

Redefine Mine Closure

Leaving a positive legacy



CSA Global
Mining Industry Consultants
an ERM Group company



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The business of sustainability



Closure is a Burning Platform for Industry....

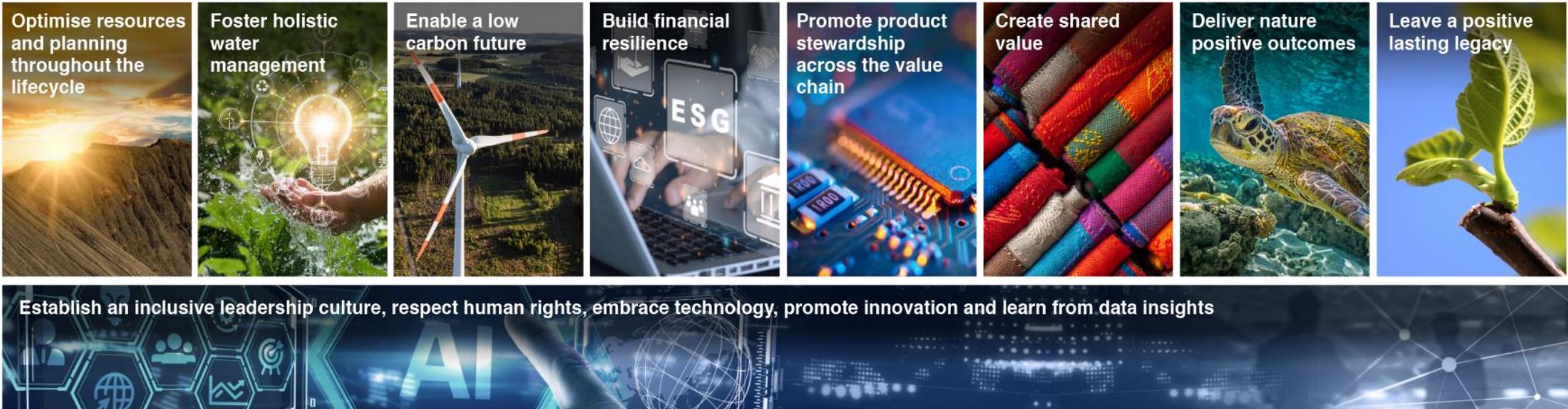
1. Closure is a material risk to mining companies.
2. The mining sector is beginning to better understand the potential total cost of closure
 - Often multiple times higher than originally estimated and/or carried on the books.
 - Total cost of closure is often unrealistic and optimistic - based on overly optimistic estimates and timelines, design and operating decisions, and amplified by ambitious commitments for land rehabilitation made in pursuit of permits.
 - Costs of execution commonly come in at levels that can have a material impact on the bottom line.
3. There is tremendous uncertainty in the likelihood and timing that closed sites will be able to be relinquished
4. Relinquishment successes across the globe are rare.
5. There is little incentive for government to return financial securities and certify closure completion. This results in long term care and maintenance costs

