

GARY SLENDERS

PRINCIPAL PROCESS ENGINEER



POSITION/TITLE: Principal Process Engineer - Wastewater

PROFESSION: Chemical Engineer

NATIONALITY: Australian

YEARS EXPERIENCE: 32 years

EDUCATION: Bachelor of Engineering in Chemical Engineering - Royal Melbourne Institute of Technology, 1985.
Tertiary and Further Education, 1989
Certificate of Waste Water Treatment Plant Design - International Environment School 1996 (University of Queensland)
ADMS 4 Dispersion Model Training Course 2013
Cambridge Environmental Research Consultants

PROFESSIONAL AFFILIATIONS: AWMA USA

SPECIALISATION

Chemical Engineer. Chemical Process Design, Design Draftsman, Project Manager, Construction Supervisor, and Commissioning of Chemical Process Plant, Odour Control, Water and Wastewater Treatment Plants.

- Sewer Odour and Corrosion Assessment. Upgrade of Software for the dynamic modelling of Sulphur Generation, and Transport in Sewers
- Project Management and Team Leader
- Design and specification of Sedimentation, Screening and Filtration Equipment. Specification of Chemical Processes for the coagulation and flocculation of potable water.
- Design, documentation, supervision of construction, and commissioning of Heat Exchanger Equipment for Sludge Digester Applications
- Design, Construction, Installation and Commissioning of Biological Odour Treatment Systems for Odour Control in Process Industry and Wastewater Treatment.
- Design, documentation, supervision of construction of Secondary Treatment Systems (Biological Processing including Activated Sludge, Biological Nutrient Removal and Anaerobic Digestion)
- Air Ducting Layout, and Design. Duct Sizing, and air balancing. Fan selection, installation and commissioning.
- Drafting and Computer Aided Drawing P&IDs, General Arrangement Drawings, Detail Design Drawings 2D
- Project Manage Installation of Water and Wastewater Treatment Systems
- Piping Layout, and Design. Process Piping material selection. Economic Pipe Line Sizing. Pumping system design, installation and commissioning.
- Development of Models and Application programs for BioTrickling Filters and BioFilters, Packed Bed Air Humidifiers, Chemical Packed Bed Scrubbers, Chemical Fluid Bed Scrubbers, and Activated Carbon systems
- Research and Development into areas including Instrumentation for corrosive gas streams, moisture control systems for BioFilters, Development of Biological Media for Biofilters
- Design of Package Membrane Filter, Reverse Osmosis, and Ion Exchange Water Treatment Systems
- Design, documentation, construction, and commissioning of Chemical Dosing Systems
- Design, documentation, supervision of construction of Tertiary Treatment Systems (Nutrient removal, Nitrification, Denitrification, Enhanced Phosphorus Uptake, Ammonia Stripping, Phosphorus Precipitation)
- Design, documentation of Industrial Treatment Processes (Heavy Metal Precipitation, Acid Neutralisation, Ion Exchange)
- Microsoft Office (Excel, Word, Powerpoint, Projects) AutoCad 2D, Licenced User of Intellicad (Autocad Compatible) and Pascal Programming Language.

Continued overleaf...

EMPLOYMENT

AOMC Pty Ltd**2014 - Present**

Principal Process Engineer and co-director. Process Design development for Wastewater and Odour Control.

- Odour Management Liquid Waste facilities. Abattoir & Render Plant Odour Control
- Consulting Bindaree Beef Biodigestion wastewater Project
- HunterH2O water authority ductwork design
- Aljoaib Consulting Engineering Saudi Arabia – Royal Commission of Jubail and Yanbu, Lead Process Engineer and Task Manager for Stage 4 development of Industrial Wastewater Treatment Plant No. 8

MWH Global (UK)**2012 to 2014**

Principal Process Engineer Level 7 – Secondment to United Utilities AMP5 alliance. Process Design Specification development for Advanced Digestion Systems, Biosolids Handling and Odour Control.

