Closure: What is the real cost?

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Outline

- Closure liability audits
- Closure cost accounting
- Water, water, water
- Closure Cost Considerations

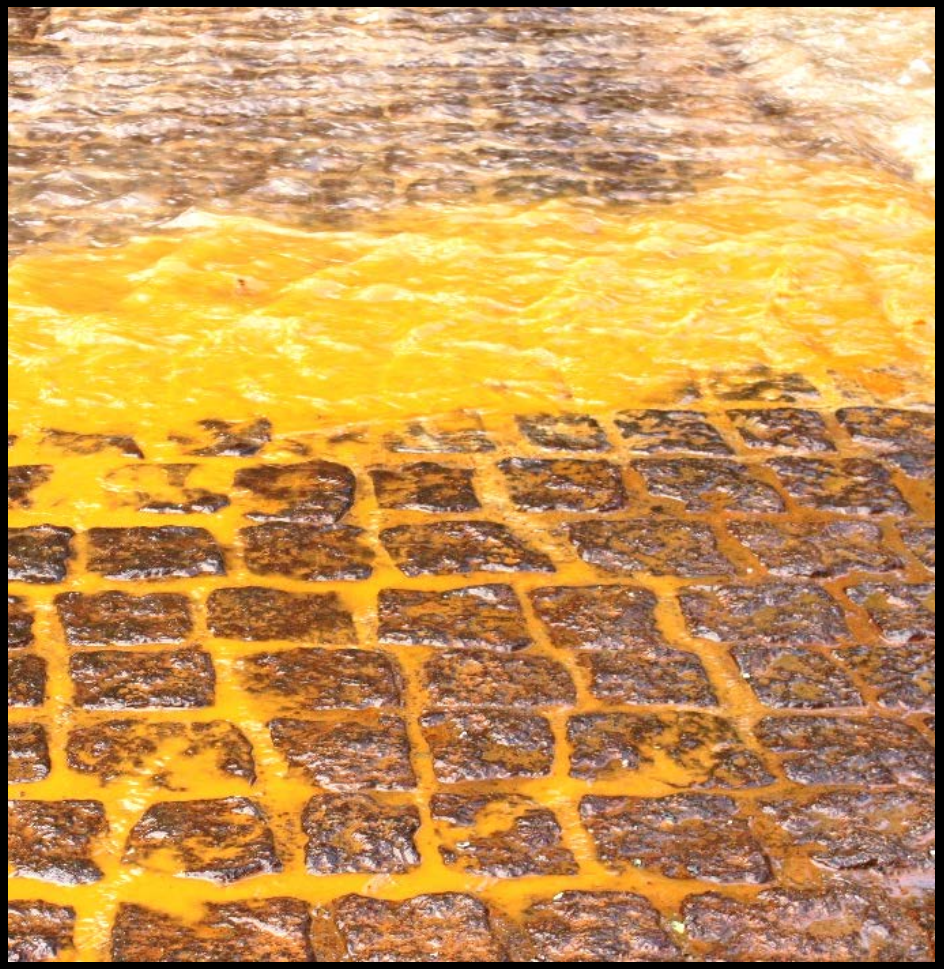
CLOSURE LIABILITY AUDITS

Looking for the big stuff

- Costs
- Risks
- Uncertainties
- Long-term liabilities
  - water management
  - physical stability

Challenges

- Limited information
- High level designs
- Poor planning
  - No (or poor) closure plan
  - Design criteria
  - No closure integration in operations
- Inadequate cost estimates
- Intentional (?) obfuscation



Audit Approach

- Site visit
- Closure plan review
- Environmental/social review
- Staff interviews
- Regulatory reviews
- Subject matter experts
- Conceptual closure plan
- Cost estimate

Opportunities

- Design changes
- Closure technologies
- Operational integration
- Alternative land uses

CLOSURE COST ACCOUNTING

Common Terminology

- Mine Closure Cost (MCC)
- Financial Assurance Cost Estimate
- Life-of-Mine Closure Cost (LOM)
- Asset Retirement Obligation (ARO)

From: Parshley, et. al. in Mine Closure 2009

Closure Cost Types

	Financial Assurance	LOM	ARO	Early Closure
Use(s)	Financial assuramce	Planning (prefeas, feas), budgeting, etc.	Financial Reporting to Shareholders	Planning, financial decision
Rate Basis	Third-party	Operator & Third-party	Operator & Third-party	Operator & Third-party
Included Development	Maximum (near-term)	All Planned	Current Financial Year	Current + Permit
Govt. Contracting Rules	Maybe	No	No	Maybe
Cost Basis	Current Cash	Cash Flow	Cash Flow	Either/both
Salvage Value	No (varies)	Yes	No	No (generally)