Factors leading to Poor Outcomes

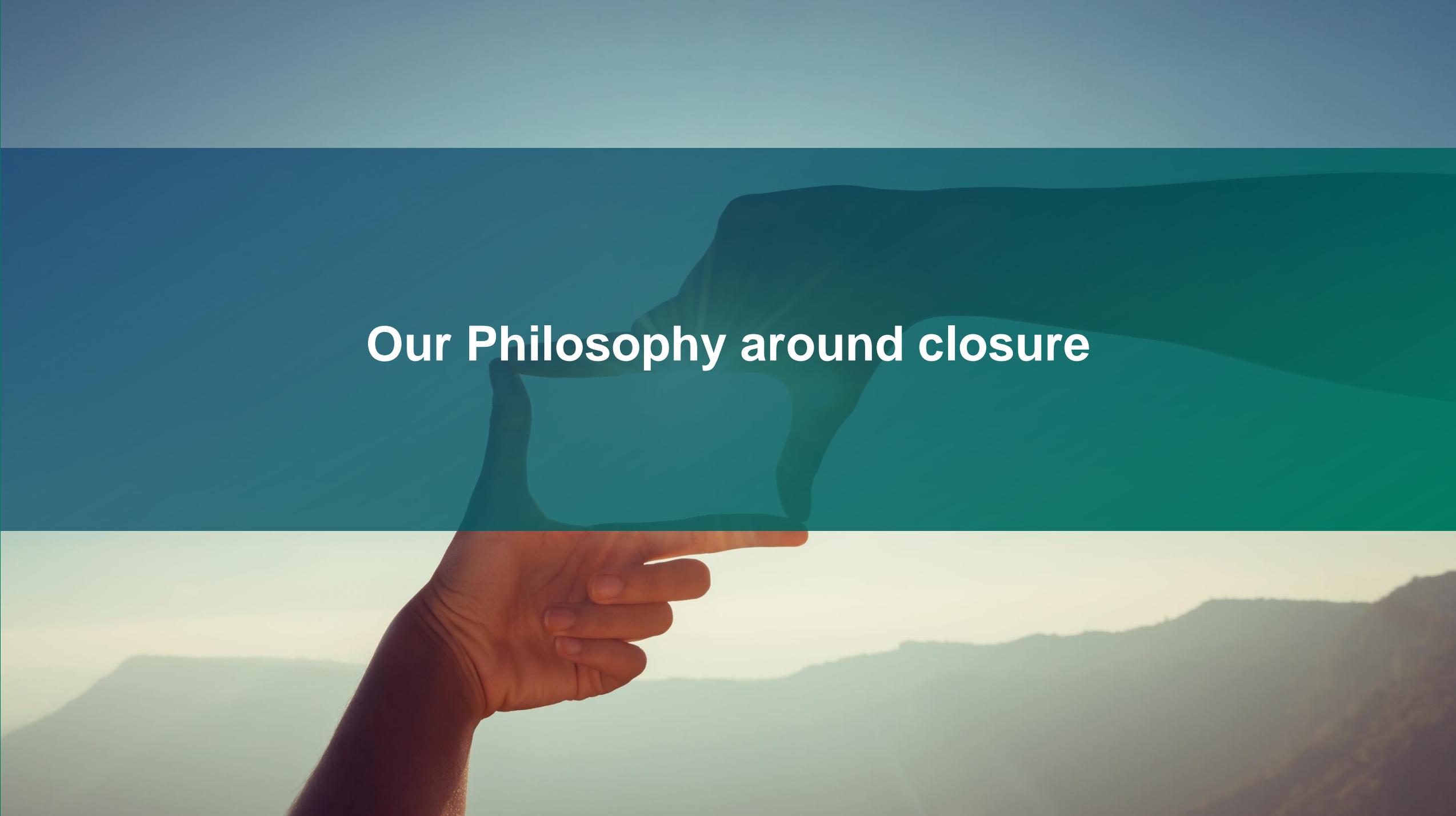
- It is common practice for industries to neglect closure information gathering throughout the life of the asset in favour of closure studies towards the end of the lifecycle.
- Across the industry closure plans do not identify the actions required to further develop the closure knowledge base, assess opportunities, manage risks, and ultimately inform the post-closure land use.
- Closure considerations are frequently restricted to the physical acts of demolition and rehabilitation with social considerations limited to restructuring of the organisation's workforce.
- Organisations commonly assume they know the needs of the local stakeholders with regards to social and economic transition to closure, and often identify the discrepancy in needs too late to be effectively managed.

In order to Create The Mine We all want to See™

Shaping sustainable future and creating value for all stakeholders through safe, just and responsible mining and materials processing.



It is vital we effectively tackle mine closure throughout life of mine, ensuring we meet business and community expectations and leave a positive lasting legacy.

