



## Mike Fitzpatrick

### Qualifications

1989 Doctor of Philosophy in Chemistry  
(University of Otago).

### Professional Affiliations

- Member of New Zealand Institute of Chemistry, Auckland Branch Treasurer 1997-2000.
- Approved Handler Test Certificate (Class 3.1A, Class 5.1.1.A, Class 6, Class 8, Class 9.1A, Class 9.2 A).



### Career Summary

Dr Fitzpatrick is an analytical and environmental chemist with broad experience in chemical analysis, water quality, the assessment of contaminants in the environment, human health and education.

Dr Fitzpatrick has significant expertise in analytical chemistry, the evaluation and modelling of water quality, aquatic life criteria, water treatment, environmental monitoring, chemical processes and contaminated wastes. He has developed two processes for the removal of pentachlorophenol from contaminated materials and holds a New Zealand patent for one of the processes. He has also worked extensively on the development of aquatic life criteria in New Zealand. Dr Fitzpatrick is also a world authority on phytoestrogens in foods, and is also an expert in the chemistry of arsenic and vitamin C. Dr Fitzpatrick has worked in New Zealand, United States, Mali, Armenia and Bulgaria

### Employment Record

#### ***Principal Environmental Chemist – Freshwater Solutions Ltd 2011 - present***

- Environmental chemist.
- Environmental chemist and toxicologist.
- Water quality specialist.

#### ***Chief Scientific Officer - Centre for Advanced Medicine Ltd 2003 - present***

- Director of analytical and research laboratory.
- Director of research programme.
- Scientific support to Chief Medical Officer.
- Analytical consulting.

#### ***Principal Environmental Chemist - Kingett Mitchell Ltd/Golder Associates NZ Ltd 1997 - 2011***

- Project Manager, environmental chemist.
- Environmental chemist and toxicologist.
- Water quality specialist.

***Chief Chemist/Senior Consultant Grayson Laboratories, Auckland 1994 - 1996***

- Chief Chemist: water, timber and environmental laboratories.
- Responsible for 10 analysts.
- TELARC signatory: analysis of waters, analysis of metals by AAS.
- Senior Consultant: environmental, industrial and food-related projects.

***Senior Analyst/Senior Consultant - Allan Aspell and Associates, Auckland 1992 - 1994***

- Manager of consulting laboratory.
- Senior analyst: food, environmental and inorganic testing laboratories.
- Senior Consultant: environmental, industrial and food-related projects.

**Selected Project Experience**

**Primary Industry**

**Lorneville Plant Water Quality Assessment – Alliance Group Ltd.** Review of the water quality data and assessment of the effects of a treated meat processing discharge on river water quality.

**Ammonia criteria derivation – AFFCO Wairoa.** Derivation of site-specific ammonia water quality criteria for the lower Wairoa River.

**Assessment of Effects – Fonterra Longburn.** Assessment of effects related to the discharge of wastewater at the Longburn Dairy Factory.

**Ammonia criteria derivation – Alliance Ltd.** Derivation of site-specific ammonia water quality criteria for the lower Wairoa River.

**Assessment of Effects – Fonterra Stirling.** Assessment of effects related to the discharge of wastewater at the Stirling Dairy Factory.

**Assessment of Effects – Fonterra Hautapu.** Assessment of effects related to the discharge of cleanwater and stormwater from the Hautapu Dairy Factory to the Waikato River.

**Anchor Hautapu Health and Safety Assessment – Anchor Products Ltd.** Project Manager; Health and safety assessment of chemicals and biological agents used at the Hautapu dairy factory.

**Edendale Nitrate Dietary Intake Modelling – NZMP.** Project Manager for the preliminary modelling of dietary intake nitrate.

**Edendale Dairy Factory Discharge Assessment and Resource Consent Application – NZMP.** Assessment of environmental issues associated with the discharge of dairy factory effluent and increased cleanwater discharge to the Mataura River. Preparation of consent documentation and evidence for resource consent hearing.

**Anchor Edendale Land Discharge – Anchor NZ Ltd.** Assessment of the effects of the discharge of dairy factory effluent to land, modelling and monitoring of groundwater quality.

**Anchor Te Awamutu Gap Analysis and Environmental Audit – Anchor NZ Ltd.** Project Manager for the review of dairy factory site monitoring programme and site audit ahead of re-application for resource consents.

**Anchor Edendale Dairy Factory Discharge Assessment – Anchor NZ Ltd.** Assessment of environmental issues associated with the discharge of dairy factory effluent to the Mataura River. Preparation of consent documentation and evidence for resource consent hearing.

