



The rising cost of closure – it's the water and a lot more

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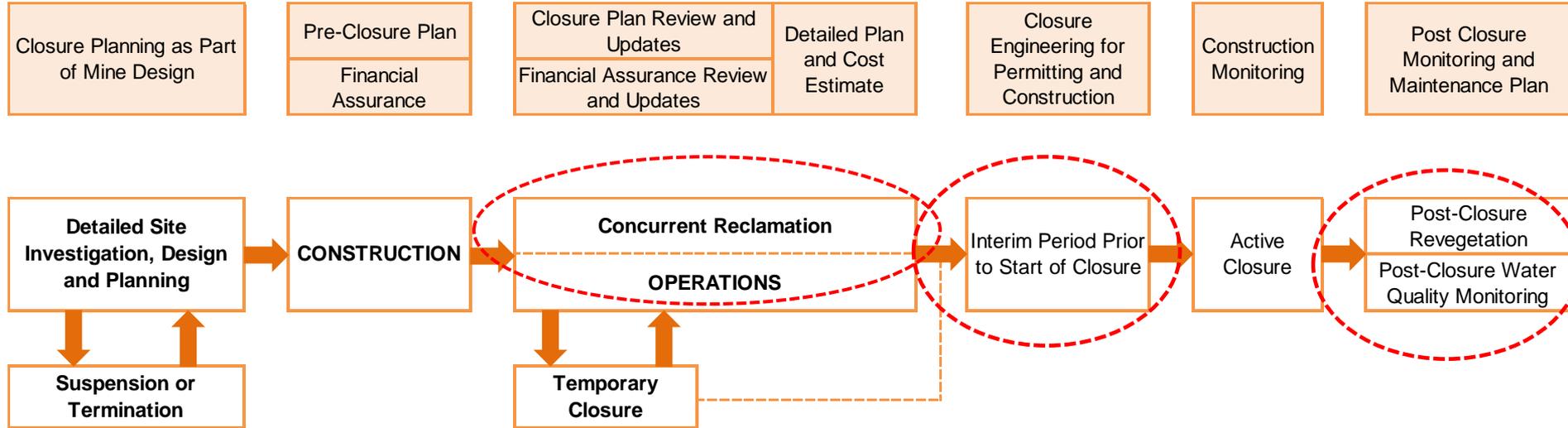
What is happening...

- Expectations for mine closure costing are increasingly global
- There's now a place for everything and everything needs a place
- Perpetuity has a number
- Economic trade-offs between direct cost and long-term cost obligations



