

RESUME

ROBERTO AGUILERA, Ph.D., P.Eng.

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ADDRESS

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PERSONAL

Married, one daughter, two sons, two grand-children
Date of Birth: September 24, 1945
Birthplace: Villavicencio, Colombia, South America

CITIZEN

Dual: Canadian / Colombian

EDUCATION

Universidad de America (Bogota, Colombia)
February 1963 - December 1967
Petroleum Engineer (1968)

Colorado School of Mines
September 1969 - May 1971
Master in Petroleum Engineering

Colorado School of Mines
September 1971 - September 1973
Ph.D. in Petroleum Engineering (1976)
Minor: Chemical and Petroleum Refining Engineering

LANGUAGES English, fluent written and spoken
 Spanish, fluent written and spoken

PROFESSIONAL EXPERIENCE

Professor, Chemical and Petroleum Engineering Department,
University of Calgary, Canada, September 1, 2006 to date.

Oil and gas consultant, May 1981 - present, President of
Servipetrol Ltd (Canada).

Skolkovo Institute of Science and Technology (Skoltech), 2016 -
2017. Invited to present post-graduate course on Petrophysics
and Reservoir Engineering, Moscow (Russia).

Director of Junex Inc., 2002 – November 2012, Quebec City
(Canada).

Adjunct Professor in the Chemical and Petroleum Engineering
Department, September 2001– August 2006, University of
Calgary (Canada),

AAPG Instructor on "Fractured Reservoir Analysis," 1984-1996.
Co-instructors: Dr. David Stearns (Professor of Geology at the
University of Oklahoma), Dr. Melvin Friedman (Professor of
geology at Texas A&M University), Dr. Ronald Nelson (structural
geologist, Amoco).

Amoco Petrophysical School. Instructor on "Naturally Fractured
Reservoirs," 1996-1999. Amoco Research Center, Tulsa,
Oklahoma.

Oil and gas consultant, September 1978 - July 1991, President of
Roberto Aguilera & Assoc., Inc. (USA)

Societe Quebecoise d'Initiatives Petrolieres, SOQUIP (Canada),

March 1977 - September 1978. Chief of Production and Reservoir Engineering

Cities Service International (Argentina), August 1974 - March 1977, Reservoir Engineer

International Petroleum - EXXON (Colombia), September 1973 - July 1974. Senior Project Engineer

Universidad de America (Colombia), January 1974 - July 1974. Lecturer in Reservoir Engineering (Adjunct)

H.K. van Poolen & Associates (U.S.A.), January 1972 – March 1973. Reservoir Modelling and Log Evaluation (part-time)

Texaco Inc. (U.S.A.), June 1971 - September 1971. Engineer's Assistant

Texaco Inc. (U.S.A.), June 1970 - September 1970. Engineer's Assistant

Texaco Inc. (Colombia), May 1968 - July 1969. Production Engineer

Texaco Inc. (Colombia), December 1966 - February 1967. Student in training

Sinclair and BP (Colombia), December 1965 – February 1966. Student in training

GENERAL INFORMATION

I am a member of the Society of Petroleum Engineers (SPE) Legion of Honor and an SPE Lifetime member. I am the 2019 recipient of the global SPE Distinguished Achievement Award for Petroleum Engineering Faculty, current Executive Editor of the SPE Journal, and an SPE Distinguished Lecturer for the 2000-2001 season discussing Naturally Fractured Reservoirs in 27 cities throughout the world.

I was appointed ConocoPhillips Industrial Chair in Tight Gas Engineering at the University of Calgary in September 1, 2006 and I held that Chair until December 15,

2013. The 16th of December 2013, I was appointed as CNOOC Limited and Nexen Industrial Research Chair in Tight Oil and Unconventional Gas (TOUG).

I developed the multi-disciplinary GFREE research program for integrating geoscience (G), formation evaluation (F), reservoir drilling, completion and stimulation (R), reservoir engineering (RE), and economics and externalities (EE) with a view to unlocking gas from tight and shale formations in Canada and the world. Since then, GFREE members have made more than 100 presentations discussing results of this research. Some of the results have been highlighted in presentations at international conferences in Calgary, Canada; San Jose, California; Anaheim, California; Manchester, England; Oklahoma City, Oklahoma; Anchorage, Alaska; Villahermosa, Mexico; Dallas, Texas; Keystone, Colorado; Idaho Falls laboratory, Idaho; Madrid, Spain; Cartagena, Colombia; New Orleans, Louisiana; Florence, Italy; Lima, Peru; San Francisco, California; Denver, Colorado; Port of Spain, Trinidad; Muscat, Oman; Al-Khobar, Saudi Arabia; Quindao, China; Santa Cruz, Bolivia; Buenos Aires, Argentina; Mexico City, Mexico; Pittsburgh, Pennsylvania; San Antonio, Texas; Perth, Australia; Dubai, UAE; Monterey, California; Mishref, Kuwait; Banff, Canada; Vienna, Austria; The Woodlands, Texas; Maracaibo, Venezuela; Bogota, Colombia; Tulsa, Oklahoma; Quito, Ecuador; Monterrey, Mexico and Beijing, China.

