Drs Ben Keet

Position:	Senior Specialist In-situ Remediation Techniques Director Geo & Hydro Milieutechniek BV

EXPERIENCE

1988 - Present

Independent senior environmental specialist consultant in New Zealand. Also responsible for Geo & Hydro Milieutechniek bv, The Netherlands. As Managing Director responsible for the rapid development of a number of companies which commenced in 1987 (Wellington), 1990 (Melbourne) 1992 (Sydney), 1992 (Brisbane), 1993 (Perth, Luxembourg, Assen (NL)), 1996 (Dieren, Holland) and currently as engineering design and contractor firm Geo & Hydro Milieutechniek bv based in Brummen, Holland. Man. Dir. of K8 Ltd, providing specialist advise to MfE (New Zealand).

Project manager of more 4000 contaminated soil and groundwater projects. Responsible for over 550 large and 1800 smaller site investigations as well as a number of emergency response oil spill clean-up projects (40). Designed and managed well over 400 biological (in-situ) remediation projects ranging from small service stations, larger gasworks, depots and refineries to very large projects such as Sydney & Luxembourg Airports. Techniques applied include biosparging, bioventing, ORC, HRC, bioslurping, soil air extraction, a multitude of free product recovery techniques as bioslurping, MPRS (US patent B.Keet), fluid - fluid extraction for DNAPL's, substrate injection (gaseous and dissolved), micro-porous membranes (for nutrient and AE dosing & nitrate remediation in deep aquifers), complex-ion extraction, nitrogen -substrate micro sparging (VOCL), development and application of diffusion spargers and samplers, immobilisation techniques for heavy metals and application of specialised grouting techniques, incl. horizontal cement curtains below landfills as well as installation of sequential reactive barriers, as containment technique and for areal plume treatment.

Worked on Hill AFB (site of Wiedemeijer Natural Attenuation Protocol) and many other DoD (US) sites part of the Bioventing Initiative from '93 till '96. Project Manager for a number of intrinsic biorestoration studies for Min. of Defence (NL) and the application of bio-fences, iron walls and GHCD systems to control migration of contaminants in groundwater reservoirs.

Initiated the research and development of new sensor controlled automated in-situ bioremediation systems which continuously determine the bottlenecks in the natural attenuation processes and by minor intervention assist these natural soil processes in the biodegradation of contaminants thereby reducing energy consumption by often more then 90 % compared to standard in-situ systems. By the incorporation of data loggers even the need for monitoring tasks (sampling etc.) is extensified to once per year.

Obtained several patents (US, AUS, NL and other countries) in the fields of remediation and environmental technology. Developed leak prevention / detection systems, flexible skin double walls for underground tank systems and a low cost heat recovery from dung cellars (patents granted). Chairman of several courses on the application of in-situ and ex-situ soil and groundwater remediation techniques in US, UK, Australia, New Zealand, Holland and Luxembourg. Initiator of successful Hand-On Training concept in de Benelux providing over 30 courses at post-doc level on remedial design, ecological monitoring techniques, modelling, risk and uncertainty analysis. Sr. advisor for MfE (New Zealand) providing support and technical edits of policy documents.

1987 - 1988

Established an environmental consultancy office in Wellington, New Zealand, GCNZ Ltd. now URS. Build up a new client base consisting of petrochemical, pulp and paper, fertiliser and pesticide companies as well as Landfill owners. Introduced a number of new techniques being a mixture of US remediation techniques and oil field technology.

1982 - 1987

Petroleum and reservoir engineer with Shell International, in Africa, S. America, North Sea and Head Offices (London and The Hague). Some highlights:

1985 - 1987:	Focal point of North Sea Team (all fields except Brent)
1984 - 1985:	Gabon, Algeria; Initially responsible as the sole Shell representative

1977 - 1982

Assistant Lecturer Physics and Groundwater Hydraulics, numerical and analytical modelling techniques(post graduate), at the Free University, Amsterdam, The Netherlands. Publication of several handbooks and guideline documents.

ACADEMIC QUALIFICATIONS

Doctoral Degree (1st class honours) in Hydrogeology, with special subjects Hydrochemistry, Isotope Hydrology and Exploration Techniques (Geophysics/Drilling).

Author of about forty scientific publications, co-author of a text book on Multivariate Statistical Analysis and author of "Handbook on Cost-effective Remediation Techniques" and "In situ remediation: Decision making in presence of doubt" (resp. 1993 and 2002)

Invited chairman for the 1995 Battelle In-Situ and On-Site Bioreclamation Symposium in San Diego. Course leader and lecturer for in-situ and intrinsic biorestoration techniques ('96 through to 2001) for Geoplan bv, Amsterdam. NOBIS lecturer on extensive in-situ techniques.
Initiator & Coordinator of Hands-On Training Course program
Lecturer on UN courses on groundwater restoration in Arab world
Keynote speaker WASTMinz contaminated site conf. Nelson NZ 2003

PROFESSIONAL MEMBERSHIPS

Society of Petroleum Engineers (US)
Australian Institute of Petroleum
Australian Water & Wastewater Association
American Society for Testing and Materials
National Ground Water Association
Water Pollution Control Federation
Env. Man. Industry Association
Environment Institute of Australia (training)
Australian Drilling Industry Ass. (Licenced Driller)
Member of the editorial committee of the Journal of Groundwater, a leading journal on groundwater pollution (US).
AAAS (Science) New York,
VVM (NL)