A hand is shown holding a small, dark, rectangular object, possibly a piece of paper or a small book, against a background of a sunset or sunrise over a mountain range. The hand is positioned in the lower-left quadrant, with the fingers gently gripping the object. The background features a gradient of warm colors from yellow to orange, with silhouettes of mountains in the distance. The overall mood is serene and contemplative.

Our Philosophy around closure

Delivering Successful Business and Closure Outcomes

At ERM we have a resource pool of 7500 skilled staff across the World who bring industry-leading skills in:

- Mine closure planning, assessment and management
- Commercial and Strategy Leadership
- Biodiversity
- Sustainability
- Environmental and Social Impact Assessment
- Climate Change Adaptation
- Water management, water treatment
- Health and Safety Management
- Remediation Decommissioning
- Waste Characterisation and geochemical assessments
- Health & Safety Leadership and Management.

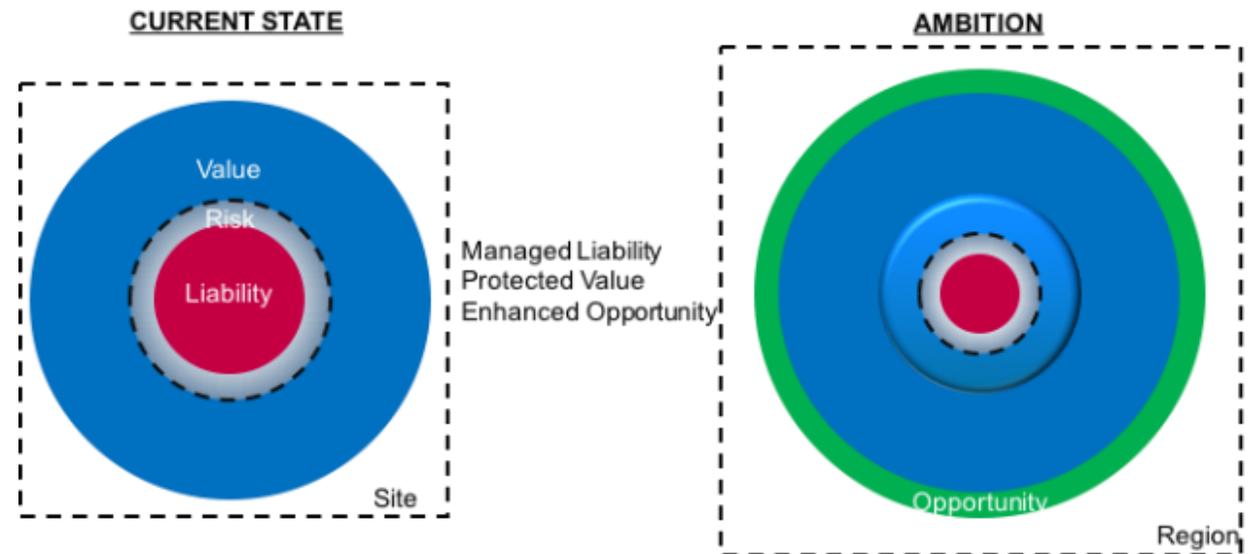


This provides a platform we are very proud of, but we will deliver great business and closure outcomes with our Clients because we are passionate about what we do, and we think like this.

Enabling a Different Kind of Conversation:

The Shared Value Approach to Repurposing & Regeneration

- To enable exploring a new closure paradigm, stakeholders need to be able to see this as an opportunity as opposed to a scale back on environmental and social commitments.
- Need to move from a conversation about Mine Closure
- To a discussion on Regional Opportunities that can arise from different closure outcomes
- Mining Companies become an actor in the system instead of the single proponent, creating a **shared value approach**



Building opportunity and using this to provide a focus for a new ambition. A shared problem is a problem halved.

Our Role in Supporting Closure & Asset Regeneration





Case Studies



De Beers Group

Snap Lake, Victor and Voorspoed Mines, Canada

Strategic Closure, Technical Support and Stakeholder Participation

ERM has been supporting De Beers Group to redefine current closure plans since 2018 for three assets in their portfolio where production has ceased. These sites are being used as case studies supporting a paradigm shift in the overall approach to mine closure referred to as “Reimagining Closure”.