Publications have been co-authored by members of the GFREE team, and students and/or professors of other universities such as the Colorado School of Mines, the University of Texas at Dallas, the Pontificia Universidad Catolica in Chile, the University of Vienna in Austria, Curtin University in Australia, Yangtze University in China, Petroleum University of Technology in Iran, Shandong University in China, the University of Manchester in England, Heriot Watt University in Scotland, Imperial College in England, the University of Tulsa, Oklahoma, and the Universidad Nacional Autonoma de Mexico (UNAM), Mexico City.

Publications have also been co-authored with professionals of various organizations in the oil and gas industry including CNOOC-Nexen, Junex, Halliburton, Schlumberger, IHS-Fekete, Computer Modelling Group, Murphy Oil Corp, Taurus Reservoir Solutions, WestMan Exploration, Hoch and Associates, KJS and Associates, PRA International, Chance Petroleum, Yoho Resources, Paramount Resources, Page Compliance Ltd., BC Oil and Gas Commission, CNRL, MPD Reservoir Engineers Ltd., and IHS Markit in Canada; Pemex (Mexico), Halliburton (USA), Schlumberger (United Kingdom), CBM Ingenieria (Mexico), Cydarex (France), French Petroleum Institute (France), BP (United Kingdom), Apache Corporation (USA), Waseda University (Japan), Hydrate Energy International (USA), and Ecopetrol (Colombia).

As the GFREE program gets to be more recognized worldwide I have been invited to make special presentations as lecturer, key note speaker or panel member by the Colegio de Ingenieros Petroleros de Mexico on "Characterization of Naturally Fractured Reservoirs for Improvement of Hydrocarbon Recoveries" (Mexico, 2008); the Petroleum Society of Canada on "Characterization and Exploitation of Tight Gas and Shale Gas Reservoirs" (Calgary, 2009); the Society of Petroleum Engineers SPE on "New Training Methods for the 21ST Century in the E&P Industry" (New Orleans, 2009); the University of Manchester on "Petrophysics of Naturally Fractured Reservoirs with a Link to Oil and Gas Productivity" (England, 2011); the Society of Petroleum Engineers on "Unlocking Shale Gas Reservoirs in the Middle East" (Al-Khobar, Saudi Arabia, 2011); the Canadian Society of Exploration Geophysicists on "Naturally Fractured Reservoirs" (Calgary, 2010 and 2011) and "Use of Petroleum Engineering Concepts for Estimation of Pore Stimulated Reservoir volume (pore SRV) and Prediction of Well Performance," (Calgary, 2016); China University of Petroleum (East China), where I was awarded the title of Guest Professor, on "Unconventional Gas Exploitation" (2011); the Bolivian Chamber of Energy and Hydrocarbons on "Naturally Fractured Reservoirs," (Santa Cruz, Bolivia, 2011); the Society of Petroleum Engineers SPE to present on "Practical Evaluation of Shale Gas and Tight Gas Reservoirs" (Buenos Aires, Argentina, 2011, 2013), Cornell University to present on "Unconventional Resources for Gas and Oil: to frac, or not to frac, that is the question" (2013); the CSPG Gussow Conference to present on "Multidisciplinary Studies: Importance of Rock Properties on Unconventional Reservoirs" (Banff, Canada, 2013); World Petroleum Council Youth Forum to present on "Natural Gas: Unlocking the Unconventional" (Calgary, Canada, 2013); Colombian Society of Petroleum Engineers to present on "From Conventional to Tight Gas to Shale Gas to Tight Oil to Shale Oil Reservoirs: The GFREE Approach" (Bogota, Colombia, 2014); Colombian Society of Petroleum Engineers to present on "Effect of Oil and Gas Prices on Global and Latin American Unconventional Resource Plays" (Bogota, Colombia, 2015);); the Society of Petroleum Engineers SPE to present on panel discussion dealing with "Shale Oil and Shale Gas Resources in Latin America – Building the Production Curve under Economic Constrain" (Quito, Ecuador, 2015); the Society of Petroleum Engineers SPE to present on panel discussion dealing with "Synergy Between Academia and Industry Collaboration in Latin America: What is Required" (Quito, Ecuador, 2015); Skoltech in Moscow, Russia, to present Energy Colloquium on "Flow Units in Conventional and Unconventional Petroleum Reservoirs" (November 22, 2016), Calgary, Canada, to present the Best of SPE "Breaking a Paradigm: Can Oil Recovery from Shales be Larger Than Oil Recovery from Conventional Reservoirs? The Answer is Yes," at the GEOCONVENTION of Canadian Society of Petroleum Geologists CSPG, Canadian Society of Exploration Geophysicists CSEG (May 7-9, 2018); Beijing, China to make a

