

Maritz E. Rykaart

Practice Leader and Principal Engineer


Profession

Civil/Geotechnical Engineer

Education

BEng (Civil), Rand Afrikaans University, South Africa, 1991.
MEng (Civil), Rand Afrikaans University, South Africa, 1993.
PhD Geotechnical Engineering, University of Saskatchewan, Canada, 2001.

**Registrations/
Affiliations**

PEng, (BC, SK, YT, MB, NWT/NT), Canada
Member of Canadian Geotechnical Society
Member of Canadian Dam Association
Executive of Cold Regions Group (CGS)

Specialisation

Geotechnical engineering; Permafrost engineering; Soil cover design and construction; Mine waste management system design and closure; Tailings containment system design and construction.

Expertise

- Unsaturated soils, including teaching of short courses
- Mine waste system cover design, construction and performance monitoring
- Design and implementation of soil geotechnical field investigations
- Design, construction and inspection of earthen embankment and tailings dams
- Design and construction of mine water management systems, including surface water diversion structures, spillways, storm water channels etc.
- State-of-the-art drain-down modeling for tailings and heap leach facilities
- Mine closure plan development, including closure cost estimating
- Permafrost engineering
- Project management, including large multi-disciplinary projects

Employment

2009/4 – Present	SRK Consulting (Canada) Inc., Practice Leader, Vancouver, Canada.
2006/4 – 2009/3	SRK Consulting (Canada) Inc., Principal Consultant, Vancouver, Canada.
2001/10 – 2006/3	SRK Consulting (Canada) Inc., Senior Consultant, Vancouver, Canada.
1998/9 – 2001/9	University of Saskatchewan, Ph.D. Candidate & Research Assistant, Saskatoon, Canada.
1996/9 – 1998/8	Wates, Meiring & Barnard (Pty) Ltd., Geotechnical/Civil Engineer, Midrand, South Africa.
1996/1 – 1996/8	Thuthuka Project Managers (Pty) Ltd. Site Engineer/Project Manager, Springs, South Africa.
1993/7 – 1995/12	Wates, Meiring & Barnard (Pty) Ltd., Geotechnical/Civil Engineer, Midrand, South Africa.
1992/1 – 1993/6	Rand Afrikaans University, M.Eng. Candidate & Research Assistant, South Africa.

Publications

49, including refereed journal papers, conference proceedings and invited lectures

Languages

English, Afrikaans

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Publications

1. Kurylo, J., Podaima, T., Rykaart, M. (2015). Building on Soft Tailings: East Lake TMF Expansion. Tailings & Mine Waste 2015 Proceedings, Vancouver, BC, Canada, October 26-28, 2015.
2. Rykaart, M., Miller, M., Kurylo, J., Wade, L. (2015). Evaluating the Performance of a Frozen Core Dam Founded on Ice Rich Saline Marine Silts and Clays. Proceedings of GeoQuebec 2015. Canadian Geotechnical Conference, Quebec City, Quebec, Canada, September 21-23, 2015.
3. Miskolczi, I., Rykaart, M., Stringer, S., Connell, R. (2014). Evolution - Changing Cover Objectives to Fit the Purpose. The Con Mine Experience. Paper presented at InfoMine cold covers practice 2014, Whistler, Canada, April 7-9, 2014.
4. Rykaart, M. (2014). Five Shades of Grey - Five Habits for Effective Cold Region Cover Design. Paper presented at InfoMine cold covers practice 2014, Whistler, Canada, April 7-9, 2014.
5. Rykaart, M., Parshley, J., Maley, P. (2013). Draindown modeling: scaling up to the real world. Paper presented at Heap Leach Conference, Vancouver, Canada, 22-25 September 2013 (Invited).
6. Kurylo, J., Rykaart, M., Wade, L. (2013). Engineering Challenges for Tailings Management Facilities in Permafrost Regions. Paper presented at Tailings2013, Santiago, Chile, 27-29 August 2013.
7. Miller, M., Kurylo, J.B., Rykaart, M. (2012). Frozen dams in permafrost regions. Paper submitted to the Mine Water Solution in Extreme Environments Conference, Lima, Peru, April 15-17, 2013.
8. Rykaart, M. (2010). To Cover or not to Cover? Using Soil Covers in Cold Regions. Paper presented at the Canadian institute's Northern Reclamation & remediation Conference, Yellowknife, NT, Canada, May 18-19, 2010 (Presentation only, Invited).
9. Rykaart, M. (2010). Mine Waste Disposal Site Selection. Paper presented at SRK Workshop on Tailings and Heap Leach Engineering, Vancouver, BC, Canada, April 28 – May 1, 2010 (Presentation only).
10. Rykaart, M. (2010). The 5 Habits of highly Effective Cover Design. Paper presented at SRK Workshop on Tailings and Heap Leach Engineering, Vancouver, BC, Canada, April 28 – May 1, 2010 (Presentation only).
11. Rykaart, M. (2009). The 5 Habits of Highly Effective Cover Design. Paper presented at the Modern Mine Reclamation Workshop, Alaska Miners Association, 2009 Annual Convention & Trade Show, Anchorage, Alaska, USA, November 2-8, 2009 (Presentation only, Invited).
12. Rykaart, M., Hockley, D. (2009). Cover Design and Construction Practices in the North (Cold Regions). Paper presented at the 2009 Northern Latitudes Mining Reclamation Workshop, Yellowknife, NT, Canada, September 9-10, 2009 (Presentation only, invited).
13. Rykaart, M. (2007). Performance of Tailings Covers in Northern Climates. Paper presented at the 25th Annual Yellowknife Geoscience Forum, Yellowknife, NT, Canada, November 20-22, 2007 (Presentation only, Invited).
14. Chapman, J.T., Coedy, W., Schultz, S., Rykaart, M. (2007). Water Treatment and Management during the Closure of the Colomac Mine. Proceedings of the Mine Closure 2007 Conference. Santiago, Chile, October 16-19.