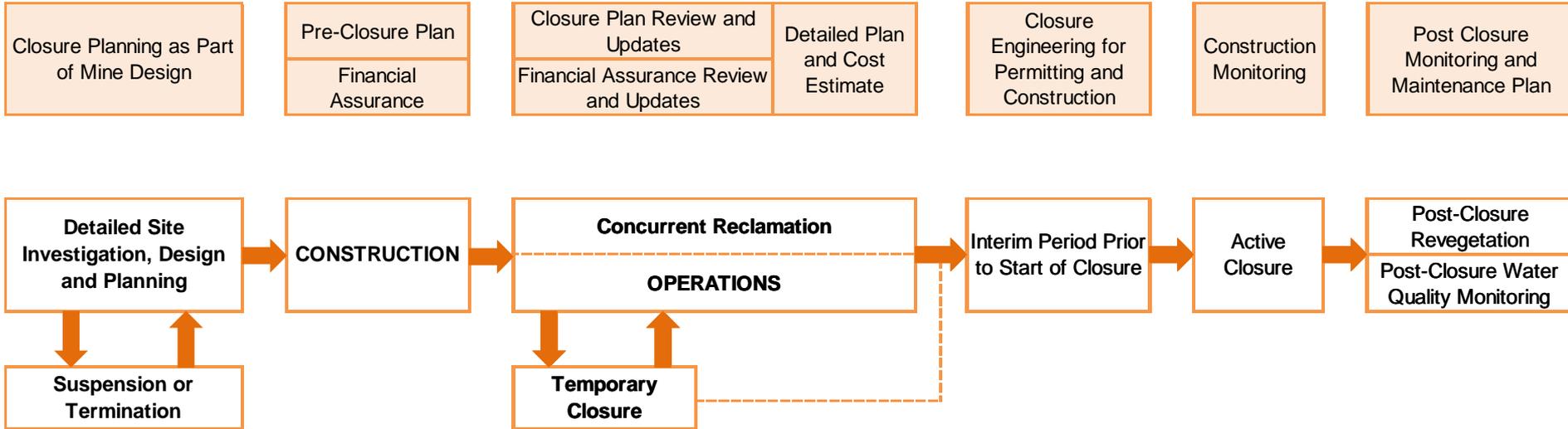


Expectations



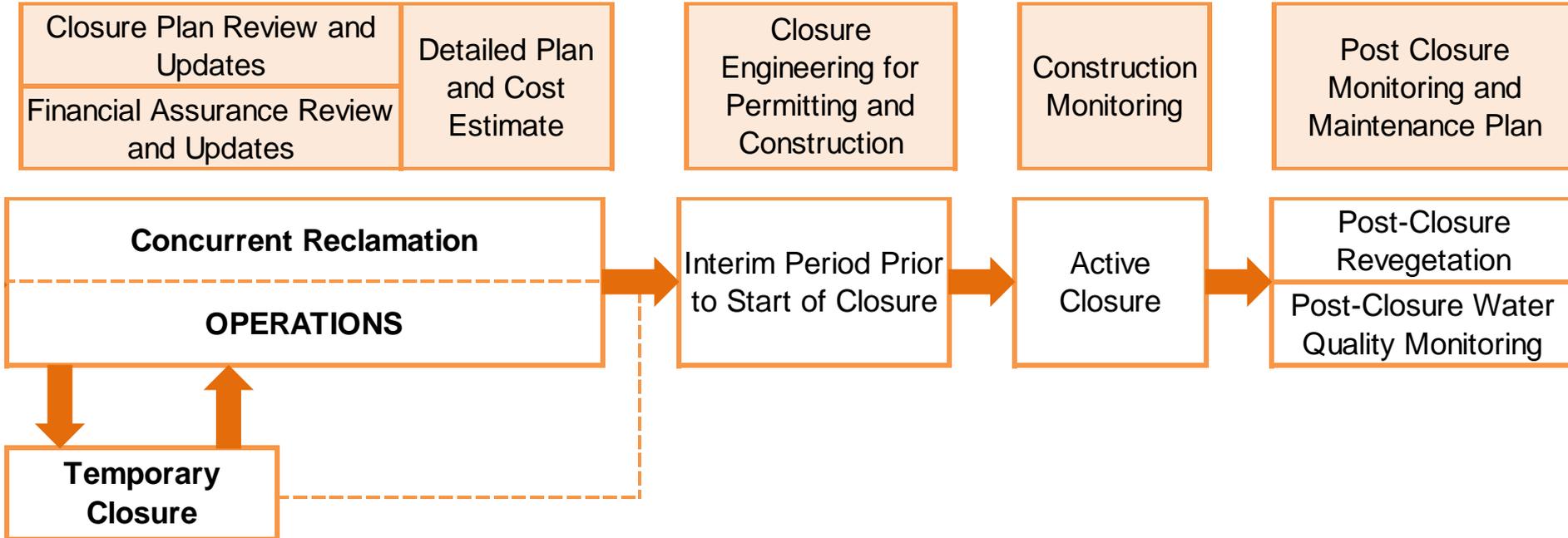


Expectations – Zooming In

