



R. KEITH MACLEOD, P.Eng.

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Keith is a Director and Associate of Sproule in Calgary and is involved in the management of Sproule's Canadian, U.S. and International subsidiaries. Keith's experience at Sproule has been primarily in the areas of property and corporate reserves evaluations, acquisitions and divestitures, securities commission reports, and investment advice. He also lectures at the University of Calgary and to the petroleum industry through Sproule's inhouse courses on the "Evaluation of Canadian Oil and Gas Properties", "Risk Analysis of Canadian Oil and Gas Properties", and "Introduction to Coalbed Methane". He has also presented to industry on topics such as "National Instrument 51-101", "Understanding Reserve Evaluations" and "The Process of Determining the Fair Market Value of Reserves."

Keith is active with the Society of Petroleum Engineers, as a Past President of the Canadian Section and as co-chair of the Gas Technology Symposium and Horizontal Well Technology Conference. In the past, Keith has been an industry advisor to the Alberta Securities Commission, and served on their Oil and Gas Taskforce and Sub-Committee. He was one of several authors that prepared the Canadian Oil and Gas Evaluation Handbook, Volume II, "Detailed Guidelines for Estimation and Classification of Oil and Gas Resources and Reserves", prepared by SPEE and CIM. Keith is a member of APEGGA, SPE, SPEE and the Petroleum Society of CIM.

Keith has experience in Argentina, Australia, Azerbaijan, Belize, Canada, China, Colombia, Costa Rica, Cote d'Ivoire, the Czech Republic, Ecuador, Egypt, Equatorial Guinea, India, Iran, Iraq, Kazakhstan, Peru, Russia, Ukraine, United Kingdom, and the United States.

Diplomas and Degrees

- ❖ B.S. (Honors), Mining Engineering (1984), Montana College of Mineral Science and Technology, Butte, Montana, U.S.A.
- ❖ Diploma in Technology in Mineral Science (1978), College of Cape Breton, Sydney, Nova Scotia, Canada

Memberships

- ❖ Association of Professional Engineers, Geologists and Geophysicists of Alberta (APEGGA)
- ❖ Petroleum Society of the Canadian Institute of Mining, Metallurgy and Petroleum (CIM)
- ❖ Society of Petroleum Evaluation Engineers (SPEE)
- ❖ Society of Petroleum Engineers (SPE)

Work Responsibilities

- ❖ Property and corporate evaluations
- ❖ Reserves assessments and audits
- ❖ Acquisitions and divestitures
- ❖ Technical and economic assessment of oil and gas drilling opportunities
- ❖ Investment advice
- ❖ Reservoir engineering
- ❖ Natural gas supply and deliverability studies
- ❖ Coalbed methane studies
- ❖ Expert technical witness
- ❖ Lecturer to industry

Previous Employers

- ❖ 1983 **Quintana Exploration of Canada Ltd.**, Calgary, Alberta, *Junior Engineer*
 - ❖ Responsible for updating economics and reserves of company fields.
 - ❖ Conducted economics and engineering for exploration land sales in Western Canada.
 - ❖ Undertook deliverability studies and contract considerations for new and existing fields, which involved discussions with transmission companies.
 - ❖ Responsible for all in-house computer programs and evaluation of existing programs in industry.

- ❖ 1981 to 1982 **James A. Lewis Engineering Co. Ltd.**, Calgary, Alberta, *Reservoir Engineering Technologist*
 - ❖ Involved in economic evaluations of oil and gas properties in Canada and the United States.
 - ❖ Carried sole responsibility for clients and projects within the company.
 - ❖ Developed oil and gas price forecasts for Canada and the United States.
 - ❖ Responsible for keeping up to date on royalties and taxes in Canada and the United States.
 - ❖ Conducted exploration economics and economic sensitivity studies for clients.

- ❖ 1979-1981 **Sproule Associates Limited**, Calgary, Alberta, *Reservoir Engineering Technologist*
 - ❖ Involved in economic evaluations of Canadian oil and gas properties; preparing valuation and Security and Exchange Commission reports; worked extensively on shallow gas in southeastern Alberta and heavy oil in southern Saskatchewan.
 - ❖ Conducted case studies of economics in various areas of Western Canada.