- Leigh Biosolids Handling process upgrade. Odour Control and CHP Biogas desulphurisation and Siloxane removal specification Process Investigation and design specification.
- Carlisle Biosolids Lime Sludge Plant odour control system tender technical assessment and detailed design of Raw Sludge odour control BioTrickling Filter
- Workington WwTW Odour Control System. Construction supervision and commissioning assistance for Wet Chemical Scrubber (Caustic / Hypochlorite) odour control system
- Ellesmere Port WwTW Biosolids Handling and Refinery Waste Inlet Works stream odour control systems. Process Investigation and design specification.

MWH Global (Australia) Pty Ltd**2007 – 2012**

Senior Process Engineer Level 6 – Technical. Process Specialist for MWH Melbourne. Plant Design and Sewer Odour Assessment - Melbourne, Sydney, and Brisbane. Biological Odour Control system design.

- Water Resources Alliance – Melbourne Water Corporation East Drop Structure Project (\$ M 14) Sewer Septicity and Ventilation Modelling, Process Design and Selection. Project Costing, Process Design, Specification and Tender Assessment. Western Treatment Plant Biogas Audit and Flare Stack System.
- Melbourne Water Corporation DAF Plant Augmentation Commissioning (\$ M 2.5)
- Sydney Water Corporation – Wollongong Sewerage Treatment Works Biosolids Odour Control System. EPCM contract, two stage Biological and Activated Carbon Design. (\$ M 16)
- US Alliance South East Water – Flinders SPS and Shoreham SPS Pressure Balance Vessel Design, Dromana Odour Hotspots Investigation, Mt Martha Rotary Drum Thickener design report. Woollara Drive Odour Investigation
- Murrumba Downs Alliance Morten Bay Water (\$ M2.5) Design Options for Permanent Odour Control System and for Temporary Odour Control System
- Pimpama Coomera Waterfuture Alliance (\$ M1.50) Tender Assessment and HAZOP review for Biological Odour Control.
- Yarra Valley Water Lilydale Sewer Upgrade Odour and Corrosion Assessment Report.

K2 Corporation Pty Ltd**2006 to 2007**

Senior Project Engineer responsible for the Design, Installation, and Commissioning of Industrial Wastewater Treatment Systems

- Happy Valley Enterprises A & G Lamattina (\$M 1.1) Food Production Water Processing Plant including In-line Rotary Screens, Cyclones, Dissolved Air Flotation, Belt Press, Screw Conveyor and Polyelectrolyte Dosing
- McCains Foods Ballarat (\$ 600,000) Minicyclones silt removal, .and Rotary Screens.

ENVIRONMENTAL GROUP (OPERATIONS) Pty Ltd

2004 to 2006

Biological Process Engineer Responsible for the Development of Processes and Procedures for the manufacture of BioTrickling Filters and BioFilters

- Wodonga West Waste Water Treatment Plant - BioFilter Media Changeover
- Redcliffe Waste Water Treatment Plant - Inlet Works Odour Control Augmentation. BioTrickling Filter Design, Manufacture, Installation and Commissioning

CLEAN TEQ Pty Ltd

1997 to 2004

2001 to 2004:

Process Manager responsible for:

The development of process design Software for Design of odour control systems. Current set of Design Programs available:

- CleanBio 2004 – BioFilter design program incorporating packed column humidification design.
- CleanCarb 2004 – Activated Carbon design program featuring non impregnated, KI, and KOH impregnated activated carbon beds.
- BioTrickling Filter Program– BioTrickling Filter design program for Hydrogen Sulphide and Styrene removal based on super high surface area packings. Program based on in house developed design model
- CleanScrub - Packed Bed Chemical Scrubber Program featuring Ceilcote, Lantec, Jaeger, and Bei Hai HuiHuang Packing
- FluidTeQ – Fluidised Bed Chemical and Particulate Scrubbing program developed for Euromatic ellipsoid packings.

The development and updating of design documentation and standards for the construction of BioFilters, BioTrickling Filters, Scrubbers, and activated Carbon units. Documentation includes:

- Design of Housings, and internal components including grating, and piping layouts, and supports
- Design of Ducting Layouts, air balancing selection, duct pressure drop calculation methods, Air flow calculations
- Installation procedures for standard instrumentation. used in air and liquid phase measurement.
- Designs for standard spray systems, Nozzle spray droplet size distribution calculation, design of standard demister systems, and performance calculations.
- Design of standard chemical, and humidifier sumps including liquid height and holdup calculations.
- Design of Housings installation including slab and plinth layouts, drain locations, and hydraulic seal arrangement.