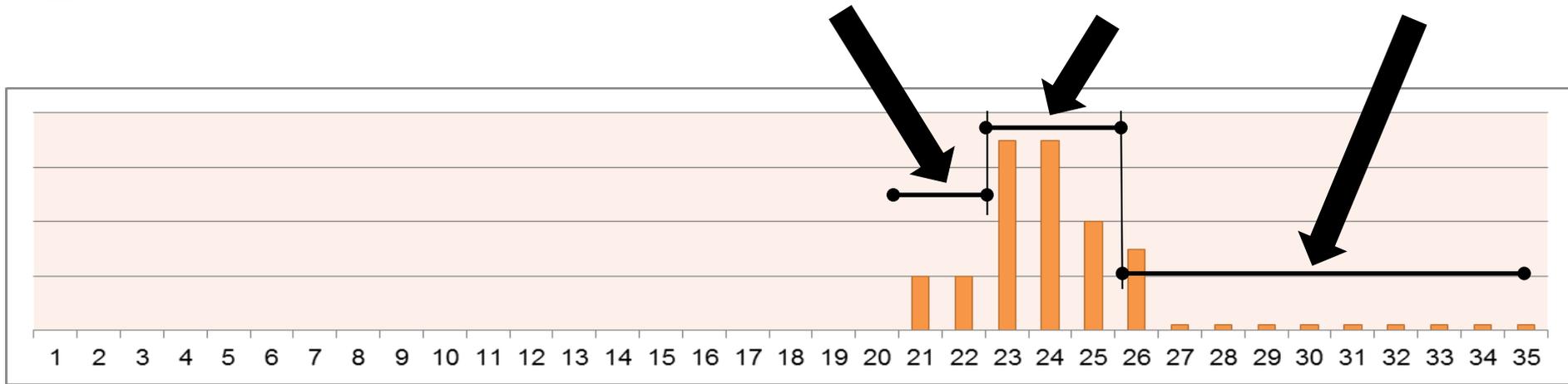




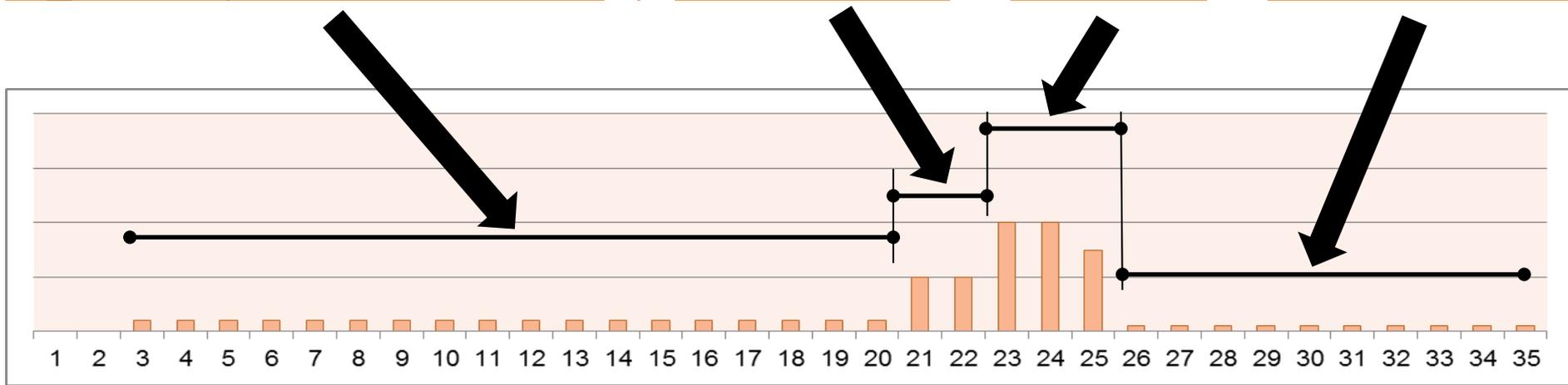
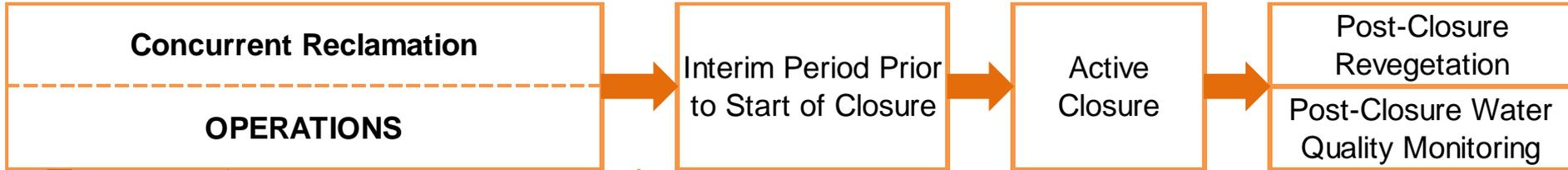
Expectations – Zooming In