ERM has worked with De Beers to establish the business case for change, develop the strategic framework for reimagining, and supported the execution of site specific plans and studies. Key to this work has been taking an unconstrained view of the scope of the closure plans and introducing collaborative design as a tool to better engage regional stakeholders in decision making. ERM continues to support De Beers as they look to apply a ‘reimagining lens’ to their portfolio of active, closing, and legacy sites more broadly. This work is showing early success by reducing the total cost of closure and establishing conditions where regional value can be created in the post-closure phase.

Lessons Learned

- Acknowledging mine closure as a material business risk.
- Taking a more holistic view of mine closure and its strategic objectives.
- Transition thinking from managing liabilities to creating opportunities.
- Embracing a range of potential outcomes that go beyond demolition and rehabilitation.
- Involving regional stakeholders as active participants and peers in decision making.



Ranger Uranium Mine

Technical Studies and ongoing Hydrogeological expertise

ERM have supported Rio Tinto through closure by completing numerous technical studies that build upon previous studies completed the ERM team members at Ranger since 2009.

The team at ERM have worked closely with the Ranger hydrogeological team to establish and redefine background constituents of potential concern (COPCs) in groundwater surrounding the site, and assess potential environmental impacts. This knowledge is being fed into key hydrogeological studies to inform post closure conditions. A soil investigation is currently being led by ERM to determine potential contamination issues associated with water treatment and disposal areas, as well as provide remediation options.

ERM continue to support and advise ERA's water management team with their groundwater compliance reporting and regulatory commitments, and have done so since 2015. Technical advice has been provided to ERA by our technical leadership team and through attendance at key workshops attended by external stakeholders. Key workshops have required communication on geochemical advice related to potential acid sulphate soils (PASS) and adapting to climate change conditions and external expectations.

Value delivered to client

- Proactive management of external expectations.
- Supporting Rio Tinto through a constantly changing atmosphere in the closure space.
- Successfully working in highly sensitive environmental areas.
- Need to promote a culture of respect, trust and transparency between Rio Tinto, delivery teams and stakeholders.
- ERM has consistently supported Rio Tinto through a constantly changing atmosphere in the closure space.



Ebbw Vale, United Kingdom

Sustainable Regeneration Program

Ebbw Vale Steelworks, South Wales closed in 2002. The closure precipitated a fundamental change in the local economy, and the Welsh Assembly Government and Blaenau Gwent CBC commenced a programme of reclamation and redevelopment in 2005. ERM was appointed to lead the delivery team, and development is now well advanced, with a new educational campus, a new hospital housing and community facilities at its core.

Value delivered to client

- Leading a multidisciplinary team of some 14 designers and advisors.
- Project management and programming.
- Sustainability visioning, advice, assessment and auditing.
- Environmental Impact Assessment.
- Stakeholder engagement and health impact assessment.
- Strategic advice on sustainable procurement, waste and recycling.
- Transport assessment.
- Carbon footprinting and strategic emissions reduction planning.
- Sustainable Development Management Systems.

The Works' Ebbw Vale has become recognised by the Welsh Assembly Government and the Design Commission for Wales an exemplar of sustainable regeneration. The project is characterised by ERM's holistic approach to sustainability, which places equal emphasis on social and economic aspects as environmental and resource use issues. ERM's team secured outline planning consent for the £350 million development in 14 weeks with only one formal objection submitted.