**Anchor Hautapu Dairy Factory Discharge Environmental Assessment – Anchor NZ Ltd.** Assessment of environmental issues associated with the discharge of dairy factory effluent to the Waikato River. Preparation of consent documentation.

**Mining Sector**

**Review of K1 and K2 Pit Water Quality – Solid Energy.** Review of the water quality of the K1 and K2 pits, water quality modelling.

**Environmental Impact Assessment at the Sadiola – Mine Anglo Gold.** Technical advice on issues relating to the Sadiola gold mine in Mali. Issues relate to the effects on mining on the environment, particularly the fate of cyanide in receiving waters.

**Review of Boron Criterion – Solid Energy.** Project Manager for the review of the ANZECC water quality trigger level for boron.

**Derivation of Antimony Aquatic Life Criteria – Newmont Waihi Gold Mine.** Project Manager for the derivation of site-specific antimony criteria for the Ohinemuri River.

**Selenium Fish Survey – Newmont Waihi Gold Mine.** Survey for selenium in fish of the Ohinemuri and Waitekauri Rivers.

**Snail toxicity review – Newmont Waihi Gold Mine Ltd.** Project Manager for the investigation of the causes of snail toxicity the Ohinemuri River.

**Derivation of Selenium Aquatic Life Criteria – Newmont Waihi Gold Mine.** Project Manager for the derivation of site-specific selenium criteria for the Ohinemuri River.

**Review of the ANZECC Nickel Aquatic Trigger Level – Solid Energy.** Project Manager for the review of the ANZECC aquatic life trigger level for Nickel.

**Arsenic data review – Dundee Precious Metals Inc.** Review of human exposure to arsenic data at the Tsumeb smelter, Namibia.

**Review of Kimihia Wetland Water Quality – Solid Energy.** Project Manager for the of the water quality of the Kimihia wetland and an assessment of the effects of mine water discharges.

**Human health assessment – Deno Gold Armenia.** Project Manager for the investigation of Armenian water, beer and wine and assessment of human health risk.

**Jinfeng Water Quality Assessment – Sino Gold.** Project Manager for review of water quality sampling programme, review of water quality data, refinement of site water management system, modelling of site and receiving water quality and geochemical modelling.

**Jinfeng Gold Mine Assessment of Effects – Sino Gold.** Technical advice on issues associated with the development of the Jinfeng Gold mine at Jinfeng, China. Development of a site water management system, modelling of site and receiving water quality and geochemical modelling.

**Environmental review – Deno Gold Armenia.** Project Manager for environmental review of the activities of the Deno Gold polymetallic mine, Kapan, Armenia.

**Laboratory and field training – Deno Gold Armenia.** Project Manager for training of local staff in environmental and analytical chemistry at Deno Gold, Kapan, Armenia

**Water quality review – Deno Gold Armenia.** Project Manager for baseline water quality study and review of the Voghdji River and tributaries, Kapan, Armenia.

**Hazardous waste analysis – Deno Gold Armenia.** Project Manager for advice on hazardous waste disposal for Deno Gold, Kapan, Armenia

**Removal of manganese by anaerobic wetlands – Coeur Gold Ltd.** Project Manager for the investigation of rates of removal of manganese from an anaerobic wetland at the site of the closed Golden Cross Mine near Waihi.

**Rotowaro ash trials – Solid Energy.** Review and modelling of data from trials designed to investigate the leaching of boron from coal ash.

**Awaroa Open Pit Expansion – Solid Energy.** Modelling of water quality for the Lake Waahi catchment and the effects of the expansion of the Awaroa open pit coal mine at Rotowaro, New Zealand.

**Te Kuha Open Pit Assessment of Effects – Rangitira Developments Ltd.** Technical advice on issues associated with the development of an open pit coal mine at Te Kuha, Westport, New Zealand. Baseline water quality and rock geochemistry definition, geochemical modelling, and site and receiving water quality modelling.

**Golden Bar Geochemistry and Water Management – Gold and Resource Developments Macraes.** Technical advice on issues associated with the development of the Golden Bar open pit gold mine at Macraes, New Zealand. Development of a site water management system, modelling of site and receiving water quality and geochemical modelling.

**Kinetic Testing – Gold and Resource Developments Macraes.** Project Manager for the set up of testing facility for geochemical kinetic tests on Golden Bar rock samples.

**Cypress Pit Geochemistry and Water Management – Solid Energy.** Technical advice on issues associated with the development of the Cypress open pit coal mine in the Upper Waimangaroa Valley, Westport, New Zealand. Development of a site water management system, modelling of site and receiving water quality and geochemical modelling.