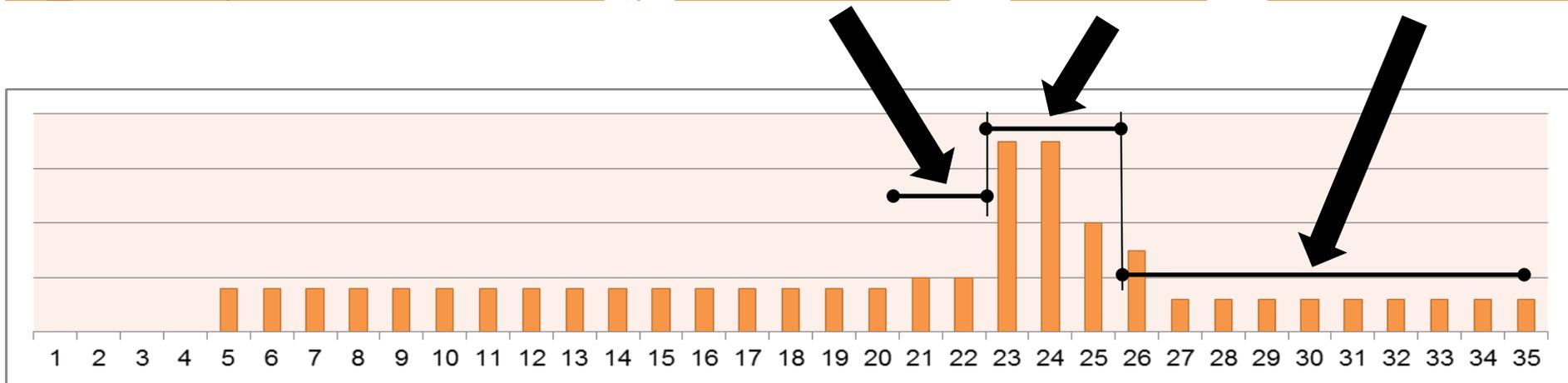
No Concurrent – Interim – Active – 10y PC



Concurrent – Interim – Active – 10y PC

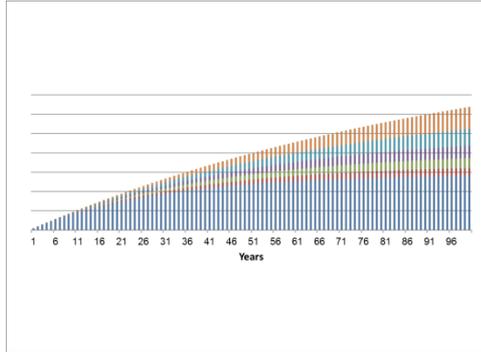


Mine Water Management – Active – 10y+ PC



Evolution of perpetuity in terms of post-closure mine water management

5 years and we'll check



to

30 years is a reasonable assumption

to

100 years and counting

Property, Location, Owner	Start of Operation	Current Production	Commodity and Mining Method	Comment
Fort Knox, Alaska, Fairbanks Gold Mining, Inc., Kinross	1997	40,000 ore tonnes/day	Gold Open Pit, Carbon-in-pulp mill and heap leach	2013 Closure Plan assumed mining ceases Dec 31, 2020
Greens Creek, Alaska, Hecla Mining Company	1987	2,000 ore tonnes per day	Silver, Gold, Zinc and Lead Underground, mill operations, dry stack tailings	Estimated end of mine life in 2028
Red Dog Mine, Alaska, Teck Cominco Alaska and NANA Regional Corporation	1989	10,000 ore tonnes/day	Zinc and Lead Open Pit, mill operations	Estimated end of mine life in 2039
Chino Mine, New Mexico, Freeport McMoran Copper and Gold, Inc.	1910	36,000 ore tonnes per day 150 million pound copper production via SX/EW	Copper Open Pit, mill and leach operations, conventional tailings	Estimated end of mine life in 2036 Completed 640 acres of reclamation in 2013

