

Name	Richard (Dick) Bolton (1926-2009)
Occupation/role	Civil Engineer, Ministry of Works (MoW)
Years active	1956 to 1988

Key contribution

1956: MoW Wairakei liaison engineer with consultants and contractors working on the Wairakei Geothermal Project. 1959: transferred to Wellington as assistant to the MoW Chief Geothermal Engineer, responsible for carrying out investigations into the development and utilisation of New Zealand's geothermal resources. 1974 appointed MWD's Chief Geothermal Engineer, until his retirement from the department in 1983. During this period, he actively promoted the improvement and use of reservoir engineering techniques to better predict the behaviour of the geothermal fields under exploitation.



Narrative

Contributions to the geothermal industry in New Zealand

After graduating with a Bachelor of Engineering Degree (Civil) from Canterbury University in 1946, Dick Bolton joined the Hydro Electric section of the then New Zealand Public Works Department in 1947. He spent 9 years working on hydro power plant design and construction projects, which included a two-year absence to attend Imperial College, London where he obtained a Diploma in Hydro Power Engineering (1952). During this period in the United Kingdom, Dick worked for Sir Alexander Gibb and Partners on the North of Scotland Hydro Board power schemes.

At the beginning of 1956, he joined the Wairakei Geothermal Power Project team as Ministry of Works liaison engineer with consultants and contractors working on the Wairakei Project. He very soon became involved in all aspects of the novel work associated with the

construction of the world's second commercial geothermal power plant. His three years' onsite work experience on the Wairakei Project laid the foundations for his subsequent lifelong career in geothermal engineering.

In 1959 Dick moved to Wellington as assistant to the Ministry of Works (MoW), Chief Geothermal Engineer (Jack Smith), and was responsible for carrying out engineering investigations into the development and utilisation of New Zealand's geothermal resources. He was appointed Ministry of Works Chief Geothermal Engineer in 1974. A position he held until his retirement from the department in 1983.

Overseas Development Aid and Educational Contributions

After leaving the MoW, Dick joined the New Zealand Ministry of Foreign Affairs as an aid adviser attached to the NZ Embassy in Jakarta. His duties in this role included monitoring progress on geothermal aid projects, providing advice to the Indonesian authorities on geothermal matters in Indonesia, and providing support to the Embassy staff on energy related matters. Dick finally retired from Government service in 1988, after which he spent several years as a geothermal consultant.

Dick's extensive knowledge of geothermal development resulted in him becoming involved in UNDP overseas geothermal development projects particularly in Chile on the investigations into the El Tatio project (Starting 1965). Within New Zealand he assisted the NZ Ministry of Foreign Affairs to set up New Zealand's geothermal aid programmes in Indonesia and the Philippines (1974) and continued to provide valuable advice to these programmes on an ongoing basis. He was also a key party to the establishment in 1978, of the Geothermal Institute at the University of Auckland and was a member of its inaugural Board of Directors. His extensive knowledge of geothermal drilling resulted in him representing the MoW on the Officials Committee responsible for setting up the New Zealand Government's oil exploration programme in 1976..

Scientific Contribution

In addition to his engineering responsibilities, Dick made a large contribution to the scientific side of geothermal development, particularly in developing better understanding of the underground resource, such as his 1970 paper *The Behaviour of the Wairakei Geothermal Field During Exploitation*. He was closely involved in the first ever Reservoir Engineering study of the Wairakei Reservoir carried out by Professor Whiting, Head of the Petroleum Engineering Department at Texas A & M University, during the mid-1960's when the Wairakei reservoir pressure was falling by almost 2 bar per year. Later (1982) he brought Hank Ramey to New Zealand to run a short reservoir engineering course at Wairakei for local engineers and scientists, in effect inaugurating the more widespread application reservoir engineering methods in New Zealand. He also encouraged and arranged funding to develop new ideas to improve the understanding of two-phase reservoir conditions.

During his career in the geothermal industry he prepared and co-authored many technical papers on geothermal energy and participated in the UN organised international geothermal development conferences held in Rome (1970); San Francisco (1975) and in Nairobi (1981) He was also a regular attendee at Geothermal Resource Council meetings in the USA and took an active part in the joint USA, Mexico, Italy and New Zealand project to test and prove the total flow turbine concept of power generation.

Sources

NZGA, Nomination of Richard (Dick) Sharpe Bolton for Life Membership of NZGA.

Dick Bolton, *A Geothermal Pioneer, Dick Bolton, The Story of Geothermal Development, 1950-1980. A Geothermal Power Development Pioneer*, Proceedings of the 11th Geothermal Workshop, Auckland, 1989.

Rick Allis, Retrospective and Prospective Views of the Development of Wairakei Geothermal Field: 50 Years and Counting

Publications (a sample)

Bolton, R.S., (1961) *The prevention of blowouts and other aspects of safety in geothermal steam drilling*, G/43, United Nations Conference on New Sources of Energy, Rome.

Bolton, R. S. (1970) *The Behaviour of the Wairakei Geothermal Field During Exploitation*, *Geothermics*, 2, pp. 1426-1439

Bolton, R.S. and Studt, F.E. (1976): *Investigation and Development of New Zealand's Geothermal Resources*. Unpublished report, cited in *Kawerau Geothermal Field, Report on Investigations and Development*, MWD, 1986

Bolton, R.S., (1982) "Fracturing in the Wairakei geothermal field" Proc. Geothermal Resources Council Workshop, Hawaii, 27-28.

Bolton, R., Dench, N., Fooks, L., Leaver, J. (1990). *Development of a Code of Practice for Deep Geothermal Wells*. Geothermal Resources Council Transactions, 14(2), 1153-1158.

Bolton, R. (1998). *Notes on the early history of Wairakei*. Proceedings of the 20th Geothermal Workshop, Auckland.

Bolton, Richard S, (2004): *A brief history of geothermal power in New Zealand*. Ref: MSDL-2272. Alexander Turnbull Library, Wellington. <http://natlib.govt.nz/records/35040876>

Bolton, R.S., (2009). *The early history of Wairakei (with brief notes on some unforeseen outcomes)*. *Geothermics* 38, 11–29

Bolton, R.S., Hunt, T.M., King, T.R., Thompson, G.E.K., (2009). *Dramatic incidents during drilling at Wairakei Geothermal Field, New Zealand*. *Geothermics* 38, 40–47.