

## CURRICULUM VITAE

**LUCIAN BURGER**

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**Name of Staff:** Lucian Willem Burger  
**Name of Firm:** Airshed Planning Professionals (Pty) Ltd  
**Position:** Managing Director/Principal Consultant  
**Date of birth:** 24 May 1960  
**Years with Firm/entity:** 21 years  
**Nationality:** South African

### Membership in Professional Societies:

- South African Institute of Chemical Engineers (Fellow: No. 4533)
- American Institute of Chemical Engineers (Senior Member: No. 0090107071)
- National Association of Clean Air (NACA)
- Accredited Inspectorate Authority (AIA) for completion of risk assessments as partial fulfilment of Major Hazard Installation Regulations (Reference MHI013)
- SANAS Risk Assessment Specialist Technical Committee (2003 - ongoing)
- Member of the Technical Committee on Air Quality Standards Setting (2002-2003)
- SABS Air Quality Standards Specialist Technical Committee (Chairman of Working Group 1)

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### EDUCATION

#### University

**1984 - 1986** : PhD student at the University of Natal (Department of Chemical Engineering), Durban.  
Completed December 1986. Degree awarded March 1987  
Supervisor: Prof M Mulholland

**1983 - 1984** : MSc Eng student at the University of Natal (Department of Chemical Engineering), Durban.  
Completed April 1984. Degree awarded March 1985  
Supervisor: Prof M Mulholland

**1980 - 1982** : BSc Eng student at the University of Natal, Durban. Completed a BSc Eng (Chemical Engineering) - Cum Laude

**1979** : BSc Eng student at the University of Port Elizabeth, 1<sup>st</sup> Year  
Chemical Engineering

#### Matriculated

**1978** : Cradock High School, Cradock, South Africa. Aggregate: A

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### EMPLOYMENT RECORD

**1990 - Present** : Airshed Planning Professionals (Pty) Ltd (Previously known as Environmental Management Services 1990 to 2003)  
Air Pollution Impact Assessment Consultants  
Managing Director

**1989** : Process Engineer. AECI Engineering Department, Modderfontein

**1987** : Council for Scientific and Industrial Research (CSIR), Pretoria

**1984 - 1986** : Research Assistant, Department of Chemical Engineering, University of Natal, Durban

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## LANGUAGE SKILLS

Language	Reading	Speaking	Writing
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

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## KEY QUALIFICATIONS AND RELEVANT EXPERIENCE

27 years' experience in:

- Air Pollution Dispersion Modelling
- Micrometeorology
- Ambient Air Monitoring
- Chemical Engineering
- Development of Air Emissions Inventories (Mining and Ore Handling, Metal Recovery, Chemical Industry, Petrochemical Industry, Power Generation, Waste Disposal and Recycling, Transport)
- Air Quality Management Programmes
- Formulation of National Strategies
- Project Management

### Policy, Strategic Planning and Air Quality Management:

- As chairman of Working Group 1, Lucian Burger was involved in the development of the South African Air Quality Standards Framework (SANS 69) and the Air Quality Standards for Criteria Pollutants (SANS 1929), in conjunction with the South African Bureau of Standards (SABS).
- Mercury emission limits - The South African Regulations for Mercury Waste Disposal was drafted in 2001. These regulations were completed together with Infotox (Pty) Ltd, specialists in toxicology.
- Dispersion modelling regulations – Chairman of the Dispersion Modelling Working Group for standardizing and setting requirements for the use of dispersion models for regulatory purposes, in conjunction with the Department of Environmental Affairs. This project is current and due to be completed in 2011.
- Guidelines For Thermal Treatment Of Wastewater Sludge – Development of the position paper and subsequent guidelines on the air emissions impact from thermal treatment options of wastewater sludge. The Water Research Commission published the complete set of guidelines in 2009 [*Herselman JE; Burger LW; Moodley P (2009) Guidelines for the utilisation and disposal of wastewater sludge Volume 5 of 5: Requirements for thermal sludge management practices and for commercial products containing sludge, ISBN No: 978-1-77005-711-1*].
- Review and Implementation of the new Air Emission License (National Environmental Management Air Quality Act) role out programme (2006-2008). This included the development of the framework, technical workshops with industry and training of local authorities. The tasks were divided between principal consultants within Airshed Planning Professionals. Lucian Burger was responsible for the Power Generation and Pulp & Paper sectors.
- List of Activities, Setting of Minimum Emission Standards. Served as technical advisor to the

Department of Environmental Affairs for the development of air pollution emission rates for all major stationary industrial activities. Published in 2010 (Government Gazette 33064)