**Golden Cross Aquatic Life Criteria Review – TIMES Environmental.** Project Manager for the review of aquatic life criteria and biological monitoring at the Golden Cross mine.

**Endako Molybdenum Mine Assessment of Effects – EnviroNet.** Modelling of water quality at the Endako Molybdenum mine in British Columbia and the assessment of environmental effects in relation to land-use.

**Globe Hill Progress Mine Assessment of Effects – Gold and Resource Developments Macraes.** Technical advice on issues associated with the development of Globe Hill Progress gold mine at Reefton, New Zealand. Development of a site water management system, modelling of site and receiving water quality, geochemical modelling, development of site-specific aquatic life criteria, field monitoring, preparation of consent documentation, assessment of environmental effects.

**Water Treatment Plant Operation – Coeur Gold Ltd.** Project Manager for the review and of the operating conditions of the Golden Cross Water Treatment Plant.

**Resource Consent Hearing – Coeur Gold Ltd.** Provision of expert evidence regarding water quality criteria and the effects of minewater discharge on the Waitekauri River.

**Bennydale Coal Mine Discharge Assessment of Effects and Resource Consent Application – Solid Energy.** Project Manager for the assessment of environmental issues associated with the discharge of the disused Bennydale Coal Mine minewater to the Mangapehi Stream. Preparation of resource consent documentation.

**Derivation of Site-Specific Aquatic Life Criteria for Iron and Manganese – Coeur Gold Ltd.** Project Manager for the derivation of new site-specific water quality criteria for the Upper Waitekauri River for Iron and Manganese.

**Mine Discharge and Upper Waitekauri River Water Modelling – Coeur Gold Ltd.** Project Manager for the modelling of discharge and receiving water quality for the Golden Cross Mine discharges to the Upper Waitekauri River.

**Bennydale Coal Mine Discharge – Solid Energy.** Project Manager for the assessment of environmental issues associated with the discharge of minewater to surface water. Provision of on-going technical advice, design of a passive minewater treatment system (ALD/wetland) and on-going assessment of monitoring data.

**Geochemistry and Water Quality Assessments at Macraes – Gold and Resource Developments Macraes.** Assessment of environmental issues associated with the effects of gold mining activities on surface water quality. Modelling of the effects of site and receiving water quality. Assessment of effects.

**Derivation of Site-Specific Aquatic Life Criteria – Coeur Gold Ltd.** Project Manager for the derivation of new site-specific water quality criteria for the Upper Waitekauri River.

**Sludge Disposal Resource Consent Application – Coeur Gold Ltd.** Project Manager; Assessment of effects associated with the disposal of sludge to the Golden Cross underground mine workings. Preparation of resource consent documentation.

**Huntly West Coal Mine Environmental Assessment – Solid Energy.** Assessment of environmental issues associated with discharge of mine seepage water to Lake Waahi. Preparation of consent documentation.

**Lake Waahi Sediments Review – Solid Energy.** Analysis of data from a survey of selected trace elements in Lake Waahi. Preparation of assessment of environmental effects.

**Review of Trace elements in Lake Waahi Eels – Solid Energy.** Analysis of data from a survey of the concentrations of selected trace elements in eels in Lake Waahi. Preparation of report.

**Gold Mine Closure – Coeur Gold Ltd.** Assessment of long-term water quality issues associated with the closure of the Golden Cross mine. Modelling of post-closure water quality.

**West Coast Coal Terminal – Solid Energy.** Assessment of effects of the construction of a coal terminal at Granity. Preparation of evidence for resource consent and Environment Court hearings.

**Mataura Lignite Mine Environmental Assessment – Solid Energy.** Project Manager for the assessment of environmental issues associated with discharge of minewater from the Mataura Lignite mine to the Mataura River. Preparation of consent documentation.

### **Electricity Generation**

**Effects of Anti-foaming Agents – Genesis Energy.** Project Manager for on-going technical advice on issues associated with the discharge of anti-foaming agents to the Waikato River.

**Otahuu Power Plant Monitoring Programme – Contact Energy.** Project Manager for the development of power plant site discharge monitoring program.

**Otahuu Power Plant Resource Consent Application – Contact Energy.** Provision of technical advice on the effects of a cooling water discharge on the Tamaki Estuary, baseline water quality and sediment monitoring.

**Clutha Hydro-Electric System Consent Renewals – Contact Energy.** Co-ordination of technical gap analysis to assess available information as part of the resource consent renewal process.