Property, Location, Owner	Start of Operation	Current Production	Commodity and Mining Method	Comment
Continental Mine, New Mexico, Freeport McMoRan Copper and Gold, Inc.	1968	6,500 ore tons per day	Copper Open Pit and Underground, conventional tailings	Restart in 2016, estimated end of mine life in 2025
Questa Mine, New Mexico, Chevron Mining Inc.	1919 to 2014 (UG) 1964 – 1983 (Open Pit)	14,000 ore tons per day	Molybdenum Underground Block Cave, mill flotation, conventional tailings	Chevron announced closure in June 2014
Tyrone Mine, New Mexico, Freeport McMoRan Copper and Gold, Inc.	1916 to 1921 (UG) 1967 to 1992 (open pit mill) 1984 to present (SX/EW)	100 million pound copper production via SX/EW	Copper Open Pit, leach operations	Estimated end of mine life in 2020 Completed 4,600 acres of reclamation between 2003 and 2013

Associated Financial Assurance Est.

Property, Location	Current Life of Mine (Years) ¹	Surety Cost Estimate (USD)	
		Undiscounted	
Fort Knox, Alaska ²	5	99,231,393	2013
Greens Creek, Alaska ³	13	68,918,907	2014
Red Dog Mine, Alaska ⁴	24	305,150,000	2010
Chino Mine, New Mexico ⁵	21	493,450,000	2007
Continental Mine, New Mexico ⁶	9	25,588,000	2014
Questa Mine, New Mexico ⁷	0	1,109,602,975	2013
Tyrone Mine, New Mexico ⁸	5	480,504,000	2008

1. As of January 1, 2015

2. Alaska Department of Natural Resources, (2014) "Mining Reclamation Bond, Reclamation and Closure of the Fort Knox and True North Mines," issued to Fairbanks Gold Mining, Inc.

3. Alaska Department of Natural Resources, (2014) "Corrected Approval of June 2014 Greens Creek Mine Reclamation Plan" issued to Hecla Greens Creek Mining Company, August 14.

4. Alaska Department of Natural Resources, (2010) "Mining Reclamation Bond, Red Dog Mine Reclamation and Closure and Dam Authorizations," issued to Teck Alaska Incorporated, June 30.

5. Golder (2007) "Chino Closure/Closeout Plan Update, Chino Mines Company," submitted to the New Mexico Environment Department and the MMD, August 28.

6. Telesto (2014) "2014 Continental Mine Closure/Closeout Plan Update," December.

7. Chevron Mining Inc. (2013) "Questa Tailings Disposal Facility and Stormwater Management and Water Treatment Project," submitted to the Mining and Minerals Division of the New Mexico Energy, Minerals and Natural Resources Department, October 17.

8. MMD (2008), Appendix A, Mine Closure Financial Assurance Summary, Permit DP 1341 and GR010RE, Tyrone Mine, issued December 23.

