Formal Qualifications

BE {Bachelor of Engineering (Chemical Engineering, Honours), University of New South Wales, 1966}

MSc {Master of Science (Textile Technology), University of New South Wales, 1969}

PhD {Doctor of Philosophy (Surface Chemistry), University of New South Wales, 1974}

MBA {Master of Business Administration, Macquarie University, 1984}

CPEng {Chartered Professional Engineer}

Affiliations

MIE(Aust) {Member, Institute of Engineers, Australia, elected 1974}

Member, Risk Engineering Society, since 1993.

Publications

32 scientific papers published mostly relating to research and development of wool scouring machinery and to industrial waste water treatment and disposal systems.

Patents

Inventor named on four patents owned by Unisearch Ltd. Australian Patent Nos. 429659, 502191, 500765 and 515041 with several corresponding overseas applications accepted for each.

Award

The invention of the UNISAS aerobic biological treatment process (Australian Patent No. 515041) won first prize for Unisearch Ltd., in the university category of the Technological Excellence awards at the 9th Annual World Fair for Technology Exchange (Tech Ex) in Atlanta, Georgia, March, 1981.

20 Christina Place, Kareela
NSW Australia 2232

Tel/Fax: (61-2) 9528-2870
E-mail: johnmccracken@optusnet.com.au

Employment

February 1967 to January 1982 At the School of Textile Technology, Faculty of Applied Science, University of New South Wales. Project Scientist then Senior Project Scientist responsible for leading a multi-disciplinary team of scientists, engineers, technologists and other support staff initially working on major funded R&D projects in areas concerned with improvements in the early stage processing of wool, and later, on various treatments of industrial waste waters and related matters.

February 1982 to current Self-employed professional consultant and managing director of this company with up to five other professionals on staff. Engaged on numerous major assignments locally, interstate and overseas since commencement of the consultancy.

Many of the earlier assignments involved feasibility studies including all relevant environmental and economic considerations and/or the conceptual process and/or process and engineering designs for the treatment, reuse and disposal of waste waters with recovery of byproducts and/or energy. Essential aspects of operations management for both efficient planning and optimum economies figured prominently in these assignments. Some also involved research and development into new products and processes and an analytical support laboratory was established and maintained to aid this work.

Since 1984, following receipt of a commission as an in-house consultant to the (then) NSW Department of Planning, the projects became more involved with qualitative and quantitative risk analysis and assessment; with analysis and assessment of environmental effects associated with planned or existing operations and facilities; and with hazard audits, and other safety and environmental management systems. In the course of this work Dr. McCracken has acquired a thorough knowledge of risk analysis and assessment and of safety management, and of HAZOP procedures and methods. He has used risk analysis and assessment and related software extensively and has developed and used extensively his own risk assessment software. He has however continued his extensive involvement in rigorous analysis of water and waste water management issues, particularly as related to rural industries and the production and management of large volume or high strength waste waters.

Examples of projects undertaken include:

* Guidance papers and manuals - Preparation for the NSW Government's Hazardous Materials Policy Co-ordinating Committee of guidelines for the co-ordinated approach to the assessment and management of contaminated waters including fire fighting water from industrial sites based on probabilistic techniques; draft NSW Department of Housing's Manual on Contaminated Land.

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* Commission of Inquiry into the East Coast Armaments Complex at Point Wilson, Victoria - assisting the Commissioners on all matters related to risk from the fixed installations and transportation of munitions.