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15. Rykaart, M. (2007). Experience with the Application of Cover Systems. Proceedings of the APEGBC hosted workshop "Emerging Technologies in Mine Waste Management", Vancouver, BC, Canada, April 2007.
16. Rykaart, M. (2006). Important Considerations for Closure Cover Systems in a Northern Environment. Paper presented at the Canadian Institute's Northern Mine Reclamation Management Conference, Yellowknife, Northwest Territory, Canada, May 29-30, 2006 (Presentation only, Invited).
17. Rykaart, M., Hockley, D., Noel, M., Paul, M. (2006). Findings of International review of Soil Cover Design and Construction Practices for Mine Waste Closure. Proceedings of the 7th International Conference on Acid Rock Drainage (ICARD), St. Louis, MO, USA, March 26-30, 2006, pp. 1804-1822.
18. Rykaart, M., Boyce, S. (2005). From Numerical Modeling to Practice: Cover Performance Data for Five Heap Leach Pads. Paper presented at Heap Leach and Waste Rock Facility Closure Workshop, Elko, Nevada, USA, June 21-22, 2005 (presentation only).
19. Rykaart, M., Hockley, D., Noel, M. (2005). Results of International Review of Design and Construction Practices for Soil Covers Used in Mine Waste Closure. Paper presented at CIM Toronto 2005, Toronto, Ontario, Canada, April 24-27, 2005 (Presentation only, Invited).
20. Rykaart, M., Hockley, D., Noel, M., Paul, M., Jahn, S. (2004). International Review of Soil Cover Design and Construction Practices. Paper presented at the 11th Annual British Columbia ML/ARD Workshop, Vancouver, British Columbia, Canada. December 1-2, 2004 (presentation only).
21. Hockley, D., Rykaart, M., Noel, M. (2004). Soil Covers in the Canadian North. Paper presented at the 11th Annual British Columbia ML/ARD Workshop, Vancouver, British Columbia, Canada. December 1-2, 2004 (presentation only).
22. Rykaart, M., Noël, M. (2004). Comparative Surface Flux Boundary Modeling as Applied to the Design of Soil Covers. Paper presented at the 2004 SME Annual Meeting & Exhibit, Denver, Colorado, USA, February 23-25 (presentation only).
23. Wilson, G.W., Williams, D.J., Rykaart, E.M. (2003). The Integrity of Cover Systems - An Update. The AusIMM Bulletin. Journal of the Australian Institute of Mining and Metallurgy. Pages 63-69, November/December 2003.
24. Rykaart, E.M., M. Noël (2003). "Comparative Study of Surface Flux Boundary Models to Design Soil Covers for Mine Waste Facilities". Proceedings of the 6th International Conference on Acid Rock Drainage (ICARD), Cairns, Australia, 12-18 July, 2003.
25. Rykaart, E.M., G.W. Wilson (2003). Methodology for Calculating the Closure water Balance for an Acid Generating Tailings Dam. Proceedings of the 6th International Conference on Acid Rock Drainage (ICARD), Cairns, Australia, 12-18 July, 2003.
26. Rykaart, E.M., G.W. Wilson, N. Currey, P. Ritchie, (2003). Case Study: Final Closure of a Tailings Dam Using Direct Vegetation. Proceedings of the 6th International Conference on Acid Rock Drainage (ICARD), Cairns, Australia, 12-18 July, 2003.
27. Hockley, D.E., M. Noel, E.M. Rykaart, S. Jahn, M. Paul (2003). Testing of Soil Covers for Waste Rock in the Ronneburg WISMUT Mine Closure. Proceedings of the 6th International Conference on Acid Rock Drainage (ICARD), Cairns, Australia, 12-18 July, 2003.
28. Wilson, G.W., D. Williams, M. Rykaart (2003). The Integrity of Cover Systems. Proceedings of the 6th International Conference on Acid Rock Drainage (ICARD), Cairns, Australia, 12-18 July, 2003.