- NEDLAC 'Dirty Fuels Project' - The project undertaken for NEDLAC comprised the development of emissions inventories for several major conurbations across South Africa, the prediction of resultant air pollutant concentrations and the quantification and costing of health risks due to inhalation exposures. Project was completed in 2004.
- Low Smoke Fuels Standards- Served on the Technical Committee on the Low Smoke Fuels Standards Development Committee administered by the Department of Minerals and Energy (1998-2003).
- Projects related to Air Quality Management
  - Saldanha Industrial Development Zone (IDZ) – Part of an integrated team of specialists that developed the proposed development and management strategies for the IDZ. Air quality guidelines were developed and a method of determining emissions for potential developers. The investigation included the establishment of the current air emissions and air quality impacts (baseline) with the objective to further development in the IDZ and to allow equal opportunity for development without exceeding unacceptable air pollution levels.
  - Vaal Triangle Airshed Priority Area Air Quality Management Plan– Served as technical advisor to the Department of Environmental Affairs for the development of South Africa's first air pollution priority area air quality management plan. This included the establishment of a comprehensive air pollution emissions inventory, atmospheric dispersion modelling, focusing on impact area "hotspots" and quantifying emission reduction strategies. The management plan was published in 2009 (Government Gazette 32263)
  - Cape Town - An air quality situation assessment was undertaken on behalf of the City of Cape Town in 2002 in support of their plans for the development of an air quality management plan for the City.
  - Johannesburg - An air quality baseline assessment was undertaken and an air quality management plan compiled for Joburg on behalf of the City. The project was completed during September 2003.
  - Coega - An air pollution management strategy was developed in 1997 for the Coega Industrial Development Zone. Air quality guidelines were developed and a method of determining emissions for potential developers. The objective was to allow equal opportunity for development without exceeding unacceptable air pollution levels. Developed an airshed air quality management model for application at Coega in 1999. The model was developed in-house so as to assist the Coega Development Corporation in the proactive allocation of emission limits to prospective investors in the IDZ. The purpose being to maximise development opportunities whilst ensuring the maintenance of good air quality in the long-term.
  - Gauteng - An air quality baseline assessment was completed for Gauteng in 1999 to inform their proposed air quality management plan. This project was funded by DANIDA.
  - Gauteng - Part of the Environomics/Africon project team to develop industrial buffer zones for Gauteng was undertaken by members of our project team. These buffer zones have been implemented in a GIS system for DACEL and are meant as an early warning decision-support tool to indicate possible conflicts between sensitive activities (including residential development, hospitals, etc.) and pollution caused by industrial activities.

- Ekurhuleni – An air quality baseline study and an Air Quality Management Plan has been developed for the Ekurhuleni Metropolitan Municipality. This work was completed in 2005.
- UMhlathuze – An air quality situation analysis has been undertaken for the uMhlathuze District Municipality and guidance given in terms of the air quality implication of the municipality's spatial development framework. Work is was completed in 2005.
- Tswane – An air quality baseline study was completed for the Tswane Metropolitan Municipality (2005).

A general list of projects completed in various sectors and applications is given below.

Transport Sector: Bakwena Toll Road Concession (Pretoria – Rustenburg); N1/N2 Protea Toll Road (Cape Town – Paarl – Somerset West); Protea Toll Road Tunnel Options; N14 (Germiston) On-/Offramp; N3TC Toll Road Concession De Beers Pass Alternatives; Gauteng Heavy Vehicles Freeway Re-Routing Study; SAPIA Vehicle Emissions Management Strategy; Gauteng Department of Transport Air Quality Management Plan; MMT Fuel Additive Monitoring Campaign (Afton); Sasol Vehicle Emissions Ambient Air Monitoring Campaign; Cape Town International Airport Air Quality Management Plan; OR Tambo International Airport Detailed Air Emission Inventory and Air Quality Management Plan; Sir Seretse Kama (Botswana) Air Impact Assessment; Iron Ore Train Transport (Sishen Mine to Saldanha Bay Iron Ore Port); Coal Train Transport (Moatize to Nicala Port, Mozambique); Bauxite Ore Long-haul Road Transport (Bakhuis to Nickerie, Suriname); Baseline Assessment of Iron Ore Transport (Zanaga Mine to Pointe Noir, Republic of Congo (Brazzaville)).

Provision of Expert Testimony: [e.g. Herbicide Contention Case: Victory Farm v HL&H Timber Products (Pty) Ltd, Rautenbach Aerial Spraying Ltd, Alan James McEwan; SAPREF Alkylation Unit Fire, Rhone-Poulenc Warehouse fire, Shell-Sasol Alcohol Reformulation Contention; Kudu Oils v Department of Environmental Affairs and Tourism), Global Forest Products (Pty) Ltd & Others v Lone Creak River Lodge (Pty) Ltd & Others; Pride Milling Company (Pty) Ltd v Klipspruit Colliery & Others; Triple S Diensstasie Edms Bpk / P Senekal; PetroSA v Langeberg Shopping Mall, SFF & Others v Visigro Investments