NPV Assumptions

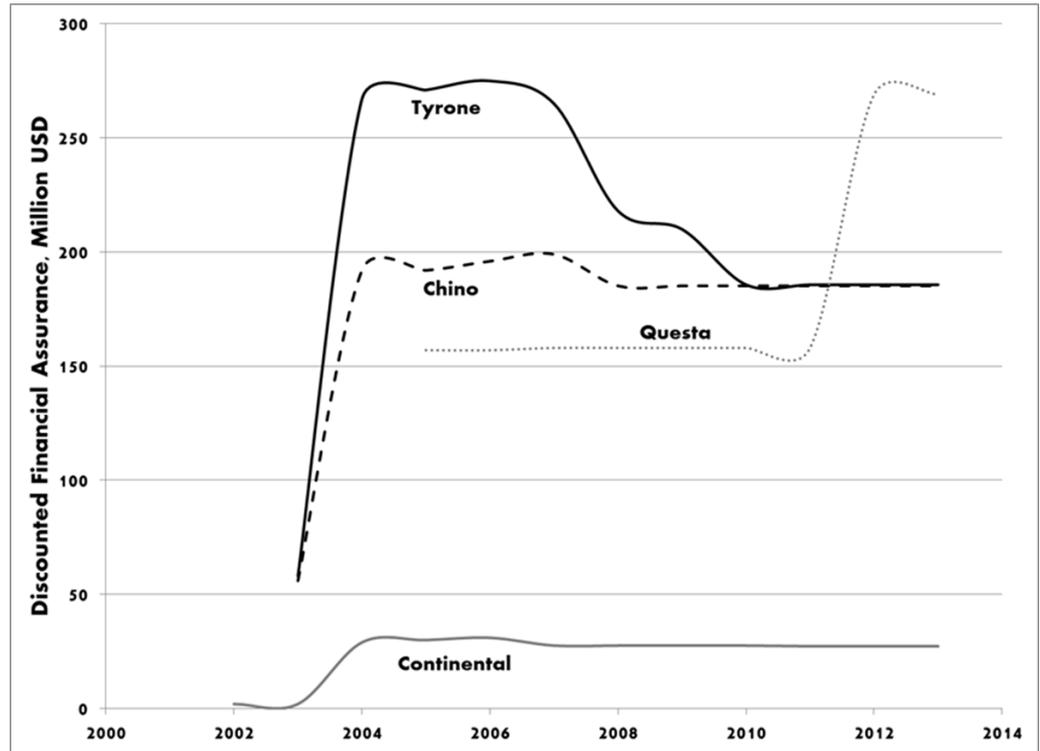
Property, Location, Owner	Discount Rate	Long term inflation rate	Post-Closure Operations and Maintenance Period	Reference
Fort Knox, Alaska, Fairbanks Gold Mining, Inc., Kinross	7.8%	3.5%	18 years (8 years WQ standards achieved, additional 10 years monitoring)	Kinross 2013
Questa Mine, New Mexico, Chevron Mining Inc.	6.81% ¹	2.62% ²	128 years (28 years reclamation and water treatment, 100 years water treatment and monitoring)	Chevron 2013

¹ Composite aggregate bond indices: Lehman Brothers US Government Aggregate Bond Index (1991 to 2007), Barclays Capital Aggregate Bond Index (2008 to 2012).

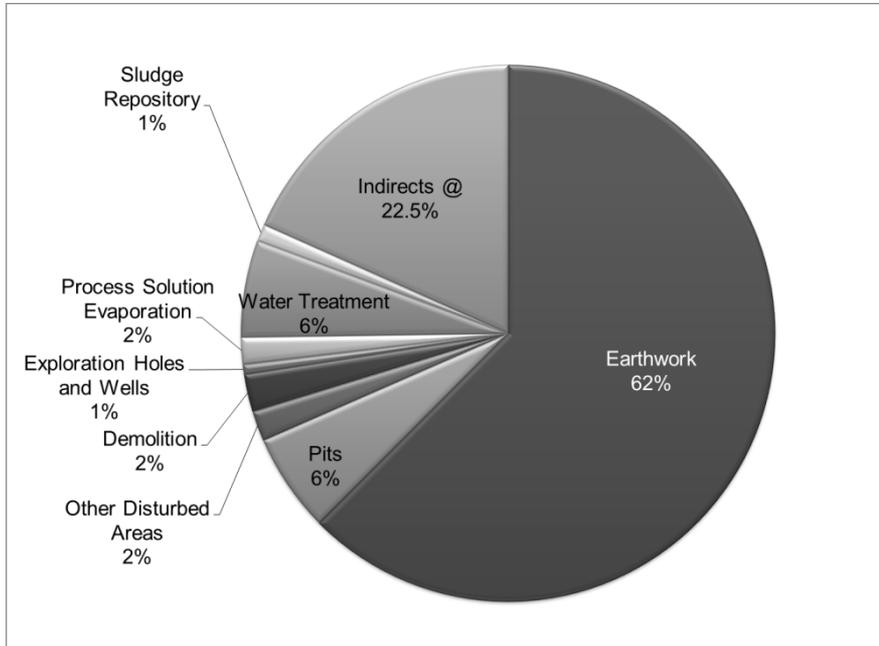
² US Department of Labor – Consumer Price Index – All Urban – West Consumers, Average from 1991 to 2012

New Mexico Financial Assurance

- Reported annually by the Mining and Minerals Division of the Energy, Minerals and Natural Resources Department
- Questa (Chevron)
- Tyrone, Chino and Continental (FCX)