Committee Work

- ❖ 2004 Conference Chair, Oil and Gas Disclosure Conference
- ❖ 2004 SPEE Standing Committee, Canadian Oil and Gas Evaluation Handbook
- ❖ 2003 Conference Chair, Oil and Gas Disclosure Conference
- ❖ 2003 SPEE Standing Committee, Canadian Oil and Gas Evaluation Handbook
- ❖ 2003 Past Chairman, Canadian Section of SPE
- ❖ 2002 Conference Chair, Oil and Gas Disclosure Conference
- ❖ 2002 Chairman, Canadian Section of SPE
- ❖ 2001 Alberta Securities Commission, Oil and Gas Taskforce and Sub-Committee
- ❖ 2000 Co-Chairman, Horizontal Well Conference
- ❖ 1998 Co-Chairman, Gas Technology Symposium, SPE
- ❖ 1998 Director, Canadian Sector of SPE
- ❖ 1996 Finance Chairman, SPE Gas Symposium
- ❖ 1993 Technical Committee, SPE Gas Symposium
- ❖ 1992 Chairman of APEGGA/ASET JRB

Presentations

- ❖ MacLeod, R.K. (2005) "The Marriage of SEC, NI 51-101 and SPE/WPC Guidelines in Corporate Disclosure" presented at the AAPG Conference on June 21, 2005.
- ❖ MacLeod, R.K. (2005) "2004 Yearend Disclosure – Is NI 51-101 Making a Difference" presented at the Petroleum Society of CIM Luncheon on May 25, 2005.
- ❖ MacLeod, R.K. (2005) "Overview of Coalbed Methane Potential in Canada" presented at the Society of Petroleum Evaluation Engineers Luncheon on April 19, 2005.
- ❖ MacLeod, R.K. (2004) "CBM Reserves Reporting" presented at the Society of Petroleum Engineers Workshop on November 16, 2004.
- ❖ MacLeod, R.K. (2004) "Impact of the New Rules on Oil and Gas Disclosure" presented at the Schlumberger Information Systems Conference on June 21, 2004.
- ❖ MacLeod, R.K. (2004) "Impact of the New Rules on Oil and Gas Disclosure" presented at the CAPL Conference on May 20, 2004.
- ❖ MacLeod, R.K. (2004) "Overview of Coalbed Methane Potential in Canada" presented at the Raymond James Coalbed Methane Investors Seminar on April 1, 2004.
- ❖ MacLeod, R.K. (2003) "Canada's New National Instrument 51-101 – Reserves Reporting Regulations" presented at Schlumberger Information Solutions Conference on July 24, 2003 and September 11, 2003.
- ❖ MacLeod, R.K. (2003) "Standards for Reserves Audits" presented at the Reserves Symposium for Senior Canadian Issuers on March 3, 2003.
- ❖ MacLeod, R.K. (2002) "International and Frontier Property Issues" presented at the SPE Applied Technology Workshop on September 24, 2002.
- ❖ MacLeod, R.K. (2002) "Standards for Reserve Audits" presented at the SPE Applied Technology Workshop on September 23, 2002.
- ❖ MacLeod, R.K. (2002) "Reserve Evaluations and New Disclosure Rules" presented to Bennett Jones on September 10, 2002.