Horsehead Zinc Smelter, Pa, USA

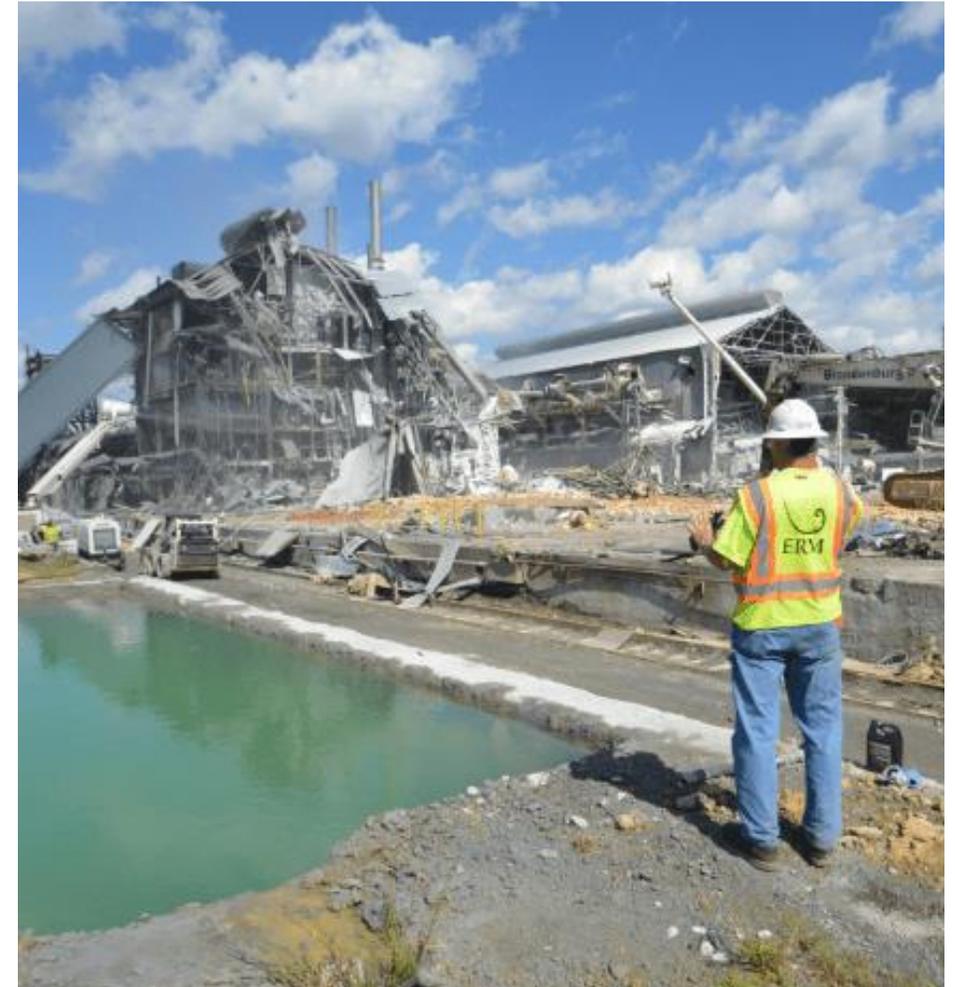
Demolition Management & Material Recovery

ERM managed a turn key DDD project of the former Horsehead zinc smelting facility and 110 MW George F. Weaton Power Station near Pittsburgh Pennsylvania USA. The client required the demolition prior to property sale to Shell Oil Company for the development of a new multi billion dollar ethylene cracker plant. The scope included the demolition to grade of >80 structures on 260 acres along the Ohio River.

Given the location on the banks of the Ohio River extensive marine protection measures were taken and activities were coordinated with the United States Coast Guard as well as regulators and community. Ancillary features and equipment were taken out of service and demolished while essential operations of the main zinc smelter remained temporarily operational.

Value Delivered to client

- Decontamination, abatement, and demolition of the power plant and associated coal unloading structures and stacks with a 70 calendar day period.
- Recovery and recycling of over 29,000 tons of scrap steel and non ferrous metals to fund the abatement, decontamination and demolition efforts.
- Managing the transportation and off site disposal of over 13,000 tons of friable and non friable asbestos containing material and screening, loading and shipping of over 10,000 tons of zinc dust for reuse.