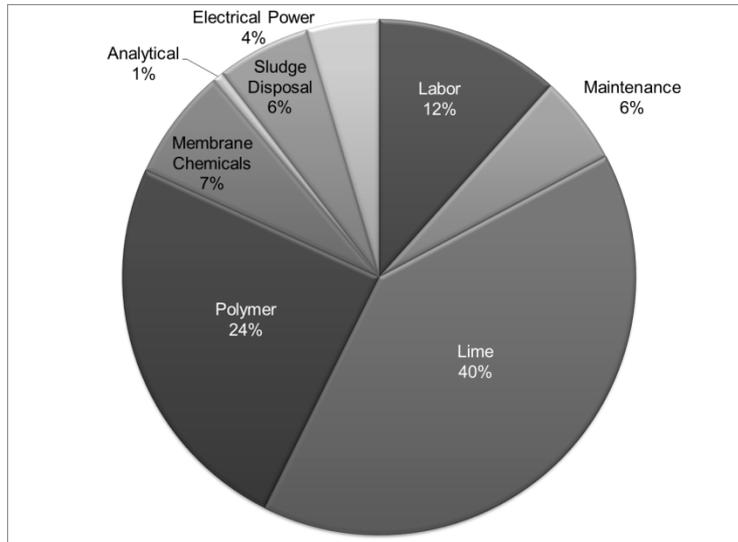
Direct Costs - Tyrone



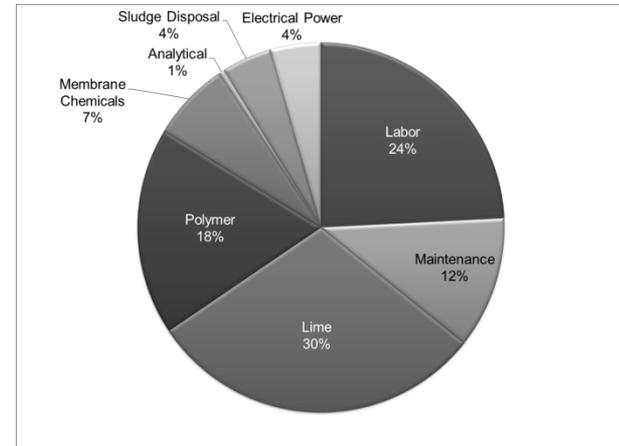
- Copper, Open Pit, leach operations
- ~ 100 year operating history
- Approximately 8,500 acres of disturbance
- Completed 4,600 acres of reclamation between 2003 and 2013
- **\$149MM Direct Cost**