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29. Parshley, J., Buffington, R., Rykaart, M. (2003). Lessons Learned from the Closure of the Yankee Heap Leach Pad, Bald Mountain Mine, Nevada. Paper Presented at the Heap Leach Closure Workshop, Elko, Nevada, USA, March 25-26. (presentation only).
30. Fredlund, M.D., Stianson, J., Rykaart, M. (2003). Automatic Mesh Refinement in the SVFlux and ChemFlux Software Packages. Proceedings of 2nd Asian Conference on Unsaturated Soils (UNSAT-Asia 2003), 10-12 November, Osaka, Japan.
31. Rykaart, E.M., G.W. Wilson, D.G. Fredlund (2002). Spatial Surface Flux Boundary Model for Tailings Impoundments. Proceedings of the Tailings and Mine Waste Conference 2002, Fort Collins, Colorado, USA, January 28-29, pp. 283-291.
32. Rykaart, E.M. (2002). A Methodology to Describe Spatial Surface Flux Boundary Conditions for Solving Tailings Impoundment Water Problems. Ph.D. Thesis, Department of Civil Engineering, University of Saskatchewan, Saskatoon, Saskatchewan, Canada.
33. Fredlund, M., J. Stianson, M. Rykaart (2002). Applications of Automatic Mesh Refinement in the SVFlux and ChemFlux Software Packages. Proceedings of the 55th Canadian Geotechnical Conference, Niagara, Ontario, Canada. October 20-23.
34. Rykaart, M., M. Fredlund, J. Stianson (2002). Modeling tailings dam flux boundary conditions with 3-D seepage software. Ground Engineering, Vol. 35, No. 7, July, pp. 28-30.
35. Rykaart, M., M. Fredlund, J. Stianson (2001). Solving tailings impoundment water balance problems with 3-D seepage software. Geotechnical News Magazine, Bitech Publishers, Vancouver, B.C., Vol. 19, No. 4, December, pp. 50-54.
36. Rykaart, E.M., G.W. Wilson, D. Fredlund, N.A. Currey (2001). A Spatial Flux Boundary Model for Tailings Dams. Proceedings of the 54th Canadian Geotechnical Conference. Calgary, Alberta, Canada. 16-19 September. Volume 2, pp. 1102-1109.
37. Wates, J.A., E.M. Rykaart (1999). The performance of natural soil covers in rehabilitating opencast mines and waste dumps in South Africa. Water Research Commission Report No. 575/1/99.
38. Rykaart, E.M. (1997). Modeling the Performance of Soil Covers. Pre-Conference Workshop: Groundwater Impact Assessment and Management. Sandton, South Africa. 24 June, 1997.
39. Rykaart, E.M. (1996). Experiments on Recharge through Soil Covers to Coal Spoils. Proceedings of One-Day Course on Hydrology of Made Ground. Fourways, South Africa. 9 October 1996.
40. Rykaart, E.M., J.A. Wates (1996). Prioritizing Impact Mitigation Measures at Collieries: Case Study. Proceedings of Second National Conference on Environmental Management Technology and Development. Fourways, South Africa. 7-8 October.
41. Wates, J.A., E.M. Rykaart (1996). Development of a Groundwater Quality Management Plan for the Middle Steelpoort. Proceedings of Second National Conference on Environmental Management Technology and Development. Fourways, South Africa. 7-8 October 1996.
42. Rykaart, E.M. (1996). Using Soil Covers as a Barrier Against AMD: A Review. Proceedings of the Young Water, Environmental and Geotechnical Engineers Festival. Botha's Hill, Kwa-Zulu Natal, South Africa. 17-19 July.

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43. Rykaart, E.M., J. Haarhoff (1995). Die Verfyning van Inspuitnossels vir Opgeloste-Lug Flottasie (The Refining of Air-Injection Nozzles in Dissolved Air Flotation). Water Research Commission Report No. 448/1/95, ISBN 1868451682.
44. Rykaart, E.M., J. Haarhoff (1995). Behaviour of Air Injection Nozzles in Dissolved Air Flotation. Water Science and Technology. 31(3-4), pp. 25-35.
45. Haarhoff, J., E.M. Rykaart (1995). Rational Design of Packed Saturators. Water Science and Technology. 31(3-4), pp. 179-190.
46. Rykaart, E.M., J. Haarhoff (1995). Behaviour of Air Injection Nozzles in Dissolved Air Flotation. Proceedings of Specialist Conference on Flotation Processes in Water and Sludge Treatment. Orlando, Florida, U.S.A. 26-28 April.
47. Haarhoff, J., E.M. Rykaart (1995). Rational Design of Packed Saturators. Proceedings of Specialist Conference on Flotation Processes in Water and Sludge Treatment. Orlando, Florida, U.S.A. 26-28 April.
48. Wates, J.A., E.M. Rykaart (1994). Design of Soil Covers for Control of Infiltration. Proceedings of First National Conference on Environmental Management Technology and Development. Fourways, South Africa. 7-8 March.
49. Rykaart, E.M. (1993). Die Verfyning van Inspuitnossels vir Opgeloste-Lug Flottasie (The Refining of Air-Injection Nozzles in Dissolved Air Flotation). Thesis for fulfillment of Masters Degree Program in Civil Engineering, Rand Afrikaans University, Johannesburg, South Africa.

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Key Experience: Project Specific

Recent project experience includes:

Hope Bay Project, Hope Bay Mining Ltd, (formerly Miramar Mining Company) (NU, Canada)

- Project Manager, 15 years ongoing support associated with geotechnical and tailings engineering, permitting, field characterization, capital and closure cost estimating, strategic planning
- Project Manager, multiple licence amendments, inputs to prefeasibility studies and environmental impact assessment
- Project Manager and Engineer of Record, all surface infrastructure including precedent setting frozen core dam
- Project Manager, detailed engineering for all surface infrastructure designs including frozen core dam
- Project Manager, geohydrological, geotechnical and geochemical characterization studies of mine expansion plans
- Principal Engineer, seven annual geotechnical inspections
- Project Manager, Stage 2 Study input pertaining to mine geotechnics, geohydrology, overburden, geochemistry, various geotechnical designs and tailings design from 40 to 100 million tonnes
- Project Manager, multiple geotechnical and hydrogeological field programs (including submarine CPT testing)
- Principal, site wide (80 km by 20 km regional belt) overburden characterization report
- Principal, design of overburden pit slopes (in permafrost and talik)
- Principal, multiple tailings options assessments including methods and sites (evaluated over 100 different sites)
- Principal, design and costing of tailings impoundment, including tailings characterization testing
- Principal, design and costing of three dewatering dikes multiple kilometres in length
- Principal, design and costing of all-weather roads (over 100 km) and airstrips
- Principal, options assessment, detailed design, permitting and closure cost estimating for 10 km all-weather road, including free-span river crossing using add-freeze piles
- Principal, closure costing for Doris, Boston, Windy and Patch sites
- Principal, complete project closure cost estimate
- Principal, site wide water balance (multiple iterations)
- Principal, support with site wide environmental management plans
- Project Manager, two geotechnical field programs
- Senior Engineer, various site reconnaissance studies
- Senior Engineer, scoping study input, including tailings costing
- Senior Engineer, pre-feasibility study input, including tailings costing
- Senior Engineer, tailings and waste rock management conceptual designs
- Project Manager, conceptual designs for various mine surface infrastructure including; roads, airstrips, tank farms, explosives magazines, mill pads and causeways
- Senior Engineer, conceptual designs of large dykes to allow in-lake open pit mining