Thompson Smelter, Manitoba, Canada

Stakeholder Engagement to Build Economic Diversification

In 2010, Vale announced that it would be closing its smelter and refinery in Thompson, Manitoba by 2015 with the estimated loss of 500 jobs. Recognizing the urgent need to identify economic development opportunities that could help reduce the impact of the closure, the City of Thompson embarked on a participatory planning exercise involving citizens, the City, the chamber of commerce, other levels of government, the mining company, as well as five First Nations from the region. Known as the Thompson Economic Diversification Working Group (TEDWG), this coalition of ten stakeholders developed a comprehensive set of plans and strategies that together form the Thompson Economic Diversification Plan. Working with the TEDWG ERM rePlan ensured the process was systematically followed and that all voices were heard.

ERM rePlan was also able to bring valuable planning skills and technical support that was required to revise the regulatory framework and develop a series of action plans in five priority areas that addressed either bottlenecks to economic development or opportunities for diversification. Action Plans were developed for: i) Education and Training; ii) Housing; iii) Local and Regional Identity/Place Branding; iv) Restorative Justice, and; v) Economic Development. When taken together, the new regulatory framework and the individual action plans form a comprehensive framework for sustainable economic diversification, development and growth in the Thompson Region.

Lessons Learned

The Thompson Economic Diversification Working Group process represents a Canadian best practice in stakeholder engagement and strategic planning involving northern communities with large urban and regional Aboriginal populations which ensured that both local and regional stakeholders were fully engaged in planning for the long term sustainability of their community.



ERM in the Mining, Metals and Materials Community Four Brands – One Solution

ERM is a global consulting firm that collaborates with leading mining companies to operationalize sustainability – bringing corporate sustainability strategies, commitments, and policies to life across an organization.

This “boots to boardroom” approach is possible by linking our local, technical know-how with evolving ESG insights.



We work with Juniors to move from concept to discovery, and support Mid-tiers and Majors to improve their operational performance, build resilient stakeholder relationships and plan early for closure to mitigate long-term costs.

Acquired ERM Groups companies, CSA Global, Critical Resource and Stratos, bring geotechnical, data and in-country political stakeholder specialists to our team.



CSA Global
Mining Industry Consultants
an ERM Group company

CSA Global delivers services across geological exploration, resource estimation, mine geology, water management, geometallurgy, mine engineering and data management. The team at CSA Global help our clients journey across the exploration, evaluation and development stages of mining – taking their mine from concept through to feasibility study then development and operation.



Stratos works across the space between government, industry, Indigenous peoples and NGOs to collaborate and support them in developing the ideas, strategies and tools they need to solve large scale, non-linear, complex problems. Offering transformative yet practical solutions.



Critical Resource is focused on political, stakeholder and sustainability challenges in the resource sector allowing companies to unlock their commercial value by managing these challenges in a strategic and responsible way. Providing independent assessments and assurance, alongside in-country project support to help clients understand and manage their stakeholder, political and reputational risks. We also support senior executives to design and implement group-level strategies that help to align their organizations behind them.

Together, we employ 7,000+ specialists who work across 170 offices in 39 countries and territories around the world.

What Makes the ERM Group of Companies Different?

A Boots to Boardroom Approach

We connect baseline science to navigate the political, social & regulatory landscape at the operation and corporate levels

Work Across the Entire Lifecycle

Help to explore, evaluate & optimize resources at every stage of the mining lifecycle.

Help You Understand & Manage Your Business Risks

We work with our client to identify, manage & Integrate technical and non-technical risks.

Offer a Scalable Approach

We support our Client across their specific or holistic project needs.

A Proven Approach for Collaborative Partnerships

A proven approach to forming collaborative partnerships and resilient relationships with Indigenous communities and other Communities of Interest.