Quantitative Risk Assessments and Consequence Modelling: Air Products Durban plant (Hydrogen); Comprehensive Risk Assessment of AECl (chlorine, ammonia, acrylonitrile, sulphur dioxide), Umbogintwini Factory Complex; Oleum Storage Tank Farm Lever Brothers. Boksburg; Ammonia Tank Farm Palabora Mining Company, Palaborwa; Ammonia Refrigeration Unit, Palabora Mining Company, Palaborwa; Chlorine Dosing facility Palabora Mining Company, Palaborwa; Accidental liquid Bromine spills and fugitive gas emissions at Delta-G Scientific, Halfway House; Accidental emissions and spills of organo-pesticides at Sanachem, Verulam. Burning of waste dumps in Botswana (Botswana Government). Chlorine Dosing Facility at mining operations (Rustenburg); Dispersion and Consequence Modelling of Toxic Liquid Spills (e.g. Acrylonitrile and Propylene Oxide), Combustion Products (e.g. Hydrogen Cyanide), Bund Fires and Vapour Cloud Explosions of a large number of storage tanks at Vopak Tank Terminals, Durban Harbour, Investigation of Fire at Sapref Refinery Alkylation Unit; Risk assessment of ammonia, hydrogen fluoride and nitric acid Columbus Stainless (Middelburg); Natural Gas Pipeline from Mozambique to Secunda (Sasol Gas). Hydrogen gas pipeline from Vanderbijlpark to Springs (Air Products), Crude oil and white product pipelines from Chevron Refinery (Cape Town) to Cape Town Harbour, Crude oil and white product pipelines from Chevron Refinery (Cape Town) to Saldanha Bay, Liquid Fuels Transportation Infrastructure from

Staatsolie Refinery To Ogane, Sol And Chevron Product Storage Depots, Suriname (Staatsolie Maatschappij Suriname N.V.), Liquid Fuels Transportation Infrastructure From Milnerton Refinery Area To Ankerlig Power Station (Atlantis Industrial Area), Western Cape Province (Eskom)

Mining and Ore Handling (Blasting; quarrying; grinding; crushing; conveying; vehicles; tailings dams). BHP-Billiton Bauxite Mine (Suriname), Exxaro Heavy Minerals Mine and Processing (Madagascar), Tenke Copper Mine and Processing Plant (DRC), Sari Gunay Gold Mine (Iran), Zaldivar Copper Mine (Chile); Gold Mine at Omagh (Ireland); ZCCM Luancha Copper mine (Zambia); Skorpion Zinc mine (Namibia); Rossing Uranium (Namibia); Trekkopje Uranium (Namibia); Gokwe Coal Mine (Zimbabwe); Murowa Diamond Mine (Zimbabwe); Gamsberg Zinc Mine (Aggeneyns); Prieska Copper mine (Prieska); Numerous coal collieries, including Riversdale (Tete Province Mozambique, Anglo Coal, Exxaro, Xstrata); Lime Quarries (La Farge, formerly Blue Circle, East London and Otjiwarongo, Namibia); Clinker Grinding and Cement Blending Plant (La Farge, Richards Bay); Bluff Mechanical Appliances – Durban Coal Terminal; Portnet's Saldanha Ore Port Facility; and others.

Metal Recovery (Smelting; electro-winning). Samancor Air Quality Baseline for all South African Chromium Smelter and Mines (Ferroveld, Ferrometals, MFC, Columbus, Tubatsi, Western Chrome Mines, Eastern Chrome Mines), Hexavalent Chromium Air Quality Reference Document (FAPA), Hartley Platinum Smelter (Zimbabwe); Mufulira Smelter (Zambia), Nkana Smelter (Kitwe, Zambia); Waterval Smelter (Amplats, Rustenburg); Lonrho Smelter (Brits); Ergo (Anglo American Corporation, Springs); Coega Zinc Refinery (Billiton, Port Elizabeth); Hexavalent Chrome and Lead (Winterveld Chrome Mines); Hexavalent Chrome Xstrata (Rustenburg); Pitch releases from graphite electrode (EMSA, Union Carbide, Meyerton); Copper Smelting (Palabora Mining Company, Phalaborwa); Portland Cement Plant (La Farge, East London and Otjiwarongo, Namibia); Westplats – Mooinooi Smelter (Brits), Holcim Alternative Fuels Project (Lichtenburg, Ulco and Blending Plant – Roodepoort), PPC Riebeeck West Expansion Project, Expansion projects for ArcelorMittal South Africa Vanderbijlpark Works, Expansion projects for ArcelorMittal South Africa Saldanha Bay Works