After: Parshley, et. al. in Mine Closure 2009

NPV vs. current costs

- Out of site, out of mind
- Early closure
- Project cost vs. portfolio costs

WATER, WATER, WATER

Water quality impacts

- Significant financial risk:
  - ongoing operations
  - closure
- Assessment relies heavily on water quality predictions
- Mitigation measures (or need for) often decided based on predictions

Water quality evaluation

- All mines that are permitted require that they will meet water quality standards and objectives
- Regulators require that scientific methods be applied to prediction of water quality
- Consequently all predictions show that water quality objectives will met, or, identify mitigation measures that will ensure that water quality objectives will be met

Water quality predictions

- Prediction of water quality practiced more than 30 years
- The - two-tiered system:
  - “Good faith” projections (no connection between test and field)
  - “Good science” predictions based on various calculations and scaling factors
- Methods:
  - Based on series of static and kinetic tests
  - Various mathematical models (geochemical speciation, oxygen transport, etc.)
  - Use of analogues
- All methods are subject to availability, completeness and applicability of information

Do predictions match reality?

- Recent report published in the USA indicated:
  - 100 percent of mines predicted compliance with water quality standards
  - 76 percent of mines exceeded water quality standards due to mining activity
  - Mitigation measures predicted to prevent exceedances failed at 64 percent of the mines

Why Do Predictions Fail?

- Predictions are only as good as the:
  - science on which the models/tools are based, and,
  - site characterization used as input
- Predictions fail for two general reasons:
  - Imperfect science
  - Imperfect science, imperfectly applied

    (or both)

Contributing factors

- **At the predictive stage**
  - Inadequate knowledge of the “experts” (inexperience)
  - Inadequate sampling / representation
  - Inadequate/inappropriate testing
- **During operations**
  - Improper implementation / Misclassification / Mismanagement
  - Simplification (without supporting science)
  - Loss of knowledge
  - System failures
  - Predictions are seldom followed-up
  - Economic pressures

Water, Water, Water

Take-away message

- To address the risks associated with predictions:
  - Revisit the original predictions
  - Evaluate the adequacy of characterisation
  - Assess prediction approach and methods and do reality checks
  - Evaluate historic and current water quality (consider transport/lag times)
  - Identify trends and evaluate against future conditions and predictions
  - Assess efficacy of proposed mitigation measures
- Assess adequacy of the financial liability:
  - for operational management
  - closure and post closure mitigation measures
  - Identify and incorporate uncertainty into financial estimation process

Water, Water, Water

CLOSURE COST CONSIDERATIONS

Post Closure Activities

Actual costs are usually assessed on NPV discounted cash flow system so the weight of risk associated with closure activities that are scheduled for a number of years in the future are diminished

- Water Treatment
- Technical Studies
- Property Holding
- Project Management
- HR
- Monitoring and Maintenance

Water Treatment

- Perpetuity
- Capital expenditure
- Annual Operational Cost
- Ongoing Maintenance

Brittania Mine Water Treatment Plant, BC Canada
Picture from: http://www.aecon.com/What_We_Do/Aecon_Infrastructure/Infrastructure_Gallery?id_1504=85

Technical Studies

- Have these been included as a closure or operational budget cost?
- How much more investigation will need to be completed to get confidence in the proposed closure methodologies?
- Has a material balance been completed?
- Is there enough material onsite to undertake the closure methodologies proposed?

Picture from: http://www.materiels-jcb.com/chargeuse-jcb-457-250cv-19-3t.html#

Property Holding Costs

QLD	NSW
Mining Lease Rental Fee	Mining Lease Rates (Shire Council)
Annual Return Fee (EA)	Agricultural Rates (Shire Council)
Agricultural Rates	Annual Admin Levy (State)
Bank Guarantee Fees	Annual Rent (State)
	Land Tax (State)
	Bank Guarantee Fees

Examples of Property holding costs

- Each State and local council/shire jurisdiction is different
- These are annual costs that will need to be paid until relinquishment
- What is the likely period of closure
- These costs can add up quickly

Project Management

- Project Management
- HR
  - Staffing after closure
  - Entitlements
  - Redundancies

Monitoring & Maintenance

- Timeframe: how long is the post closure period
- Monitoring Plan
- Maintenance: Weeds, fences, dams, bunds
- Annual expenditure: internal vs consultant

Closure Provisioning

- Financial Assurance
  - Financial security provided to the government body to cover any costs or expenses incurred in taking action to prevent or minimise environmental harm or rehabilitation or restore the environment.

- Financial Provisioning
  - Internal company financial provisioning to allow for the adequate closure and rehabilitation activities to be completed to relinquish leases and return of FA.