Commissioning Engineer: Responsible for the Design, Equipment Specification and Selection, & Commissioning of Clean TeQ package Biological Odour Control System. Major Projects include:

- Bolivar High Salinity Project (\$M1.45) – BioTrickling Filters and Activated Carbon
- Woodman Point Odour Control System (\$600,000) - BioTrickling Filter and BioFilter
- Earth Power Technology (Camellia – NSW (\$800,000) – Ammonia Fluidbed Scrubber, BioFilter
- Maroochy Shire Council Yandina Pump Station (\$30,000) – BioTrickling Filter

1997 to 2001

Engineering Manager. Responsible for the Design, Construction, Installation, & Commissioning of Clean TeQ package Biological Odour Control System. Major Projects include:

- Yates (Wyee) Odour Control and Continuous Ion Exchange Process. (\$M 1.8) – Packed Bed Chemical Scrubber and BioFilters
 - Spotswood Pump Station & Straining Well (\$M 2.3) – BioScrubber and BioFilters
 - Maroochy WWTP inlet works (\$ 650,000.00) - BioFilters
 - Shortlands WWTP (Newcastle) inlet works (\$ 380,000)- BioFilters
- Merrimac, Coombabah, & Elenora WWTPs - Gold Cost City Council (\$M 1.1) - BioFilters

Design Engineer for the development of Clean TeQ package water treatment systems based on:

- KOCH membrane filtration cartridges
- Resin Ion Exchange Resin & Continuous Ion Exchange Systems

BECA SIMONS PTY. LTD.**1996 – 1997**

Consulting Chemical Engineer with the Waste Water Technologies Division of Beca Simons. Responsible for investigating options for upgrading Waste Water Treatment Plants for Industrial Clients of Beca Simons.

Joe White Malting

Preliminary Design of Activated Sludge Plant to treat waste derived from Malt production process.

Peters Ice Cream Mulgrave

Reviewing current WWTP design, compiled a cost report for upgrading the existing treatment plant.

NUFARM LTD.**1995 - 1996**

Contract Chemical Engineer with the Project Engineering Group based in Laverton Victoria. Responsible for the design, layout, supervision of installation, and commissioning of a number of key expansion projects undertaken by Nufarm.

Chlorine Cell Room Upgrade - Stage 2

Project Engineer responsible for supervision the construction of an additional Chlorine Electrolytic Cell, including sourcing of materials, construction, and assembly.

99% DCP distillation

Project Engineer responsible for carrying out the following works on the 99% DCP distillation project for Nufarm Austria:

- Carrying out the Hydraulics and Pressure Drop Analysis over the entire Distillation Systems
- Compiling the Tender Specification for the Distillation Project.

Ammonium Glyphosate Pilot Plant

Project Engineer responsible for the specification, and purchase of the recirculation pump, basket centrifuge, and heat exchanger for the Ammonium Glyphosate Pilot Plant. Included in this project is the design of the tubular heat exchanger required specifically for crystallisation

Specification of Pumps and Heat Exchanger Equipment for the HCl Acidification Project.

Project Engineer responsible for the specification, purchase and installation of all Pumps and Heat Exchangers for the new 2,4-D acidification plant. Specialised equipment, including Graphite Heat Exchanger, and Hastelloy Slurry Pumps.

Design, installation and commissioning of new Brine Filters.

Project Engineer responsible for the design of piping, civil, and structural support work for the new Brine Pressure Filtration system. Supervised the installation of the filtration units and carried out the commissioning. Recently reviewed the performance of the filtration units, redesigning components of the system to enhance their operations.

Construction, & installation of new 60,000 L Brine Storage Tank.

Project Engineer responsible for the design, installation and commissioning of pipework, and civil structures for the new 60,000 L fibreglass reinforced Brine Storage Tank. Supervision of the locating the tank on site.