Doris North Mine, Hope Bay Mining Ltd, (formerly Miramar Mining Company) (NU, Canada)

- Senior Engineer, geotechnical design of all mine surface infrastructure
- Project Manager, construction of mine surface infrastructure
- Project Manager, design of frozen core tailings dams
- Project Manager, design and construction of marine jetty for barge offloading
- Project Manager, pre-feasibility study input, including tailings and surface infrastructure costing
- Project Manager, feasibility study input, including tailings and surface infrastructure costing
- Project Manager, carry out seven permafrost geotechnical investigations
- Senior Engineer, carry out numerous field reconnaissance surveys
- Project Manager, carry out three submarine geotechnical investigations
- Senior Engineer, assist in Environmental Impact Assessment
- Senior Engineer, assist in Regulatory Permitting
- Senior Engineer, complete tailings alternative assessment
- Senior Engineer, assist in obtaining Schedule II MMER Permit
- Project manager, develop various trade-off studies and financial analysis

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Back River Project, Sabina Gold & Silver (NU, Canada)

- Project Manager, Preliminary Economic Assessment (all disciplines)
- Principal Engineer, Tailings options analysis, tailings management system design, infrastructure designs and cost estimate for PEA
- Project Manager, Feasibility study (tailings, geohydrology, geotechnical, geochemistry, water management and closure disciplines)
- Project Reviewer, Tailings management system, water management and water and load balance, geohydrological model and closure plan
- Project Engineer, Revised tailings options analysis moving from single large impoundment to small starter impoundment followed by in-pit disposal
- Project Engineer, Geotechnical field investigation program design and oversight – permafrost characterization

Patch Lake Tank Farm, Hope Bay Mining Ltd, (formerly Miramar Mining Company) (NU, Canada)

- Senior Engineer and Project Manager, design & construction of fuel tank farm secondary containment facility
- Project Manager, closure plan development including cost estimates
- Project Manager, hydrocarbon contamination investigation and design of remedial options

Boston Advanced Exploration Camp, Hope Bay Mining Ltd, (formerly Miramar Mining Company) (NU, Canada)

- Principal Engineer, eight annual geotechnical investigations
- Project Manager, closure plan development including cost estimates
- Project Manager, hydrocarbon contamination investigation and design of remedial options

Windy Advanced Exploration Camp, Hope Bay Mining Ltd, (formerly Miramar Mining Company) (NU, Canada)

- Principal Engineer, eight annual geotechnical investigations
- Project Manager, closure plan development including cost estimates
- Project Manager, hydrocarbon contamination investigation and design of remedial options

Cold Regions Covers, INAC (International)

- Project Manager, in-depth review of cover performance in cold regions
- Project Manager, develop research proposals to enhance the state of knowledge with respect to cold region covers

Cold Regions Cover Review, MEND (International)

- Project Manager, review of cold region (arctic and high altitude alpine regions) mine waste cover practice
- Project Manager, develop research recommendations to enhance the state of knowledge

Environment Canada, Mining & Processing Division (ON, Canada)

- Project Manager & Principal Engineer, development of "Guideline for the Assessment of Alternatives for Mine Waste Disposal"

International Cover Review, WISMUT GMBH (International)

- Senior Engineer, review of mine waste cover design and construction practices (included over 200 mine sites in 26 countries)

Baker Lake, Hatch Ltd. (NU, Canada)

- Project Manager, preliminary design of jetty (barge landing)

SRK Chile, Santiago (Chile)

- Course Developer and Presenter, 3-day short course on unsaturated soil mechanics and modeling

SRK Australia, Perth (Australia)

- Course Developer and Presenter, 2-day short course on unsaturated soil mechanics and modeling

Antilla Project, Panoro (Peru)

- Principal, Review of tailings management system design and cost estimate as qualified person.

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Tres Estrada, Aguiar Resources Ltd. (Brazil)

- Project Engineer, PEA Tailings management system options analysis, design and costing; Water supply dam options analysis, design and costing; Access roads and railway siding design and costing; Waste rock pile siting assessment and design recommendations

Hycroft Mine, allied Nevada Gold (Nevada)

- Principal Reviewer, Tailings draindown analysis

Gibraltar Mine (BC, Canada)

- Principal Reviewer, Heap leach pad draindown analysis

Sulfur Rose Project, Guyana Goldfields (Guyana)

- Principal Engineer, PEA Tailings management system options analysis, design and costing

Keno Hill Mine, Alexco (YK, Canada)

- Principal Reviewer, Werneke tailings closure and water management plan

Yukon Government, Alaska Highway (YK, Canada)

- Principal Reviewer, Permafrost characterization and identification using geophysical techniques

Long Canyon Project, Newmont Mining Corp. (Nevada, USA)

- Principal Engineer, Closure cover modeling for tailings and waste rock areas
- Principal Engineer, numerical seepage analysis for Waste Rock Storage Facility

Lorado Mill Area Tailings Project, SRC (SK, Canada)

- Principal Engineer, Tailings cover system design, detailed engineering and construction over 2 year period.

SK Abandoned Mines, MOE (SK, Canada)

- Project Engineer and reviewer, Mine closure options assessment and closure liability cost estimate for five abandoned mines

Hay River Highway, NOR-Ex (NT, Canada)

- Principal Reviewer, Permafrost monitoring instrumentation design and installation

Romero Project, JDS Engineering (Dominical Republic)

- Principal Reviewer, PEA tailings storage facility options evaluation (dry-stack selected), design and costing.