Chemical Industry (bulk chemical; fertilizer; herbicides; pesticides). Comprehensive air pollution impact assessment of AECI (Pty) Ltd Operations, including Modderfontein, Umbogintwini, Somerset West, New Germany and Richards Bay; Kynoch Fertilizer plants in Milnerton and Potchefstroom; Fedmis Fertilizer Plant in Phalaborwa; Pesticides and Herbicides at Sanachem (Canelands); Chrome Impacts from various Bayer (Pty) Ltd operations (Newcastle and Durban); Fibre Production (Sasol Fibres, Durban); NCP Chlookop Expansion project, NCP Chlookop Contaminated Soils Recovery

Petrochemical Industry (Petroleum refineries, tank farms). Baseline and Expansion of Liquid Natural Gas Refinery (Equatorial Guinea); Site Selection for New South African Petroleum Refinery (DME), Proposed new Greenfields Petroleum Refinery at Coega (PetroSA), Hydrogen sulphide and sulphur dioxide emissions from SASOL operations (Sasolburg and Secunda); Sasol Coal to Gas Conversion Project (Sasolburg), Natref Refinery Expansion Project (Sasolburg); Engen Emissions Inventory Functional Specification (Durban); Air impact of air emissions from Sapref Refinery (Durban) Odour Impact assessment at ChevronTexaco Refinery (Cape Town); StaatsOlie expansion project (Suriname); Marathon LNG Expansion (Equatorial Guinea); PetroSA (Mossel Bay), Air impact of air emissions from Killarney, Milnerton and Saldanha Bay bulk storage tanks, Ambient air sampling campaign and Health Risk Analysis at Major Highway, Toll Plazas, Filing Stations and Taxi Ranks (Sasol)

Pulp and Paper Industry. Expansion of Mondi Richards Bay, Odour Assessment and Panel

Development for Mondi Richards Bay, Multi-Boiler Impact Assessment for Mondi Merebank (Durban), Impact Assessment for Sappi Ngodwana (Nelspruit), Impact Assessment for Sappi Stanger, Air Quality Monitoring Network and Air Pollution Management Plan for Sappi Saiccor (Umkomaas), Comprehensive Emissions Inventory and Screening Health Risk Assessment for Sappi Enstra (Springs), Impact Assessment for Sappi Tugela, Expansion Project for Cape Sawmills (Stellenbosch), Comprehensive Emissions Inventory and Screening Health Risk Assessment for Global Forest (Sabie), Air Impact Assessment for Pulp United (Richards Bay), MTO George Saw Mill (George)

Power Generation (stack emissions; coal and ash dump). Kelvin Power Station (Johannesburg); Athlone Power Station (Cape Town); Tatuka, Kendal, Matimba, Duvha and Majuba Power Stations, ESKOM; Open Cycle Gas Turbine Peaking Power Station (Mosselbay), Inhambane Power Station, Mozambique, Combined Cycle Gas Turbine Power Plant In Moamba, Mozambique.

Waste Disposal (Incineration; landfill; evaporation; waste water treatment) All Enviroserv disposal sites (Chloorkop, Margolis, Umlazi, Vissershok, Shongweni, Aloes, Holfontein, Rosslyn), and city/district landfill facilities, including Cape Town City Council, Durban City Council, Johannesburg City Council; East London City Council; Port Elizabeth City Council, Eden District Municipality, Beluluane landfill facility [Matola, Mozambique]

Nuclear Installations. Participating member in the ATMES Phase 1 project to assess the emergency preparedness to nuclear accidents following the Chrenobyl Accident, Development and Implementation of a real-time emergency dispersion model for NECSA (Pelindaba); Development of a real-time emergency dispersion model for Koeberg Nuclear Power Station, Environmental Impact Assessment for the proposed demonstration Pebble Bed Modular Reactor (PBMR); Environmental Impact Assessment for the proposed Nuclear-1 Power Station; Meteorological monitoring and development of Meteorological Chapter of Site Safety Report for potential Nuclear-1 Power Station (Thyspunt, Bantamsklip and Duynefontein).

Software Development Development of real time atmospheric dispersion model - HAWK: Atomic Energy Corporation of South Africa; CALTEX, Cape Town; NCP CHLOORKOP, Kempton Park; MOSSGAS, Mosselbay; PALABORA MINING COMPANY, Palaborwa; AECl, Umbogintwini; AECl, Modderfontein; SASOL, Secunda; SASOL, Sasolburg; SAPREF Refinery, Durban; ENGEN Refinery, Durban; ESKOM, Majuba Power Station; South Durban Air quality management system (Joint venture between major industries, authorities and community); SAPPI-SAICCOR, Umkomaas; HARTLEY PLATINUM, Zimbabwe, Richards Bay Air Quality Committee (Joint venture between major industries, authorities and community), ISCOR, Newcastle; ISCOR, Vanderbijlpark.

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## CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, these data correctly describe me, my qualifications and my experience.



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Signature of staff member

15/02/2012  
Date (Day / Month / Year)