- ❖ MacLeod, R.K. (2002) "Overview of Coalbed Methane Potential in Canada" presented to Western Oil Sands on January 30, 2002.
- ❖ MacLeod, R.K. (2001) "Proposed Oil and Gas Disclosure for Public Companies" presented to Sayer Securities in November 2001.
- ❖ R. Cech, K. MacLeod, S. Wong, W.D. Gunter, M.J. Mavor, and J. Gale (2001) "CO2-Enhanced Coalbed Methane Recovery Demonstration Pilot – A Case for China" China Paper June 2001.
- ❖ MacLeod, R.K. (2001) "Responsibilities Relating to Reserves Disclosure" presented at an Insight Conference on June 27, 2001.
- ❖ MacLeod, R.K. (2001) "New Reserve Definitions for the Geologist" presented to the CSPG on June 19, 2001.
- ❖ MacLeod, R.K.(2001) "ASC Recommendations – Impact on the Reserves Process" presented to Merak Projects Ltd. on June 4, 2001.
- ❖ MacLeod, R.K. (2001) "Proposed New Reserve Reporting Recommendations of the ASC Oil and Gas Taskforce" presented at an SPE luncheon on February 20, 2001.
- ❖ MacLeod, R.K. (2001) "New Issues for Reserve Evaluators" also presented at an SPE luncheon on February 20, 2001.
- ❖ MacLeod, R.K. (2000) "Canadian Reserves Reporting" presented at the CIBC World Markets Oil and Gas Forum on September 18, 2000.
- ❖ MacLeod, R.K. (2000) "Canadian Reserves Reporting" presented at the National Petroleum Show on June 12, 2000.
- ❖ MacLeod, R.K., Cech, R., and Hughes, D. (2000) "CBM Resource Potential in the Plains Area of Alberta" SPE 59784 Paper presented to the SPE/CERI Gas Technology Symposium in April 2000.
- ❖ MacLeod, R.K. (2000) "Oil and Gas Opportunities in Canada" presented to Schlumberger in Austin, Texas on March 29, 2000.
- ❖ MacLeod, R.K. (1999) "Reserve Evaluations and Disclosures" presented at the ASC Chief Accountant's Seminar on June 16, 1999.
- ❖ MacLeod, R.K. (1998) "The Process of Determining the Fair Market Value of Reserves." Insight Conference, Calgary, Alberta, February 24 and 25.
- ❖ MacLeod, R.K. (1997) "Understanding Reserve Evaluations." Insight Conference, Calgary, Alberta, March 25 and 26.
- ❖ Cech, R, Carlson, J.D., and MacLeod, R.K. (1992) "Economics of Coalbed Methane Projects in the Western Canadian Basin." The Canadian Coal and Coalbed Methane Geoscience Forum, Parksville, B.C., February 3.

Professional Experience in Hearings, Arbitrations and Litigations

1. Societe en Commandite Gaz Metropolitan, Intervention in the Sable Offshore Energy Project Hearing, Halifax, 1997:
 - a. Forum: Public hearing before the NEB;
 - b. Issue: GM intervened in the hearing on supply issues with the agenda of promoting the tie-in of the gas to central Canada through TQM.
 - c. Legal Counsel: Saint-Aix Advisory Group, Montreal.
 - d. Sproule provided expert assistance on gas supply issues.
 - e. Outcome: The pipeline was run to Boston as the sponsors had requested.

2. TransCanada PipeLines, National Energy Board Hearing – Calgary, 1998:
 - a. Forum: Public hearing before the National Energy Board
 - b. Issue: Pipeline Expansion Application
 - c. Legal Counsel: TransCanada PipeLines – Inhouse Counsel
 - d. Sproule was scheduled to provide expert testimony on gas supply from the Western Canadian Basin. Expert witness training completed in preparation for testimony.
 - e. Outcome: Expansion approved.
3. Confidential, Technical Arbitration, Melbourne, Australia, November 1998:
 - a. Forum: Technical Arbitration – Reservoir Reserves and Valuation
 - b. Issue: Dispute Resolution Mechanism
 - c. Legal Counsel: Government
 - d. Sproule provided expert assistance on gas reserves, valuation and testimony before the arbitration umpire.
 - e. Outcome: Arbitrator took the average of the two values.
4. Confidential, Arbitration, Calgary, 2004:
 - a. Forum: Arbitration
 - b. Issue: Gas supplier claimed force majeure for contract shortfalls on a major gas project.
 - c. Legal counsel: Bennett Jones
 - d. Sproule provided expert assistance on well performance and gas deliverability issues.
 - e. Outcome: Settled prior to commencement of arbitration. Result unknown to us.
5. Confidential Arbitration, USA, 2004:
 - a. Forum: Unocal – Agrium U.S. Arbitration
 - b. Issue: Gas contract to client obligations not fulfilled.
 - c. Legal Counsel: Client’s inside counsel and Duncan & Co
 - d. Sproule conducted property evaluations and audited third-party reports. My role was to coordinate/supervise the project, audit third-party reports and subsequent independent evaluation in preparation for arbitration. Additionally, Sproule provided advisory services to the company and outside legal counsel.
 - e. Outcome: Settled in favour of client (Agrium).
6. Confidential, Arbitration, Canada, 2005:
 - a. Forum: Arbitration
 - b. Issue: Gas supply contract price re-determination.
 - c. Legal Counsel: Macleod Dixon
 - d. Sproule audited supplier forecasts and developed independent forecasts for a major gas project. My role was to testify to the Sproule evidence at the hearing.
 - e. Outcome: Settled during arbitration. Result not known to us.