Santa Fe Project (Nevada)

- Project Engineer, Numerical assessment of shallow groundwater infiltration below waste rock pile

Gunnar Project, SRC (SK, Canada)

- Project Engineer and Reviewer, Mine closure options analysis, conceptual design and costing

Amapari Mine, NewGold (Amapa, Brazil)

- Principal, tailings options assessment
- Principal, Care and Maintenance Plan
- Principal, Closure Plan

Brucejack Mine, Pretium Resources, BC, Canada)

- Project Manager & Principal Engineer, Development of sub-aqueous waste rock and tailings management plan.
- Principal, Detailed engineering and construction of waste rock pile deposited into deep lake of soft lake bed sediments.
- Principal, Review of tailings deposition plans prepared by third party, including tailings characterization testing.
- Principal, Assessment of waste rock dump failure and development of mitigation strategy going forward.

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Bul River, Purcell Basin Minerals (BC, Canada)

- Project Manager & Principal Engineer, Dry-stack tailings design for permit application for restart of a mine. Includes options assessment transitioning from historic conventional slurry tailings deposition strategy.

San Dimas Mine, NewGold (Mexico)

- Project Manager & Principal Engineer, due diligence review of dry-stack tailings facility

Rainy River Project, NewGold (ON, Canada)

- Project Manager & Principal Engineer, due diligence review of greenfields project, evaluation of tailings impoundment

Post Ovoid Project, VALE (NS, Canada)

- Peer Reviewer, review of tailings options assessment

Pipe Kipper Project, VALE (Manitoba, Canada)

- Project Manager & Principal Engineer, tailings options evaluation

Hudsons Bay Mining & Smelting (SK, Canada)

- Principal Engineer, closure cover design
- Peer Reviewer, closure plan review

Sabodala Project, Oromin (Senegal)

- Project Manager & Principal Engineer, detailed geotechnical investigation in support of water supply dam detailed engineering
- Project Manager & Principal Engineer, detailed design of water supply dam
- Peer Reviewer, site wide water balance
- Principal, tailings options assessment
- Principal, pre-feasibility design of tailings impoundment
- Principal, pre-feasibility design of water supply dam
- Principal, geotechnical investigation in support of dam and surface infrastructure foundations
- Principal, pre-feasibility design of waste rock piles
- Principal, pre-feasibility design of saprolites pit slopes

Elk Valley Coal, Teck Coal Limited (BC, Canada)

- Project Manager, design and construction of 12 large scale lysimeters
- Project Manager, design and installation of instrumentation for 12 large scale lysimeters

Union Bay Coal Spoil Pile, SEACOR Environmental (for West Fraser) (BC, Canada)

- Senior Engineer, conceptual and feasibility level cover design
- Project Manager, regional and local borrow source assessment
- Project Manager, detailed landscape and reshaping design of coal pile
- Peer reviewer, engineering review of stream restoration works
- Senior Engineer, permitting assistance

Union Bay Coal Spoil Pile, SNC-Lavalin (BC, Canada)

- Project Manager, conceptual cover design and numerical modeling

Mt. Washington (BC, Canada)

- Peer Reviewer, review of cover design

Con Mine (NT, Canada)

- Project Manager & Principal Engineer, peer review of cover design
- Project Manager & Principal Engineer, re-evaluation of tailings closure options including re-assessment of cover design
- Project Manager, detailed engineering of cover designs

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Confidential, AIC (Namibia)

- Principal Engineer, due diligence on tailings reprocessing options

Boss Mountain Mine, Confidential (BC, Canada)

- Project Manager & Principal Engineer, due diligence on tailings impoundment

Minto Mine (YT, Canada)

- Project Manager & Principal Engineer, design of closure covers for tailings and waste rock
- Principal Engineer, tailings options assessment

Endako Mine, Confidential (BC, Canada)

- Principal Engineer, due diligence on mine closure and tailings management

Thompson Creek Mine, Confidential (Idaho, USA)

- Principal Engineer, due diligence on mine closure and tailings management

Mt. Milligan Mine, Confidential (BC, Canada)

- Principal Engineer, due diligence on tailings management

Brutica Project, Confidential (Peru)

- Principal Reviewer, qualified person sign-off on tailings management

Ollachea Project, Confidential (Peru)

- Principal Engineer, due diligence on tailings management

Huckleberry Mine (BC, Canada)

- Senior Engineer, design support for de-sulferised tailings and water cover
- Project Manager, geotechnical field program

Meliadine Project, Comaplex Minerals (NU, Canada)

- Project Manager, geotechnical field program
- Peer reviewer, adequacy review of tailings and waste management data
- Peer reviewer, recommendations for tailings options assessment

Anvil Range Mining Complex (Faro Mine), Deloitte & Touché and Yukon Government (YT, Canada)

- Senior Engineer, cover design
- Senior Engineer & Project Manager, cover modeling
- Principal Engineer & Project Manager, design, construction and monitoring (6 years) of six large scale cover test plots
- Principal Engineer & Project Manager, design, construction and monitoring (4 years) of two large scale lysimeters
- Senior Engineer, design, construction and monitoring of two large scale tailings cover test plots
- Senior Engineer, desk study of tailings relocation
- Project Manager, landform engineering
- Peer Reviewer, groundwater dewatering system design

Giant Mine, Indian & Northern Affairs Canada, (NT, Canada)

- Senior Engineer, cover design
- Project Manager, design, construction and monitoring of two large scale tailings cover test plots
- Senior Engineer, site investigation into integrity of existing stream diversion
- Senior Engineer, design & construction of water retaining earth embankment dam
- Senior Engineer, geotechnical review of all site dams
- Senior Engineer, conceptual design of hazardous landfills
- Project Manager, borrow source investigation
- Senior Engineer, closure plan for tailings dams
- Senior Engineer, costing & conceptual design for preserving permafrost over frozen arsenic chambers

