

## CURRICULUM VITAE

### SUSAN M. MCFARLAND

**BSC (GEOL.), MSc (MET. ENG.), P. ENG.**

#### ACADEMIC QUALIFICATIONS

1995 MSc. Metallurgical Engineering  
University of Alberta

Undergraduate courses taken include: Engineering Mechanics I, Materials Science I, Metallurgical Thermo Dynamics/Kinetics, Hydro & Electro Metallurgy, Materials Engineering, Pyrometallurgy, Fundamentals of Physical Metallurgy I & II, Corrosion & Oxidation, Applied Physical Metallurgy II, Introduction to Simulation, Mechanics of Deformable Bodies I, Electrical Engineering Fundamentals, Engineering Economics, Introduction to Statistics

Graduate courses taken include: Physical Metallurgy, Material Applications Scanning Electron Microscopy, Welding Processes, Welding Metallurgy, Special Topics in Physical Metallurgy

Master of Science Program Completed in Engineering. Thesis: Acoustic Emission Monitoring of Delayed Hydride Cracking in Zirconium 2.5% Niobium, Candu Reactor Tubes.

1979 BSc Geology  
University of Toronto

#### AVIATION QUALIFICATIONS

1981 - 1991 Canadian Commercial Helicopter Pilot - Instrument-rated Class I, Group IV.  
Canadian Commercial Airplane Pilot - single engine land and sea.

Endorsements and experience on type: Bell 47, 206, 206L, Bell 212, Hughes 300, 500.  
~2,900 hours total flight (2,300 hours single engine helicopters, 500 hours multi-engine turbine helicopters, 100 hours single engine airplane

#### PROFESSIONAL ASSOCIATIONS and CERTIFICATIONS

- Member, Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
- Member, ASM International
- Member, NACE International
- Member, Society of Petroleum Engineers (SPE)
- Member, National Association of Fire Investigators (NAFI)
- Member, American Welding Society (AWS)
- Member, American Society of Testing of Materials (ASTM)
- Member, Skate Canada
- Member, Society of Plastic Engineers (SPE)

## EXPERT TESTIMONY

Qualified as an expert witness in the area of failure analysis in the Court of Queen's Bench.  
Qualified as an expert witness in Provincial Court of Alberta

## COURSES, SEMINARS & TECHNICAL TRAINING

- 2010 Codes Standards Training Institute (CASTI) - *CSA Z662 (Oil and Gas Pipeline Systems) Construction and Inspection*, Edmonton, Alberta
- 2009 ASM International - *Metallography and Failure Analysis - Seminar and Practical Session*, Edmonton, Alberta
- 2008 Canadian Institute of Steel Construction - *Bolting and Welding for Design Engineers*, Fort McMurray, Alberta
- 2007 ASM International - *NDT Techniques and Flaw Detection*, Edmonton, Alberta
- 2006 American Welding Society - *What's New in Welding Consumables*, Edmonton Alberta
- 2006 ASM International - *Metallurgical Failure Analysis*, Edmonton, Alberta
- 2005 NACE International - Edmonton Section - *Petroleum & Natural Gas Industries Materials For Use in H2S-containing Environments in Oil & Gas Production* - Edmonton, Alberta
- 2003 Canadian Welding Bureau Seminar, *CSA W59 –Welded Steel Construction*, Edmonton, Alberta
- 2003 Canadian Welding Bureau, *CSA W47.1, Certification of Companies for Fusion Welding of Steel Structures*, Edmonton, Alberta
- 2001 Canadian National Advanced Fire, *Arson and Explosion Investigation Training Program*, Toronto, Ontario
- 1989 Transportation Safety Institute - *FAA Aircraft Accident Investigation, Part 2*, FAA School, Oklahoma City, Oklahoma
- 1988 Continental Airlines for Transport Canada, *Cockpit Resource Management Course*, Ottawa, Ontario
- 1988 *Transport Canada Inspector Orientation Course*, Transport Canada Training Institute, Cornwall, Ontario
- 1987 Transportation Safety Institute - *FAA Helicopter Accident Investigation Course*, Bell Helicopters, Fort Worth, Texas

## PUBLICATIONS

- Aviation Occurrence Report "Risk of Collision Between: Boeing 737-210C, C-GNWI and Gates Learjet 35 C-GBWL", Report Number 90W0021
- Aviation Occurrence Report "Canadian Helicopters Ltd. Bell 204B (Helicopter) C-FBHY", Report Number 90W0176
- Aviation Occurrence Report "E3C/Boeing 707 Snore 41 and C12/Beech 200 North 49", Report Number 90W0032
- Aviation Occurrence Report "Cameron/Dairy Queen (Balloon) C-GHZF", Report Number 89W0127

## PROFESSIONAL CAREER

**Anderson Associates Consulting Engineers Inc.** 1995 – Present  
Partner/Metallurgical Engineer

- Material failure analysis of mechanical parts and equipment including transmissions, propane, gasoline and diesel engines, specialty oilfield downhole tools, drill pipe, steel, polymer, and glass fiber reinforced pipelines, welded components.
- Extensive metallographic analysis of alloy, stainless steels and nickel alloys including laser and plasma transferred arc (PTA) applied tungsten carbide and specialty nickel alloys.
- Failure analysis of sprinkler piping and components.
- Corrosion analysis, heat treatment of carbon, alloy, stainless steels and nickel alloys and welding engineering.
- Quality assurance including specification writing, interpretation and compliance testing, mechanical testing and materials selection.
- Non-destructive evaluation.
- Fire and explosion investigation and analysis.
- Automobile, snowmobile and aircraft accident reconstruction.

**Transportation Safety Board of Canada** 1987 – 1995  
Operational Accident Investigator

- Aircraft Accident Investigator - Investigator-in-charge and assistant on over 150 helicopter, airplane and air traffic service (ATS) accidents or incidents.
- Part of Head Office Review Committee.
- Photographic documentation.
- Surveying the accident scene by ground and aerial techniques.
- Interviewing witnesses.
- Cooperation with local law enforcement agencies.
- Liaison with Transport Canada officials regarding aviation safety concerns.
- Extensive research was conducted to determine accident cause and possible prevention. Often engines/components were re-examined using test equipment. A significant amount of report writing was involved with the process; several accident reports were published. Duties also included dealing with the legal profession in Canada and the US.

**Canadian Commercial Helicopter Pilot** 1981 - 1987

- VFR helicopter flying experience in BC, Alberta, Ontario and the Yukon. Duties included managing a base of operations, flying in support of mineral exploration crews, fire suppression and support, slinging operations including long line and controlled burning (drip torch), fish and wildlife and powerline surveys.
- IFR helicopter flying experience as a co-pilot on a medium lift, air ambulance service based in Ontario.

**Geologist** 1977 - 1981

- During university and shortly afterwards, employed as a geological assistant and exploration geologist, involved mainly in regional exploration for base metals in BC and the Yukon.

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**SUSAN M. MCFARLAND, P.ENG.**

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