* Assessments of risk for existing and proposed developments - Boral's LPG distribution facility at Port Botany; Amoco's petroleum pipeline installation at Port Botany; Catoleum's chemical plant redevelopment at Botany; the proposed Bayer development at Kurnell for the formulation of pesticides and herbicides; Collie Cooke's ink manufacturing works at Botany; Metchem's adhesives warehouse at Botany; Satmell's proposed petroleum fuel depot at Wetherill Park; the extension to petroleum storage facilities at Ampol's fuel depot at Bathurst; a large chlorine storage installation (3 x 25 tonnes storage bullets) at APM's paper mill at Maryvale, Victoria; Port Botany Development Corporation's proposed 16,000 tonnes chemical storage facility at Port Botany involving about 12,000 tonnes of packaged dangerous goods; the redevelopment of Agchem's agricultural chemicals (mainly biocides) formulation and warehousing facility at Salisbury, South Australia; the relocation of a high pressure laboratory at ICI's Rhodes site; the Australian Defence Industry's new manufacturing facilities for high explosives at Mulwala; the Bayer/Kemcon agricultural chemicals (mainly biocides) formulation and warehousing facility in Wyong; the Australian Defence Industry's ammunition manufacturing facilities at Benalla, Victoria; Buckman Laboratories microbicides formulation and warehousing facilities in Wetherill Park and Wagga Wagga; the Cleanaway regional waste treatment facility on Kooragang Island, Newcastle; United Transport's Moree pesticide storage and distribution terminal; the Gas Corporation of Queensland's gas reforming and LPG facility in Brisbane for the Brisbane City Council; East Coast Distribution Services' chemicals storage and distribution facility at Banksmeadow; Yorkshire Ink's manufacturing and warehousing facility in Ingleburn; Maxwell Chemicals' proposed manufacturing and warehousing facility in Wagga Wagga; Albright & Wilson's surfactants manufacturing plant in Wetherill Park; Norvet's therapeutic goods manufacturing facility in North Wyong; Praxair Australia's helium distribution centre at Wetherill Park; CSIRO Division of Minerals' laboratory complex in Clayton, Victoria; Universal Anodisers' plant at Wetherill Park; Marley Plastics' extrusion plant at Wetherill Park; Buckman Laboratories microbicides manufacturing, formulation and warehousing facilities in Memphis Tennessee, Cadet Missouri, Jiutepec Mexico and Hammarsdale South Africa, Ghent Belgium, Campinas Brazil, Shanghai China; assessment of toxic and flammable gas hazards for mitigation of risk at the AGL gas testing facilities, Auburn, and at the new laboratories of the CSIRO Joint Research Complex for Food Science Australia & CSIRO Molecular Science, North Ryde; etc. etc.

* Advice to local, state and federal government authorities - review of assessments on existing developments and development proposals and/or land and water contamination

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issues provided to Botany Council; Fairfield Council; Brisbane City Council; Salisbury Council (SA); the Premiers Department (NSW); the Department of Premier and Cabinet (SA); the NSW Department of Planning; the NSW Department of Housing; the NSW Workcover Authority; the NSW Roads and Traffic Authority; the NSW Public Works Department; and the NSW Environment Protection Authority.

* Design assessment, HAZOP and safety studies - a major HAZOP study for the Department of Defence on its relocated manufacturing facilities for high explosives at Mulwala; a major HAZOP study for the Australian Construction Services involving CSL's blood plasma products facility for albumin and immunoglobulin processing at Broadmeadows Victoria; a HAZOP study, pre start-up hazard audit and Classification of Hazardous Zones for the Shoalhaven Starch ethanol distillation plant at Nowra; HAZOP studies on a Thermal Soil Remediation Unit for ADI; a HAZOP for Catoleum's chemical plant redevelopment at Botany; a fire safety study, a construction safety study and a HAZOP for the Cleanaway regional waste treatment plant on Kooragang Island, Newcastle; safety audit for BHP Port Kembla Coke Ovens; the preparation of a site emergency plan for the Mulwala Explosives Factory; participation in fire safety studies for chemical storage warehouses; auditing of industrial facilities in the Newcastle region on behalf of the NSW Department of Planning; an estimation of the consequences of worst credible case scenarios involving the release of hazardous materials within the Botany/Randwick Industrial Complex and Port Botany also on behalf of the NSW Department of Planning; a HAZOP study conducted in Victoria on the RAN's fire training facilities for HMAS Cerberus, Cresswell and Sterling; a HAZOP study conducted at HMAS Penguin on the RAN's new transportable recompression chambers; a HAZOP study on Luna Park; a HAZOP study on Buckman laboratories' new microbicide manufacturing and distribution facility at Wagga Wagga; HAZOP studies on the effluent treatment plant, sulfuric acid loading facilities, NOx scrubber and plant services for Western Mining Corporation Ltd's Kalgoorlie Nickel Smelter; a HAZOP study on Yorkshire Australia's new ink manufacturing, storage and distribution facility at Ingleburn; a HAZOP study on a mobile pilot plant used for the chemical extraction of heavy metals from contaminated soils for ADI Services; a HAZOP study on a new nitroester plant at ADI P/L's Salisbury facility, South Australia; HAZOP studies on Mount Isa Mines' heat recovery steam generator units and the combined cycle block for its expansion of the Mica Creek Power Station, Mount Isa; HAZOP studies on Singapore Civil Defence Authority's internal and external fire training facilities; HAZOP studies on an Indirect Thermal Desorber to be used to remediate TPH and PCB contaminated soils at a Shell refinery site in Brunei and the Olympic site at Homebush Bay for ADI and SCC Environmental (Canada); a review of the design of a scrubber system and of a deflagration incident in a Thermal Soil Remediation Unit for ADI; etc., etc.