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Granduc Mine, Castle Resources (BC, Canada)

- Project Manager & Principal Engineer, tailings impoundment site selection
- Project Manager & Principal Engineer, scoping level tailings impoundment design
- Project Manager & Principal Engineer, waste rock pile stability assessment

Whitehorse Copper Mine (YT, Canada)

- Peer Reviewer, tailings impoundment stability assessment

Santo Domingo Project, Ausenco (Chile)

- Principal Engineer, PFS tailings evaluation

Bahuerachi Copper Project, Ausenco (Mexico)

- Principal Engineer, review and audit of tailings and surface geotechnical design elements for FS

Hounde Project, Avion Gold (Burkina Faso)

- Principal Engineer, PEA tailings and waste rock design

Galore Creek (BC, Canada)

- Project Manager, conceptual design of ARD rock management containment facilities

Colomac Mine, Department of Indian & Northern Affairs (NT, Canada)

- Peer Reviewer, annual geotechnical inspection report
- Senior Engineer, cover design
- Senior Engineer, geotechnical investigations to assess seepage problems in a tailings dam
- Senior Engineer, borrow source investigation
- Senior Engineer, design of seepage remediation measures for tailings dam
- Senior Engineer, carry out annual dam safety inspection
- Senior Engineer, carry out three annual ditch inspection surveys
- Senior Engineer, design and implement ditch efficiency monitoring program
- Senior Engineer, design & construction of 8 km diversion ditches around tailings facility

Deloro Mine, CH2MHill (for Ontario Ministry of Environment) (ON, Canada)

- Peer Reviewer, final cover design
- Senior Engineer, dam safety review
- Senior Engineer, geotechnical field program
- Senior Engineer, conceptual cover design
- Senior Engineer, final cover design review

Ajax Project, KGHM (BC, Canada)

- Practice Leader, Project Manager and Principal Engineer, technical due diligence of tailings management plan

Beaverlodge Mine, Cameco (SK, Canada)

- Peer Reviewer, review of construction specifications for cover repairs
- Peer Reviewer, annual review of cover performance

Jacobina Mine, Yamana Gold (Bahia, Brazil)

- Practice Leader, Project Manager and Principal Engineer, review of tailings design and development of conceptual design changes for future development and closure

Key Lake Mine, Cameco (SK, Canada)

- Senior Engineer, waste rock pile (Gaertner) detailed closure design

Syncrude Oil Sands Mine (AB, Canada)

- Engineer, overburden dump cover instrumentation design and installation

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Detour Lake Mine, Placer Dome Canada (ON, Canada)

- Engineer, tailings impoundment soil cover performance numerical modeling
- Engineer, mine closure feasibility study

Goose Lake and George, Sabina Gold & Silver (NU, Canada)

- Project Manager, airstrip and road design
- Project Manager, geotechnical investigation in support of airstrip and road design
- Principal Engineer, tailings site selection study
- Principal engineer, PEA infrastructure designs
- Practice Leader, PEA report

Prosperity Mine, Taseko (BC, Canada)

- Peer Reviewer, tailings and waste rock alternatives assessment

Brule Coal, Western Canadian Coal (BC, Canada)

- Project Manager, geotechnical field program
- Project Manager, borrow source assessment
- Senior Engineer, conceptual waste rock pile cover design

Victor Kimberlite Project, De Beers (ON, Canada)

- Senior Engineer, geotechnical soil characterization for deep (200 m) overburden drilling

Britannia Mine (BC, Canada)

- Senior Engineer, preliminary design of surface water diversion structures to limit surface water inflow into collapsed mine adits and glory holes

Kemess North Underground (BC, Canada)

- Principal Engineer, peer review of tailings and surface infrastructure designs for FS

Red Mountain Mine, Seabridge (BC, Canada)

- Senior Engineer, tailings dam design review
- Senior Engineer, alternative tailings dam conceptual design
- Senior Engineer, scoping study input, including tailings costing
- Senior Engineer, revisiting costing components
- Senior Engineer, site reconnaissance survey for annual inspection

Kenary Cove, SEACOR (for Private Property Developer) (BC, Canada)

- Senior Engineer, conceptual design of coffer dam

Princess Colliery, Rescan (for PWGSC) (NS, Canada)

- Peer reviewer, review of cover design

Kitsault Mine (BC, Canada)

- Senior Engineer, cover design support

Nanasivik Mine, DIAND (NU, Canada)

- Senior Engineer, final closure cost estimate in RECLAIM format

North Country Gold (Nunavut, Canada)

- Practice Leader & Principal Engineer, review and design analysis of all-weather airstrip

Golden Sunlight Mine, Placer Dome (Montana, USA)

- Engineer, design & Installation of cover instrumentation

Maritz E. Rykaart

Practice Leader and Principal Engineer

Seabee Mine, Claude Resources (SK, Canada)

- Principal Engineer, conceptual closure cover design
- Peer Reviewer, comprehensive closure plan
- Peer Reviewer, tailings expansion design
- Project Manager & Principal Engineer, detailed design of tailings expansion including geotechnical field investigation
- Practice Leader & Engineer-of-Record, construction of tailings raise test section including regulatory negotiations

Tepal project, Geologix (Mexico)

- Principal Engineer, tailings site selection
- Principal Engineer, PEA tailings design and cost estimate

Spingpole Project (ON, Canada)

- Principal Engineer, tailings site selection
- Principal Engineer, PEA tailings design and cost estimate

Tulsequah Chief, Chieftain Metals (BC, Canada)

- Peer Reviewer, PEA tailings evaluation

Riacho dos Machados, MacQuarie (Brazil)

- Principal Engineer, due diligence review of tailings design

Springpole Gold Project, Gold Canyon Resources (ON, Canada)