### **Wastewater and Stormwater**

**Trade Waste Review – 3M.** Review of sources of Chemical Oxygen Demand in Trade Waste.

**Assessment of the ANZECC trigger levels for zinc – Christchurch City Council.** Project Manager for the review of the ANZECC trigger levels for zinc and derivation of revised trigger levels based on updated data.

**Analysis of methoprene – Watercare Ltd.** Project Manager for the development of a method for the determination of methoprene in wastewater by High Performance Liquid Chromatography (HPLC).

**Assessment of Effects – Pedersen Timber.** Assessment of effects related to the discharge of stormwater from the Pedersen Timber Mill at Taupo.

**Tairua Mill Assessment of Effects – Tanner Timber.** Assessment of the effects of stormwater discharge from the Tanner Timber Mill at Tairua.

**Kaitaia Mill Assessment of Effects – Tanner Timber.** Assessment of the effects of stormwater discharge from the Tanner Timber Mill at Kaitaia.

**Topuni Mill Water Quality Assessment – Carter Holt Harvey Ltd.** Project Manager for the assessment of timber treatment chemical impacted surface water quality at the Topuni Timber Mill.

**Anchor Hautapu Dairy Factory Stormwater Discharge – Anchor NZ Ltd.** Project Manager for the assessment of environmental effects associated with the discharge of dairy factory stormwater to a rural stream. Preparation of a monitoring programme.

**The Redvale Landfill Surface Water Monitoring Programme – Waste Management (NZ) Ltd.** Overview of the Redvale Landfill surface water monitoring programme, response limits and landfill water quality.

**Stormwater Review – North Shore City.** Project Manager for the review of issues pertinent to stormwater management and monitoring in North Shore City.

**Kinleith Pulp and Paper Mill – Carter Holt Harvey.** Preparation of expert evidence in relation to resource consent applications for the Kinleith Pulp and Paper Mill encompassing general water quality, nutrients and water uses.

### **Central and Local and Government**

**Newmont Waihi Gold Annual Water Quality Monitoring Report Review – Waikato Regional Council.** Review of water quality monitoring report to assess compliance and identify and issues.

**Review of submission to apply de-icers – Horizons Manawatu-Wanganui Regional Council.** Project Manager for the review of submission to apply de-icers to in the Manawatu-Wanganui region. Presentation of evidence at hearing.

**Transport effects on Aquatic Systems – NZTA.** Assessment of individual chemicals emitted by motor vehicles in New Zealand and assessment of New Zealand vehicle fleet emissions on water quality.

**Waihou River Nutrient Review – Hauraki District Council.** Review of the nutrients status of the Waihou River in relation to the discharge from the Paeroa Wastewater Treatment Plant.

**Environmental Indicators Programme – New Zealand Ministry for the Environment.** Input to report on national indicators for toxic substances in the New Zealand Environment. Part of the Ministry for the Environment Environmental Indicators Programme.

**Waikanae Wastewater Treatment Plant – Kapiti Coast District Council.** Preparation of assessment of effects associated with the Waikanae Wastewater Treatment Plant upgrade.

**Drury Sewage Treatment Plant – United Water.** Assessment of treatment and disposal of wastewater at the Drury Treatment Plant.

**Draft Part 180 Rules – Maritime Safety Authority of New Zealand.** Preparation of a review of the Draft Part 180 rules for ocean dumping of waste and other matters.

**Hauraki Plains Drainage Scheme – Carson Group.** Assessment of effects of the proposed Hauraki Plains Pouarua-Maukoro drainage scheme on water related resources.

### **Contaminated Land**

**Dioxins in Soils – Gwilym Environmental Services.** Project Manager for the review and interpretation of dioxin levels in soils from Whakatane.

**Site Contamination Assessment – McLaughlin's Park Ltd.** Project Manager for the site assessment of 55 McLaughlin's Rd. Soil and water testing programme.

**Assessment of Environmental Effects – Boron Deposition – Solid Energy.** Assessment of environmental issues associated with the discharge of coal fly ash to land.

**Field Method for the Analysis of Pentachlorophenol in Soils – Fletcher Challenge Forests.** Project Manager for the development of a field method for the analysis of high levels of pentachlorophenol in soils.

**Review of Dioxin Sampling Methodologies at Paritutu – Ministry for the Environment.** Project Manager for the review soil sampling, storage and analysis methodologies for MfE dioxin investigation at Paritutu, New Zealand.