Closure Cost Considerations

QLD Regulations

- FA will be required for:
  - All mining permits (MC,EML, MDL & ML)
  - All petroleum permits (EPL, PL, PPL)
  - Other resource activities (greenhouse gas storage, geothermal)
- FA may be required for:
  - Oil refining or processing
  - Dredging and extracting activities
  - Metal smelting and refining
  - Mineral processing

Discount System

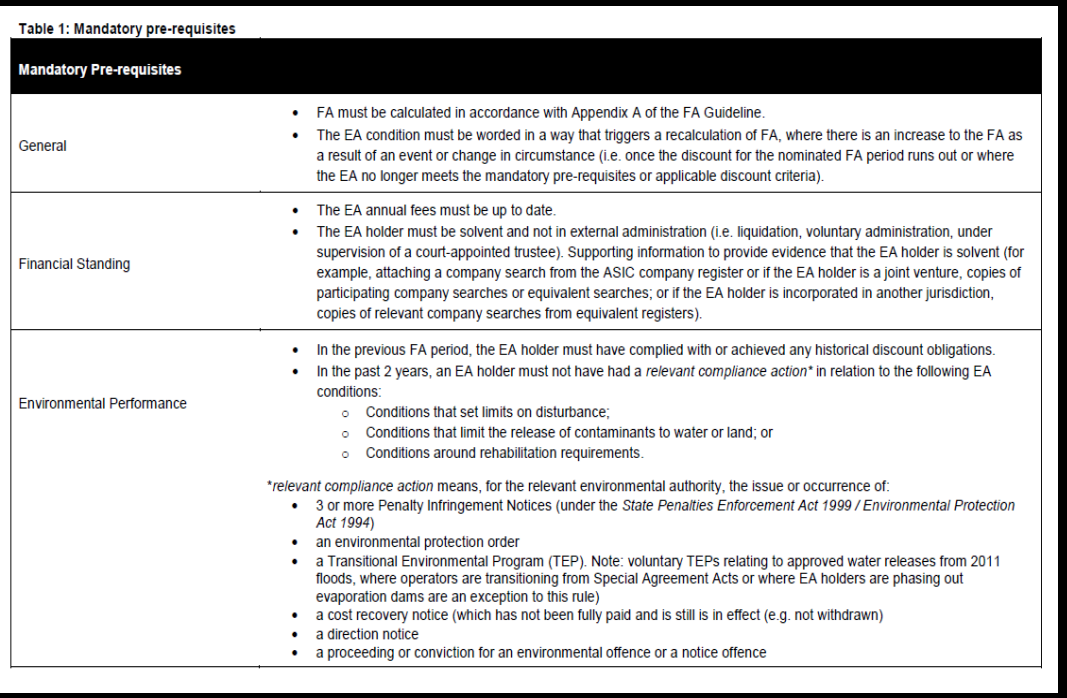


Table 1: Mandatory pre-requisites

Mandatory Pre-requisites	
General	• FA must be calculated in accordance with Appendix A of the FA Guideline. • The EA condition must be worded in a way that triggers a recalculation of FA, where there is an increase to the FA as a result of an event or change in circumstance (i.e. once the discount for the nominated FA period runs out or where the EA no longer meets the mandatory pre-requisites or applicable discount criteria).
Financial Standing	• The EA annual fees must be up to date. • The EA holder must be solvent and not in external administration (i.e. liquidation, voluntary administration, under supervision of a court-appointed trustee). Supporting information to provide evidence that the EA holder is solvent (for example, attaching a company search from the ASIC company register or if the EA holder is a joint venture, copies of participating company searches or equivalent searches; or if the EA holder is incorporated in another jurisdiction, copies of relevant company searches from equivalent registers).

Environmental Performance	• In the previous FA period, the EA holder must have complied with or achieved any historical discount obligations.
	• In the past 2 years, an EA holder must not have had a *relevant compliance action** in relation to the following EA conditions:
	  ○ Conditions that set limits on disturbance;
	  ○ Conditions that limit the release of contaminants to water or land; or
	  ○ Conditions around rehabilitation requirements.
	
	**relevant compliance action* means, for the relevant environmental authority, the issue or occurrence of:
	• 3 or more Penalty Infringement Notices (under the *State Penalties Enforcement Act 1999 / Environmental Protection Act 1994*)
	• an environmental protection order
	• a Transitional Environmental Program (TEP). Note: voluntary TEPs relating to approved water releases from 2011 floods, where operators are transitioning from Special Agreement Acts or where EA holders are phasing out evaporation dams are an exception to this rule)
	• a cost recovery notice (which has not been fully paid and is still is in effect (e.g. not withdrawn)
	• a direction notice
	• a proceeding or conviction for an environmental offence or a notice offence

- In QLD a discount will apply to the gross FA liability for an EA, where the EA holder can demonstrate that it meets all mandatory prerequisites and discount criteria they are applying for.

Discount Categories

- Financial
- Progressive rehabilitation and certification
- Waste management

There are three discount categories and EA holder may choose any discount to apply for, however the maximum discount that can be awarded is 30%

Conclusion

- Often minimized
- Availability of data
- Detail of data
- Current requirements and standards
- Post-closure conditions often ignored

We cannot solve our problems with the same thinking we used when we created them.

Albert Einstein

Thank you

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