- Principal Engineer, tailings site selection
- Principal Engineer, PEA tailings design and cost estimate
- Principal engineer, PEA pit dewatering dikes design and cost estimate

Amisk Lake Project, Claude Resources (SK, Canada)

- Peer Reviewer, tailings alternatives assessment
- Principal Engineer, PEA tailings design and cost estimate

Tiger and Silver Range Projects, ATAC resources (Yukon, Canada)

- Principal Engineer, PEA tailings design and cost estimate

Mount Margaret Mines (Queensland, Australia)

- Peer Reviewer, cover design and infiltration modeling

San Manuel Mine, BHP Billiton (Arizona, USA)

- Senior Engineer, conceptual cover design
- Senior Engineer, geotechnical field program
- Senior Engineer, in-situ material characterization

Coral Gold Mine (Nevada, USA)

- Senior Engineer, cover design
- Senior Engineer, geotechnical field program

Elder Creek Mine (Nevada, USA)

- Senior Engineer, cover design

Northumberland Project (Nevada, USA)

- Senior Engineer, tailings options assessment
- Senior Engineer, pre-feasibility study dry-stack tailings design and cost estimate
- Senior Engineer, pre-feasibility study waste rock pile design

Maritz E. Rykaart

Practice Leader and Principal Engineer

Pampa de Pongo (Chile)

- Senior Engineer, conglomerate pit slope design

Kutcho Project, Sherwood Copper (YT, Canada)

- Senior Engineer, tailings options assessment
- Project Manager, geotechnical field investigation
- Senior Engineer, pre-feasibility study dry-stack tailings design and cost estimate
- Senior Engineer, pre-feasibility study waste rock pile design

Florida Canyon Mine (Nevada, USA)

- Peer reviewer, cover design review

Glamis Marigold Mine (Nevada, USA)

- Peer reviewer, cover design review
- Senior Engineer, comparative numerical modeling using different models
- Senior Engineer, EIS input relating to cover designs

Bald Mountain Mine, Placer Dome (Nevada, USA)

- Senior Engineer, cover design modeling review (Yankee)
- Senior Engineer, review of draindown modeling (Yankee)
- Senior Engineer, develop new draindown model (Yankee)
- Senior Engineer, geotechnical site investigation (Mooney)
- Senior Engineer, review of the Casino/Winrock heap leach pad final closure water balance

Cortez Gold Mine, Crescent Valley (Nevada, USA)

- Senior Engineer, review of final heap leach pad closure water balance
- Senior Engineer, review of heap draindown
- Senior Engineer, review of cover design

Newmont Mining Company (Nevada, USA)

- Senior Engineer, closure plan for tailings dam
- Course Developer and Presenter, 3-day cover design short course

Rock Creek Mine (Montana, USA)

- Principal Engineer, review of capital updated cost estimate for tailings impoundment

Round Mountain, Kinross Mining (Nevada, USA)

- Project Manager, geotechnical field program
- Principal, draindown modeling (tailings and heap leach pads)
- Principal, conceptual cover design, cover modeling

Standard Mine Expansion (Colorado, USA)

- Principal, conceptual cover design review

Mt. Emmons Property, Thompson Creek Metals Company Inc. (Colorado, USA)

- Peer reviewer, tailings impoundment site selection and design

Mt. Hope (Nevada, USA)

- Senior Engineer, conceptual cover design

Norse Windfall Mine, BLM (Nevada, USA)

- Senior Engineer, geotechnical site investigation
- Senior Engineer, cover design

Maritz E. Rykaart

Practice Leader and Principal Engineer

Atlanta Gold Mine (Idaho, USA)

- Project Manager, geotechnical site investigation
- Senior Engineer, cover design
- Senior Engineer, feasibility study for land application disposal system (LAD)
- Senior Engineer, draindown modeling

Ridgeway Gold Mine, Kennecott Minerals (South Carolina, USA)

- Engineer, geotechnical and geochemical site investigation
- Engineer, in-situ material characterization

Holden Mine (Washington, USA)

- Project Manager, geotechnical site investigation
- Project Manager, cover design

Kidston Gold Mine, Placer Dome (Queensland, Australia)

- Engineer, design & installation of cover performance instrumentation
- Engineer, develop closure water balance for tailings impoundment
- Engineer, direct revegetation of tailings as closure

Olympic Dam, Western Mining Company (South Australia, Australia)

- Peer Reviewer, cover modeling
- Senior Engineer, preliminary cover design
- Senior Engineer, design of field characterization and testing plan to confirm cover suitability
- Senior Engineer, review of operational and closure infiltration estimates for waste rock piles

Illuka Mine, (Australia)

- Peer Reviewer, cover design and cover modeling

Goro, INCO (New Caledonia)

- Senior Engineer, lysimeter design for tailings dam cover performance monitoring

WISMUT, Lichtenberg Pit (Ronneburg, Germany)

- Senior Engineer, analysis of test cover performance data
- Senior Engineer, predictive cover performance modeling

Quiruvilca, Pan American Silver (Chile)

- Senior Engineer, conceptual cover design

Silangan Project, Philex (Philippines)

- Peer Reviewer, project expansion tailings alternatives assessment

Halilaga Project, Pilot Gold (Turkey)

- Principal Engineer, tailings and water supply dam site selection
- Principal Engineer, tailings and water supply dam PEA design and cost estimate; Two different project PEA's completed at different project sizes

Bronson Slope, Skyline Gold (BC, Canada)

- Peer Reviewer, tailings options

Confidential, Mitsui, (Mongolia)

- Principal Engineer, technical due diligence of tailings impoundment system design

Tac & Corac Project, Mediterranean Mining (Turkey)

- Principal Engineer, PEA tailings impoundment site and method selection (dry-stack), design and cost estimate

