NAME:		Dr. Christopher Myles Clunies-Ross
POSITION:		Managing Director & Laboratory Manager, Airlabs Environmental Pty Ltd
TERTIARY EDUCATION:		PhD in the Department of Chemical Engineering at the University of Queensland, 2001 (Thesis: Minimising Dioxin Emissions from Biomedical Waste Incinerators) Master of Engineering Science (Qual), University of Queensland, 1994 Diploma of Education, University of Melbourne, 1986 Bachelor of Science, LaTrobe University, 1985
CAREER HISTORY:	1993 - 2008	Managing Director of Airlabs Environmental Pty Ltd /Unilabs Environmental. NATA signatory for stack emission testing. Specialising in air/stack gas monitoring, odour surveys, workplace testing, dioxin studies and combustion research. Consulted to industry on various issues associated with the control of emissions from high temperature incinerators, including dioxin reduction strategies, specification of pollution control equipment and the monitoring of stack gas emissions. Preparation of environmental impact assessments and works approval applications.
	1992	Principal Scientist, National Analytical Laboratories, Sydney. Manager of the Air Monitoring Section, Sydney. NATA signatory of the Air Monitoring Section, Melbourne.
	1990 - 1992	Senior Environmental Chemist, National Analytical Laboratories, Melbourne. Manager and NATA signatory of the Air Monitoring Section.
	1987 - 1989	Scientific Officer, Victorian EPA, Operations Division. Involved with the inspection and licensing of industrial premises. Formulated control strategies, including the specification of appropriate pollution control equipment. Participated extensively in third party appeal conferences.
	1987	Technical/Scientific Officer, Victorian EPA, Air Quality Branch - Technical Services Section. Undertook stack emissions monitoring of licensed industrial premises.
	1986	Technical Assistant, CSIRO, Division of Chemical and Wood Technology, Melbourne. Conducted research into waste water treatment.

DIOXIN RESEARCH ACTIVITIES

From 1995 to 2000 I undertook a post-graduate (PhD) research project into the development of dry and dry-wet scrubbing technologies for removing dioxins from medical waste incinerator emissions. This resulted in the installation of combustion gas scrubbing systems in Western Australia and Malaysia.

Although these systems successfully reduced dioxin emissions below 0.05 ng/m^3 I-TEQ, there are some fundamental problems with this approach. Firstly, the installation of such equipment constitutes a major capital expense, typically in the vicinity of 40% of total capital, with significant ongoing costs. As such, its implementation is cost-prohibitive, particularly in developing countries. Secondly, this technology utilises large quantities of adsorption media, which in turn must be disposed of. With this type of process, dioxins are not eliminated from the environment, merely transferred from one medium (the air) to another (the adsorbent, and ultimately landfill).

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With this in mind, the primary objective of my research activities since 2001 has been to gain an understanding of the processes that influence dioxin formation in combustion systems so that dioxin suppression strategies can be developed. This includes eliminating dioxin formation catalysts, limiting the time that combustion gases spend in the *de novo* synthesis zone and increasing the level of suppressant gases such as sulphur dioxide and ammonia entering the system.

In January 2006 I was appointed the dioxin expert on the Independent Monitoring Committee for the Orica Botany Groundwater Cleanup Project. My appointment required the mutual support of the New South Wales DECC, Orica company representatives and the Botany community.

My principal role is to investigate dioxin emissions from the $120 million air stripping and incineration facility. This has incorporated a comprehensive study into dioxin formation and reduction in the gas conditioning and scrubbing system.

ASSESSMENT OF WORKS APPROVAL APPLICATIONS – MEDICAL WASTE INCINERATORS

During March 2007 I undertook an assessment of the proposed Dandenong Medical Waste Incinerator on behalf of EPA Victoria. I also provided advice to EPA Victoria during early 2007 on the proposed Geelong Medical Waste Incinerator. In March 2008 I assessed a proposed ethylene oxide thermal oxidiser on behalf of the client and the local government authority.

MAJOR STACK EMISSION MONITORING PROGRAMS:

Since 1990, I have participated in numerous stack emission monitoring programs at industrial plants throughout Australia, New Zealand, Malaysia, the Philippines, Vietnam, Indonesia, Saudi Arabia and the United Kingdom. I regularly undertake work on behalf of the following industries:

- Alumina Refining and Aluminium Smelting
- Cement and Lime Kilns
- Medical Waste Incinerators
- Boilers, Generators and Power Stations
- Petrochemical Facilities
- Liquid Waste Treatment and Disposal Systems
- Metal Processing Plants
- Anode/Cathode Treatment and Disposal
- Municipal and General Waste Incineration
- Sludge Incineration Plants
- Groundwater Treatment Facility
- Thermal Soil Remediation Systems
- Pulp & Paper Manufacturers

DIOXIN PUBLICATIONS:

- Clunies-Ross, C, PhD thesis "Minimising Dioxin Emissions from Biomedical Waste Incinerators", University of Queensland, Brisbane, 2000.
- Stanmore, B, Clunies-Ross, C, "Towards a Mechanism for the *De Novo* Formation of Dioxins in Waste Incinerators", Environmental Science and Technology, 2000.
- Brash, I, Clunies-Ross, C, "Report on the Characterisation and Estimation of Dioxin and Furan Emissions from Waste Incineration Facilities", Environment Australia, 1999.
- Clunies-Ross, C, Stanmore, B, & Millar, G, "The Dioxin Formation Potential Of Regenerative Soot Traps Using Copper Doped Diesel Fuel", Nature, 1996.
- Taucher, J, Clunies-Ross, C, et al. "PCDD, PCDF and PCB emissions under various operating conditions from a waste oil furnace", Chemosphere, 1992.