Upgrading the Chlorine Cell Room.

Project Engineer responsible for the design, installation and supervision of the pipework, and access walkway following the expansion of the Chlorine Cell Room.

Installation of a 10 kW air-conditioning system for the Rectifier Control Room.

Design Engineer, and Project Manager for the design, supply, and installation of a 10 kW capacity air conditioning system to alleviate heating problems within the Rectifier Control Room.

Effluent Lines Rationalisation Project.

Project Engineer responsible for evaluating effluent line rationalisation options, including piping layouts, and costing.

FISHER STEWART PTY. LTD.**1993 - 1995**

Chemical Engineer in the Engineering and Environment Group. Responsible for the design, documentation, supervision of construction, and commissioning of Water Treatment Plants, and Waste Water Treatment Plants. Projects completed include:

Brunswick Area Waste Water Treatment Plant Review

Design Engineer responsible for investigating options for augmenting the existing treatment works for the Brunswick Heads area in Queensland. Included in the review was preliminary designs for Intermittent Decant - Extended Aeration plants, optimisation of performance of the existing Aeration Ditch, and Trickling Filters, and designs for Nutrient removal, and a Sludge Handling system.

Bonlac Foods Stanhope - Water Quality Assessment, Guidelines for the Food Industry

Review of the current water quality guidelines in relation to the quality demanded by the dairy industry. Work carried out with Bonlac Foods in cooperation with Murray Goulburn (Rochester Plant)

Talbingo Water and Wastewater Treatment Plants Construction

Design & Process Engineer responsible for hydraulic designs for the Combined Chemical and Biological Nutrient Removal Wastewater Treatment Plant. Design and specification of the Chemical Dosing system for Phosphorus Precipitation for the Wastewater Treatment Plant. Responsible for updating and creating Auto CAD process, and "as constructed" drawings for the Water and Waste Water Treatment Plants. Technical Advisor on process, and process equipment for construction.

Violet Town Water Treatment Plant Construction

Design & Process Engineer, Superintendent of Works. Responsible for Supervision of final construction and commissioning of the Water Treatment Plant. Included in the duties was design performance evaluation, commissioning, and preparation of Operation Manuals.

Maryborough Water Treatment Plant Upgrade

Design & Process Engineer responsible for the design, and specification for the chemical dosing system upgrade at the Maryborough Water Treatment Plant. Included in the upgrade is a review of the performance of the existing flash mixer, and sedimentation basins. Layout design of the chemical dosing room, including construction drawings.

ALFA - LAVAL ENGINEERING PTY. LTD.**1990 - 1993**

Sales Engineer / Project Engineer with the Thermal Division of Alfa - Laval Industrial Division. Responsible for the Design and Specification of Heat Exchanger equipment for major industrial installations. A number of projects directly involved with include:

Caltex Kurnell Petroleum Refinery Cooling System Upgrade

Project Engineer responsible for the design, and project supervision for the installation of a \$160,000 seawater strainer at the Kurnell Refinery, Sydney NSW.

ICI Australia Yarraville Sulphuric Acid Plant

Design Engineer responsible for specifying heat exchanger equipment suitable for concentrated and dilute Sulphuric Acid system. Responsible for the development of calculation procedures that allowed Heat of Dilution, and exit solution temperatures for Sulphuric Acid Mixing system to be determined.

Bonlac Foods Drouin - Milk Pasturiser, and CIP Systems

Design Engineer responsible for the design, of a milk pasturiser, including full Clean In Place System for Bonlac Foods.

Rochester Swimming Complex Heater Installation

Design Engineer responsible for the design, construction, installation, and commissioning of the heating system (consisting of Heat Exchanger, pumps, Valves, and pipework) for the Rochester Swimming Centre.

PROFESSIONAL MEMBERSHIP

Eligible for Member of the IChemE UK and Australia
Member of the Air and Waste Management Association (USA)

PRESENTATIONS AND PUBLIC APPEARANCES

IChemE Victoria Chapter – Presentation on Odour Control and Odour Management Systems
Victoria EPA – Presentation to Staff and to Environmental Teams on site management of odour and maintenance of odour control systems.