Operating Costs - Tyrone

5MM USD per Year
Year 6 through 10



2.6MM USD per Year
Year 80 to 100

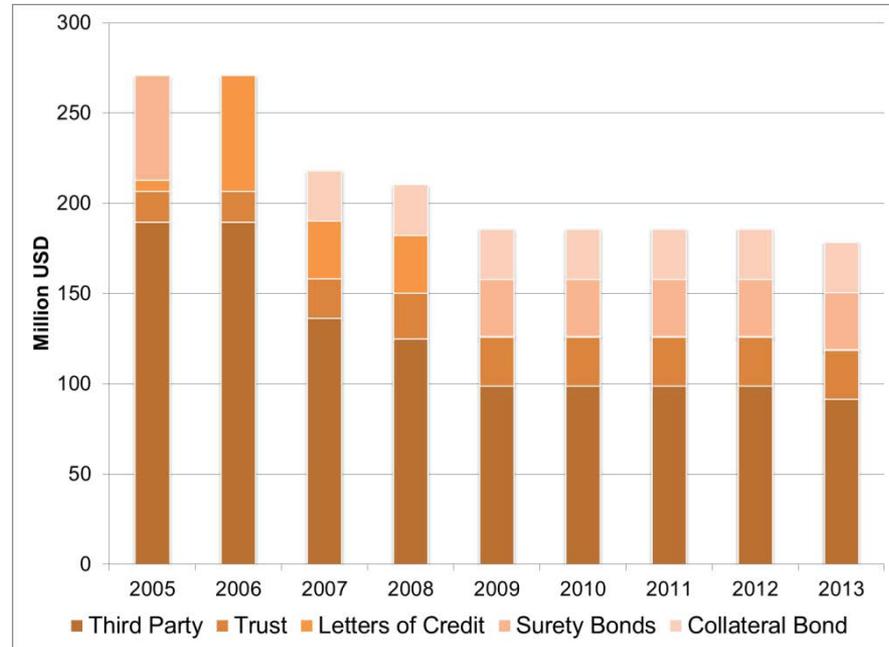


Unit costs for water treatment

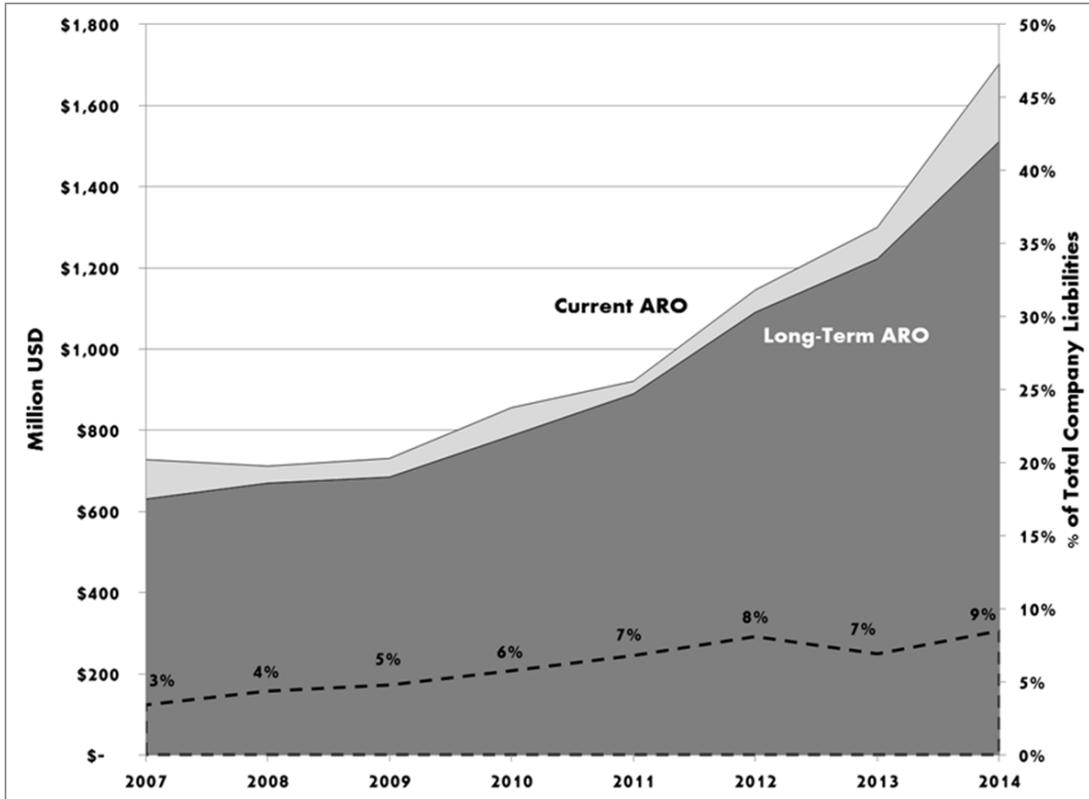
Property, Location	Average Treatment Rate (gpm)	Treatment Method(s)	Average Cost per kgal	Duration (years)
Red Dog Mine, Alaska	2,900	Lime Neutralization with High Density Sludge	4	100
Chino Mine, New Mexico	1,000	Lime Neutralization with High Density Sludge	5	100
Questa Mine, New Mexico	1,300	Lime Neutralization with High Density Sludge	7.5	100
Tyrone Mine, New Mexico	500	Evaporation	7	5
	475 to 275	Lime Neutralization with High Density Sludge coupled with membrane filtration	20	95

Financial assurance instruments over time

- Tyrone Mine
- Reported by MMD



ARO trends for FCX



Takeaways



- “All inclusive” closure cost estimates are a global phenomena
- Perpetuity \geq 100 years
- Source control (active closure) and management of migration (post-closure) economic trade-offs are increasing in scale
- Financial assurance industry is adapting
- ARO accounting can be the fastest changing liability on the balance sheet

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