**Pentachlorophenol Removal – Kingett Mitchell.** Project Manager for the development of a method for the removal of pentachlorophenol (PCP) from contaminated soils and construction of pilot-scale PCP removal plant.

**New Plymouth Dioxin Investigation – Johnson Lawrence Barristers and Solicitors.** Project Manager for the investigation into the effects of dioxin discharges and emissions on residents and the environment in the vicinity of the Ivon Watkins-Dow pesticides manufacturing plant at New Plymouth. Soil analysis and interpretation, and retrospective air-quality modelling.

**Hazardous Waste Treatment – Carter Holt Harvey Ltd.** Project Manager for the management of trials for the separation of pentachlorophenol (PCP) from a mixed hazardous waste.

### **Publications**

Boothroyd IKG, Goldstone A, Fitzpatrick M and McGilvaray R. Criteria for the Protection of Aquatic Ecological Values at Golden Cross Mine: a Case Study. In: Metal Contaminants in New Zealand: Moore TA, Black A, Centeno JA, Harding TS, Trumm DA eds. REsolutionz Press, Christchurch, New Zealand 2005.

Fitzpatrick M (2000). Soy formulas and the effects of isoflavones on the thyroid. NZ Med J 113: 24-26.

Fitzpatrick M (1999). Soya in baby milks. Pract Midwife 2: 16-19.

Fitzpatrick M (1998). Soy isoflavones: Panacea or poison? J Price-Pottenger Nutr Found 22: 3-7.

Fitzpatrick MG, Hanton LR, Henderson W, Kneebone PE, Levy EG, McCaffrey LJ and McMorran DA (1998). Application of electrospray mass spectrometry to the characterisation of tertiary arsine ligands. *Inorg Chim Acta* 281: 101-110.

Fitzpatrick MG, Hanton LR and Simpson J (1996). Conformationally flexible arsine ligands: two forms of bis[1,1'-dimethylarsino-ferrocene]-dibromo-nickel (II). *Inorg Chim Acta*, 244: 131-136.

Fitzpatrick MG and Hanton LR (1996). Fluxional nickel complexes containing five arsine ligands. *Inorg Chem*, 48: 1740-1744.

Fitzpatrick MG and Tan SS. (1994). Determination of total petroleum hydrocarbons. *Chem NZ*, 108: 18.

Fitzpatrick MG, Hanton LR, Levason WG and Spicer MD (1989). Cobalt complexes containing five arsenic-donor ligands. *Inorg Chim Acta*, 237: 1225-1226.

Fitzpatrick MG and Hanton LR (1986). Bis[1,1'-dimethylarsino-biphenyl]-diiodo-Nickel (II). *Acta Cryst*, 42: 118-121.

Fitzpatrick MG. Chelation Therapy Recent Developments and Application – The TACT Trial: AIMA New Zealand Conference, Auckland, May 2013.

Fitzpatrick MG. Changing Styles of Management: Water Quality, RMLA National Conference, Dunedin, October 2008.

Fitzpatrick MG and Kennedy P. Re-evaluation of ANZECC 2000 Trigger Values in the New Zealand Setting, SETAC World Congress, Sydney, August 2008.

Fitzpatrick MG, Montgomerie R, and Fransen P. Application of the Draft USEPA Selenium Aquatic Life Criteria in the New Zealand Context, AUSIMM Annual Conference, Wellington, July 2008.

Fitzpatrick MG. A Review of the ANZECC 2000 Trigger Levels for Zinc, NZWWA Annual Conference, Rotorua, May 2008.

Boothroyd IKG, Fitzpatrick M, Browne GN, Corlis N, Goldtone A, Speed S, Mills R and Fergusson D. Coal Ash Disposal at Rotowaro: A Reference Condition Approach to Setting Boron Criteria and Assessing Environmental Effects. AUSIMM Annual Conference, Wellington, July 2006.

Fitzpatrick MG. Review of the ANZECC Trigger Level for Boron, Australian Society for Ecotoxicology Conference, September 2005.

Fitzpatrick MG. Steam Stripping of Pentachlorophenol, WasteMinz Conference, November 2002.

Irvine CHG, Shand N, Fitzpatrick MG and Alexander SL. Isoflavone and Testosterone Extraction from Disposable Diapers: The New Zealand Experience, 2nd International Conference on the Role of Soy on Disease Prevention, September 1996, Brussels.

Fitzpatrick MG and Irvine CHG. The Phytoestrogen Content of Soy Based Infant Foods, 3rd International Conference on Phytoestrogens, December 1995, Little Rock.

#### **Contact Details**

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