

JACK A. CALDWELL, P.E., P.Eng., M.Sc.(Eng.), LLB.

SENIOR CIVIL & GEOTECHNICAL ENGINEER



EDUCATION

L.L.B., University of Witwatersrand, South Africa, 1977

M.Sc., Geotechnical Engineering, University of Witwatersrand, South Africa, 1972

B.Sc., Civil Engineering (cum laude), University of Witwatersrand, South Africa, 1968

PROFESSIONAL REGISTRATION

Registered Professional Engineer, California and British Columbia

EXPERIENCE SUMMARY

Jack Caldwell has over 40 years engineering experience on mining, civil, geotechnical, and site remediation projects. His project experience includes:

- **Site Characterization** - undertake and manage site characterization for mines, landfills, waste disposal facilities, site restoration projects, and earthquake-impacted residential properties.
- **Design** - prepare and manage preparation of designs for mine waste disposal facilities, landfills, earth dams, site reclamation and closure works, site remediation, and large and small civil engineering structures.
- **Construction Oversight** – on-site oversight of civil and geotechnical construction works, including mine tailings impoundments, dams, waste disposal facilities, and landfills.
- **Tailings Facility Management** – consult to mines on the operation of tailings management facilities, including depositions, water management, water balance studies, and practical and safe operation.
- **Mine Waste Facility Closure** – plan, design, cost, and prepared closure reports for mine waste disposal facilities including tailings impoundments, waste rock dumps, and heap leach pads.
- **Assist in Law Cases** – provide input and assistance to legal teams on engineering issues relevant to professional experience. Most of these projects were confidential and are not included in the list of projects provided below.

Jack Caldwell has worked on mines and waste management projects in Central and South America, Southern Africa, Europe, Canada, and the United States. He has designed, overseen construction of, and reclaimed facilities on projects involving mine tailings impoundments, mine rock dumps, heap leach pads, landfills, and radioactive waste disposal units. He has focused on the civil and geotechnical aspects of site characteristics, site preparation, liner design and construction, material preparation and placement, cover design and construction, tailings facility water balances, and surface water management facilities.

PROJECT EXPERIENCE (SELECTED PROJECTS)

Myra Falls Mine, Vancouver Island, British Columbia. Jack Caldwell has lead the team compiling the site-wide closure plan for this mine that is located in a national park. Work has included site characterization, evaluation of alternative closure scenarios, risk assessment of closure options, interaction with regulators and the public, and preparation of closure cost estimates and the closure plan.

Nyrstar Dam Safety Evaluations. For Nyrstar an international mining company headquartered in Switzerland, Jack Caldwell has visited eight of their mines in Canada, the USA, and Central and South America to undertake tailings dam safety inspections. He prepared reports on the safety of the dams and recommended appropriate work to upgrade the safety of the facilities.

Snap Lake Mine, Northwest Territories, Canada. (2013-present) for De Beers Canada, Jack Caldwell is a specialist peer reviewer of ongoing operation and expansion of the North Pile (tailings facility.)

Volta Grande Project, Brazil. (2013 – present) for Belo Sun Mining, Jack Caldwell leads the Independent Tailings Review Board.

Escobal Mine Dry-Stack Tailings Pile, Guatemala (2011 - present) for Tahoe Resources. For a new silver mine being developed by Tahoe Resources, Jack Caldwell is leading a team in site characterization, tailings piles design, and the evaluation of the response of the pile to the large earthquakes.

El Abra Mine, Chile (2012 - present) for Freeport-McMoran. Jack Caldwell is a member of the peer review board for the design of a new tailings facility where minimization of water consumption is the primary consideration.

Suncor Tailings Reduction Operation, Ft McMurray, Alberta (2009 - present) for Suncor Energy Ltd. Jack Caldwell has assisted Suncor Energy, Tailings Reduction Operations at their oil sands mine in Alberta on the tailings, geotechnical, and water-balance studies related to planning and implementation of a new tailings disposal method. For the same client, Mr. Caldwell coordinated engineering design and construction work leading to the placement of closure covers on tailings ponds at the Suncor Oil Sands mine in Alberta. Work involves the design and construction of a light-weight coke cap placed on geotextiles and geogrids.

