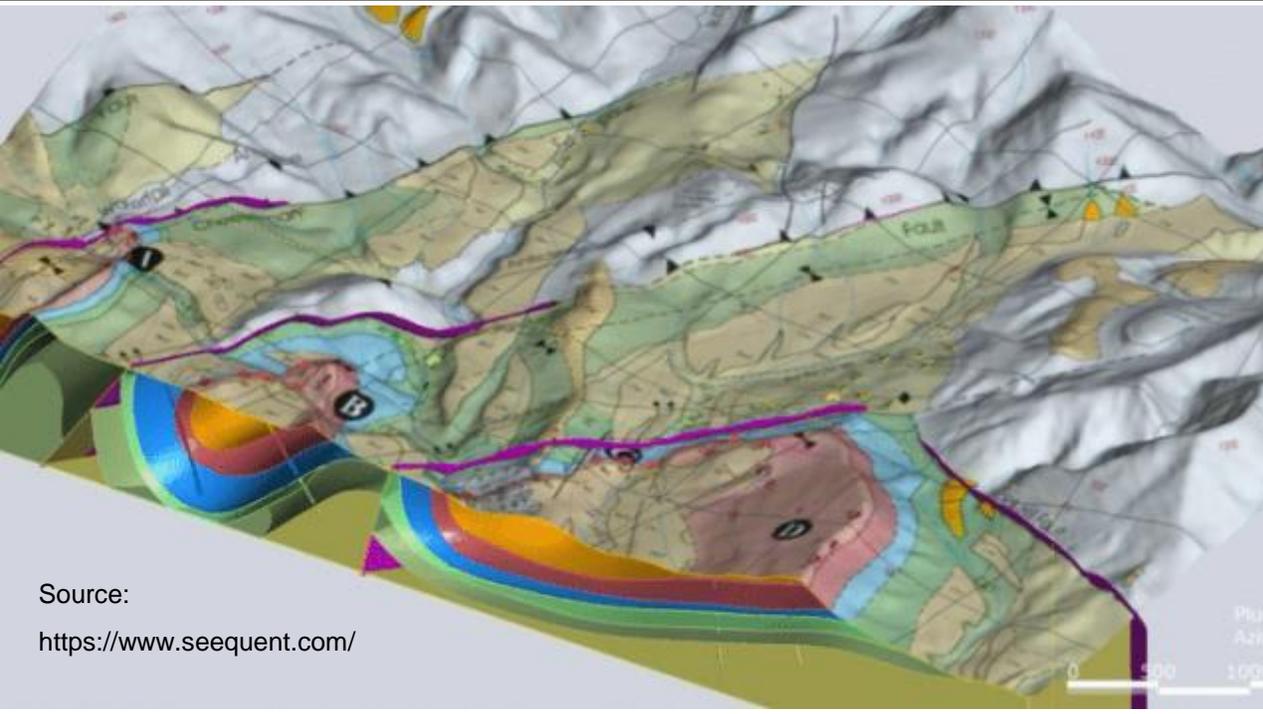


Knowledge Management (GISTM Requirement)

A portal that can manage a library of all project related information in an organized way for ever

Management of all site geotechnical data in one place

Management of historical geotechnical site data (e.g. drilling, test pit, CPT and Vane shear testing) in one place (e.g. Open Cloud) and create a site wide geological model for the site (e.g. Leapfrog)



Unlocking multiple opportunities through Artificial Intelligence (AI)

- ↳ Operational planning
- Decision making
- Safety enhancement

Let us think about the

future

**manage the present
secure for the future
manage the present
secure for the future**

About Us

GHD is one of the world's leading professional services companies operating in the markets of:

- Energy and Resources
- Water
- Transportation
- Property and Buildings
- Environment

→ We provide engineering, architecture, environmental, construction management, advisory, and digital services to private and public sector clients.



→ **Operating in the Philippines since 1998**
Offices in Makati City, Quezon City, and Cebu City
1,100+ employees in the Philippines



Manny Ancheta
Technical Director



Jey Querido
Director of Business Development



*** Thank You**