We're Proud of Our Accomplishments

EBJ Technology Merit: Virtual Engagement

Implementing and maximizing digital community engagement in a Virtual Open House for TC Energy Corporation in preparation of the 2021 NOVA Gas Transmission Ltd. System Expansion Project in Alberta, Canada. [Read More Here.](#)

WIM UK 100 Global Inspirational Women in Mining in 2020

Ivy Chen, Principal Consultant with CSA Global, joins ERM's Managing Partner Louise Pearce, as women who have gone "above and beyond contributions to the industry and been identified as role models for future generations." [Read More Here.](#)

2019 Supplier of the Year

Resolution Copper recognized ERM for our work on demolition projects in Superior, Arizona, United States. The ERM team completed the project with over 10,300 hours of fieldwork without any injuries or incidents. [Read More Here.](#)

Here are some recent acknowledgments and awards that ERM has received in the mining space.

We are proud to collaborate on projects around the world that help companies to shape a sustainable future with the world's leading organizations.

[Read more here.](#)

Where You Can Find Us Around the World



170
Offices
Worldwide

NORTH AMERICA
65 offices in the US & Canada
2,500+ professionals

ASIA PACIFIC
26 offices in 13 countries
1,096 professionals



7000+
Professionals

**LATIN AMERICA &
THE CARIBBEAN (LAC)**
10 offices in 6 countries
550+ professionals



39
Countries &
Territories

**EUROPE, MIDDLE EAST
& AFRICA (EMEA)**
33 offices in 17 countries
2,000+ professionals

Capital Project Delivery

We keep capital projects on schedule & budget by mitigating EHS risks across the project lifecycle.

[Learn more.](#)



Mergers & Acquisitions

We mitigate environmental, social and governance (ESG) and sustainability risks to protect and build value across the investment lifecycle by delivering insight-driven, commercially-focused due diligence.

[Learn more.](#)



Safety Services

We move companies beyond traditional compliance and corrective programs to maximize the return on safety investments - to safeguard lives, protect assets and strengthen reputation.

[Learn more.](#)



Product Stewardship

We help clients bring products to market safely, sustainably, and in compliance with global regulations, while meeting business goals and delivering value to stakeholders.

[Learn more.](#)



Operational Performance

We help companies mitigate risk, grow revenue, and manage costs by optimizing EHS functions with data-driven approaches, operational support and delivering managed services.

[Learn more.](#)



Low Carbon Economy Transition

Our world-class people work at the intersection of science and business and bring extensive technical and strategic capability to help organisations act at the scale and speed necessary to remain successful.

[Learn more.](#)



EHS Management & Compliance

We work with every level in the organization to define, design, and deploy programs that achieve sustainable compliance, effectively manage EHS issues, control operational costs and reduce risks.

[Learn more.](#)



Digital Services

We help business leaders achieve a step-change in EHS and sustainability performance through tech-enabled innovation. Our global expert network allows us to deliver results at pace and scale.

[Learn more.](#)



Corporate Sustainability & Climate Change

We partner with organizations to build and design clear corporate strategies and programs to enhance their transparency and disclosure on complex sustainability challenges, from climate change risk to human rights.

[Learn more.](#)



Liability Portfolio Management & Remediation

We strategically assess and manage environmental liabilities through digital applications and custom, technically integrated end-to-end site investigation, remediation, decommissioning and retirement solutions.

[Learn more.](#)



Our Purpose

Shaping a sustainable future with the world's leading organizations

50+

Years of experience

20,000+

Projects each year

>50%

of the Global Fortune 500

170

Offices in 40+ countries and territories

7,000+

Employees worldwide

100+

Thought Leaderships per year

Thank you



Chris Gimber
Partner,
ERM Asia Pacific

+61 419 734 969
Chris.Gimber@erm.com



Paul Hesketh
Global Mine Closure
Lead, ERM EMEA

+44 776 631 5463
Paul.Hesketh@erm.com



Derek Chubb
Partner,
ERM North America

+1 416 726 5984
Derek.Chubb@erm.com



Ricardo Camargo
Partner,
ERM LAC

+55 119 3403 5358
Ricardo.Camargo@erm.com

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