Ekati Diamond Mine, NWT for BHP Billiton Diamonds Inc. (2007 – present) Jack Caldwell has over the past five years prepared reports on and updated plans for the ongoing operation of the tailings impoundment. Work has included modeling impoundment performance using RIFT.

Operating Industries Inc. Landfill, Monterey Park. This project involved the design and construction of the cover, surface water management systems, and gas control systems for a 136 acre hazardous waste landfill. Jack Caldwell was on site for over four years leading a team of geotechnical engineers in site geotechnical characterization, cover design, and the provision of geotechnical engineering construction support to Foster Wheeler Environmental Corporation.

Cannon Mine Tailings Impoundment, Wenatchee, Washington. Jack Caldwell was the design and construction oversight engineer on the Cannon Mine Tailings Impoundment in Wenatchee, Washington. This is a 300-foot-high earth and rockfill embankment that impounds the tailings from a gold mine – the impoundment is now full, the reclamation cover is in place, and the top of the impoundment is used for apple orchards.

Uranium Mill Tailings Remedial Action Project, Albuquerque, NM. For five years, Jack Caldwell was Manager of Engineering for the Technical Assistance Contractor to the United States Department of Energy on the Uranium Mill Tailings Remedial Action (UMTRA) Project. This project involved successful remediation of 24 uranium mine and mill tailings sites in ten states. Jack Caldwell managed a group of geologists, and civil and geotechnical engineers in the geological and engineering work involved in site selection, site characterization, disposal cell and associated facility design and design review, construction, and surveillance and monitoring.

Weldon Spring Site Remedial Action Project, St Charles, Missouri. As a Specialist Engineering Consultant to the DOE's Weldon Spring Site Remedial Action Project, Jack Caldwell prepared specialist reports that support the conceptual design report for the disposal cell for mixed wastes. Work done on this project was the basis of the book written by Jack Caldwell entitled "Principles and Practice of Waste Encapsulation". The book sets out the principles and practices for designing, analyzing the performance of, and constructing mine and other waste disposal facilities that have to endure for very long periods (1,000 years and beyond).

ARCO Parks Shallow Land Disposal Facility, Parks, Pennsylvania. This project involved preparation of the Decontamination and Decommissioning (D&D) Plan for the site that included radioactive elements, heavy metals, and organics. Jack Caldwell (as the project civil engineer) and the project team evaluated waste thermal treatment, vitrification, cement solidification, soil washing, vapor extraction, and the design and performance of alternative disposal cells.

Greens Creek Impoundment, Alaska. Jack Caldwell was Design Engineer and Project Manager for the design of the Greens Creek tailings impoundment. This involved site investigations for and design of an earth embankment and associated works for an earth dam on very soft clays and soils.

PROFESSIONAL HISTORY

2005-2015	Part-time Civil Consultant, Robertson GeoConsultants Inc.
1995-2004	Associate and Senior Engineer, GeoSyntec Consultants
1985-1994:	Project Manager, Jacobs Engineering Group Inc.
1980-1985	Senior Engineer/Project Manager, Steffen Robertson and Kirsten
1979-1980	Senior Geotechnical Engineer, Robertson-Pincock Inc.
1976-1979	Senior Engineer/Group Manager, Steffen Robertson and Kirsten
1970-1975	Lecturer in Geotechnical Engineering, University of Witwatersrand
1969-1970	Civil Engineer, UC Dumez-Borrie Construction

SELECTED PUBLICATIONS

Jack Caldwell is the lead author of the book, "Principles and Practice of Waste Encapsulation," on the design of waste disposal facilities for radioactive and hazardous wastes. Please see the InfoMine Library for electronic copies of Jack Caldwell's over ninety technical papers. He is the author of the following courses on EduMine:

- [Tailings Facility Design, Operation, and Closure](#)
- [Mine Closure: The Basics of Success](#)
- [Geotechnical Engineering for Mine GeoWaste Facilities](#)
- [Groundwater in Mining](#)
- [Heap Leach Pads](#)
- [An Introduction to Mining Investment - Understanding the Risks](#)
- [Surface Water Management at Mines](#)
- [Mine Water and Chemical Balance Analysis](#)
- [Groundwater Modeling for Mines and Mining](#)
- [Geosynthetics in Mining](#)
- Risk Assessment, Decision Making and Management of Mine GeoWaste Facilities. (In preparation)