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* Coal industry risk assessment - Carrying out of a pioneering QRA on the phenomenon of outbursts in underground coal mining in the Bulli seam (Tahmoor Colliery) and its relationship to the deployment of continuous miners. This work has involved the establishment of appropriate risk criteria for use in quantified risk assessment applied to underground coal mining, the preparation of a very large and comprehensive fault tree for the risk analysis, and the development of several complex models to study potential consequence effects, particularly asphyxiation from outburst gases. This relatively unique on-site analysis provides guidance on the most cost-effective means of containing an acceptable level of risk to employees working in the panel development units by identification of the main contributors to risk and measuring the risk mitigation effects that the existing and proposed safeguards have on same. Subsequent QRA studies have also been completed on underground coal mining in the Bulli seam at the Westcliff, Metropolitan, Oakdale and Appin Collieries, and a preliminary risk assessment has been undertaken for underground coal mining in the Wongawilli seam directly below previous longwall workings in the Bulli seam at BHP's Cordeaux Colliery. Appointed facilitator of Task Group 5 of the Queensland Government's Moura Implementation Programme convened to develop risk-based performance guidelines for seals and stoppings used in underground coal mines, conducted at the Queensland Department of Mines & Energy in Brisbane, 1996.

* Risk assessment of exposure to contaminants in air, water and soil - quantified and qualitative risk assessment of the take up from the environment of materials emitted to air and water through inhalation, dermal absorption and ingestion of soil and in food has been an integral part of the various risk assessments undertaken, extensive work has in particular been involved in the studies for the proposed relocation of Bayer Botany plant to Kurnell, and the later Bayer/Kemcon development at Wyong, and, the Buckman Laboratories' development in Wagga and its sister plants in the US, Mexico, Brazil, Belgium, China and South Africa. These and other studies have also involved assessment of the impact of contaminants on the biophysical environment. Assessments have involved the consideration of chronic/delayed health impacts as well as acute effects. These studies have also involved the review of existing criteria and the development of appropriate criteria where none existed.

* Area studies - a QRA for the Homebush Bay Interim Development Strategy; a QRA for the proposed residential development on the Gillman site, near Port Adelaide (the site for the (then) proposed MFP); input to the NSW Department of Planning's Newcastle and Kooragang Island Area Risk Assessment Study.

* Software development for consequence and risk assessment of potentially hazardous incidents - heat radiation from fires including warehouse fires; overpressure and projectiles from explosions; containment of contaminated water including firefighting

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water; toxic smoke fumes from fires; toxic gas releases; the development of cancer from continuous and accidental emissions of carcinogens; phytotoxicity from continuous and accidental emissions of herbicides; accidents during the transportation of hazardous materials by pipeline, road, rail and water; etc.

* Waste Treatment and Disposal Systems Design and Assessment - many assignments involving wool scouring and piggery waste waters where the contaminants applied to land may include, in addition to high organic loadings, insecticides, phenols and high loadings of alkaline salts, and for tanneries where the wastes include microbicides, chromium, sulphide and salts; two assignments involved the preparation of Environmental Effects Statements (Goulburn Wool Scour at Goulburn and Riverina Wool Combing at Wagga Wagga), and an Environmental Impact Statement was prepared for Canobolas Wool Topmaking at Orange in 1993. A design of waste water systems and a risk analysis on breaches from associated storages was provided for a proposed Mauri (Burns Philp) yeast plant in Mackay, Queensland. An analysis of the influent characteristics versus contract specifications was undertaken for Australian Paper relating to the new waste water treatment facility at its Bomaderry mill. Rationalisation of water usage and disposal by irrigation were issues in many of these studies.

* Commission of Inquiry into Look At Me Now Headland (Coffs Harbour) Ocean Outfall - assistance to the Commissioner in all aspects of the Inquiry including extensive review of waste water treatment and disposal options (including such recent innovations as artificial wetlands and re-use for agricultural, forestry and urban purposes) and the risks, environmental impacts and costs of such options.

* Training and Presentations - assistance in training staff in its Major Hazards Policy Unit (MHPU) of the NSW Department of Planning in hazard identification and safety auditing at large industrial developments in the Newcastle region, and in providing guidance and advice during the various phases/outcomes of the subsequent risk assessments undertaken by these officers; presentation of major segments of the MHPU's intensive training and information dissemination course on QRA in Planning, Management and Control of Major Hazards; occasional presentations on hazard and safety to industrial development and institutional groups.

Dr John R McCracken

BE(Chem Eng, Hons), MSc, PhD, MBA, MIE(Aust), CPEng