Maritz E. Rykaart

Practice Leader and Principal Engineer

Tanco Mine, Cabot Corporation (ON, Canada)

- Principal Engineer, due diligence review of tailings management system
- Project Manager, Mine redevelopment project, scoping, prefeasibility, feasibility, detailed engineering and construction
- Project Engineer, Geotechnical investigations (in lake), dewatering dikes and other water management structures
- Project engineer, Detailed engineering of surface infrastructure, construction support

Quimsacocha, IamGold (Peru)

- Senior Engineer, tailings and waste rock management designs
- Senior Engineer, pre-Feasibility study tailings and waste management inputs

Rio Paracatu, Rio Tinto, (Minas Gerais, Brazil)

- Senior Engineer, cover designs
- Senior Engineer, design, installation and monitoring of cover trials

Golden Meadows Project, Midas Gold (Idaho, USA)

- Principal Engineer, PEA tailings impoundment site selection, design and cost estimate
- Project Manager, geotechnical field investigation in support of PFS surface infrastructure

Minas da Fortaleza, Rio Tinto, (Minas Gerais, Brazil)

- Senior engineer, conceptual cover designs
- Senior Engineer, closure plan inputs

Mauro Tunnel (Chile)

- Senior Engineer, conceptual cover design

Tatasi Mine (Bolivia)

- Senior Engineer, evaluate soil cover alternatives for final closure of tailings dam
- Senior Engineer, develop current and closure water balance for mine site

Pascua Lama Mine (Peru)

- Senior Engineer, review of proposed tailings dam soil cover for closure purposes

Canariaco, Candente Resources (Peru)

- Senior Engineer, tailings and mine waste management design
- Senior Engineer, water supply dam design
- Senior Engineer, gap analysis re. mine waste management
- Project Manager, geotechnical field program
- Senior Engineer, feasibility study input

Coal Waste Cover Project, Water Research Commission (Natal, South Africa)

- Senior Engineer, Design and installation of test cell cover instrumentation
- Senior Engineer, Calibration modeling for cover designs

Cover Design Guidelines, Department of Water Affairs & Forestry (Natal, South Africa)

- Engineer, design guideline for cover design

West Driefontein Mine (Carltonville, South Africa)

- Engineer, tailings dam closure and rehabilitation design

RMP Properties, Rand Mines (Johannesburg, South Africa)

- Senior Engineer, feasibility study and concept design for rehabilitation of tailings impoundment

Tweefontein Colliery (Witbank, South Africa)

- Senior Engineer, waste dump rehabilitation feasibility study
- Engineer, environmental management program report

Maritz E. Rykaart

Practice Leader and Principal Engineer

Goedgevonden Colliery (Witbank, South Africa)

- Senior Engineer, river diversion feasibility study
- Senior Engineer, river diversion conceptual design
- Senior Engineer, support with River Diversion permit application

Vlaklaagte Colliery (Witbank, South Africa)

- Senior Engineer, river diversion feasibility study
- Senior Engineer, river diversion conceptual design
- Senior Engineer, support with River Diversion permit application

Greenside Colliery (Witbank, South Africa)

- Senior Engineer, design & construction of River Diversion
- Senior Engineer, design & construction of storm water control channel
- Senior Engineer, permit application for River Diversion
- Senior engineer, design & contract documentation for pollution control dam
- Senior Engineer, design & contract documentation for storm water return dam

Heidelberg Colliery (Heidelberg, South Africa)

- Senior Engineer, river diversion design
- Senior Engineer, support with River Diversion permit application

Hayford Colliery (Witbank, South Africa)

- Senior Engineer, river diversion design
- Senior Engineer, support with River Diversion permit application

Design of Air Injection Nozzles, Water Research Commission (Johannesburg, South Africa)

- Engineer, potable water treatment research
- Senior Engineer, design and testing of injection nozzles for dissolved air flotation

Air Stripping, H2O Groundwater Systems (California, USA)

- Engineer, developed mathematical model for an air stripper used for groundwater contamination clean-up

Kriel Colliery (Kriel, South Africa)

- Engineer, feasibility study into flooding the underground workings with excess polluted water

Landfill Design, Krugersdorp Municipality (Krugersdorp, South Africa)

- Engineer, feasibility design for new municipal landfill

Alpha Colliery (Natal, South Africa)

- Engineer, geohydrological assessment for surface water aspects

Sappi Ngodwana (Nelspruit, South Africa)

- Senior Engineer, dewatering of river front, feasibility study and concept design
- Senior Engineer, dewatering of river front, detailed design, contract documentation and site supervision

Hayford Colliery (Witbank, South Africa)

- Engineer, environmental management program report

Environmental audit, AECI (Benoni, South Africa)

- Engineer, audit of all surface water management components of industrial complex

Middle Steelpoort Groundwater Management Plan, Department of Water Affairs & Forestry (Steelpoort, South Africa)

- Engineer, Review and design of all surface water management components
- Project Manager, technical liaison for all disciplines for final documents
- Project Manager, audit and review of six mining and processing complexes

Maritz E. Rykaart

Practice Leader and Principal Engineer

Wapadskloof Vanadium toxicity investigation, Department of Water Affairs & Forestry (Wapadskloof, South Africa)

- Engineer, review and design of all surface water management components
- Project Manager, technical liaison for all disciplines for final documents
- Project manager, audit and review of complete vanadium processing complexes

West Driefontein Mine (Carltonville, South Africa)

- Senior Engineer, emergency design to repair breach of tailings dam
- Senior Engineer, construction supervision
- Engineer, modeling maximum rate of rise for gold tailings dam

Enstra Waste Water Treatment Plant, Sappi Enstra (Springs, South Africa)

- Overall Project Manager and Site Engineer for construction of an upgrade to a pulp and paper mill water treatment plant