plenary presentation on "Improved Oil Recovery from Shale Reservoirs by Huff and Puff Gas Injection," at the International Symposium on Carbonate and Unconventional Oil and Gas Reservoirs, PetroChina Research Institute of Petroleum Exploration & Development, RIPED (July 24-27, 2018); University of Alberta, Edmonton, Alberta, to make a presentation on "Improved Oil Recovery from Shale Reservoirs by Huff and Puff Gas Injection: A True Game Changer" (September 6, 2018); Colombian Petroleum Institute, Bucaramanga, Colombia, to present on "Naturally Fractured Reservoirs and their Link to Tight and Shale Reservoirs, Recovery and Improved Recovery" (February 27, 2019); Universidad Industrial de Santander, Bucaramanga, Colombia, to make a presentation on "Pickett Plots: From a Snapshot in Time to Representing Millions of Years of Burial and Maturation Trajectory in Shale Petroleum Reservoirs" (February 28, 2019); Instituto Argentino del Petroleo y el Gas, Round Table on Reserves and Resources including Tom Blasingame (Texas A&M), Dilhan Ilk (D&M's North America Division), Roberto Aguilera (University of Calgary), and Carlos Colo (YPF). Roberto Aguilera discussed "A Comparison of Development of Unconventional Oil Reserves in the USA and Canada" (November 8, 2019); SPE Geomechanics Special Interest Group, Calgary, Canada, to make a presentation at the Calgary Petroleum Club on "Naturally Fractured Reservoirs and their Link to Tight and Shale Reservoirs" (February 13, 2020); Universidad Nacional Autonoma de Mexico and Pemex to make a Webinar Ponencias DICT presentation on "Improved Liquids Recovery from Shale Reservoirs by Gas Injection" (August 14, 2020), Universidad Nacional Autonoma de Mexico to participate on Panel Discussion on "El futuro de los shales en Latinoamérica," Recobro Mejorado de Hidrocarburos Líquidos en Shales (July 29, 2021), and SPE/IATMI APOGCE to present on a Special Session on "Improving Oil Recovery from Shale Reservoirs by Huff and Puff Gas Injection (October 14, 2021).

A consultant since 1978, I have been part of domestic and international teams that have performed integrated evaluations of several reservoirs. I have evaluated oil and gas naturally fractured reservoirs located in Canada, the U.S.A., Mexico, Venezuela, the North Sea, Abu Dhabi, Algeria, United Arab Emirates, Egypt, Peru, Brazil, Colombia, Argentina, Indonesia, Guatemala, Yugoslavia, Italy, Pakistan, Libya, Australia, Ecuador, New Zealand, Chile, Philippines, China, Japan, Yemen, Cuba, Bolivia, Vietnam, Saudi Arabia, Albania, Russia, Thailand and Iraq. Determination of reserves and economic evaluations has been an integral part of some of these studies.

As an instructor I have presented short industry courses dealing with "Naturally Fractured Reservoirs", "Reservoir Engineering", "Reservoir Simulation", "Horizontal Wells", "Unconventional Reservoir", and "Well Test Analysis" in Canada, USA, Colombia, Mexico, Peru, Argentina, Venezuela, Guatemala, Brazil, Egypt, India,

Japan, Denmark, Italy, Syria, England, Iran, Croatia, Kuwait, Indonesia, Libya, New Zealand, Greece, China, Turkey, Germany, Vietnam, Bangladesh, Cuba, Scotland, Saudi Arabia, France, Bolivia, The Netherlands, Hungary, Norway, and Russia.

I was an Adjunct Professor at the University of Calgary since September 2000 to August 2006. There I created a graduate level course on the subject of "Naturally Fractured Reservoirs." As part of this program, I have also taught for the University of Calgary in Iran at the Petroleum University of Technology (Tehran). I also created at the University of Calgary an undergraduate-Graduate course on Tight Gas Engineering.

I was an AAPG lecturer on the subject of "Fractured Reservoir Analysis" from 1984 through 1996. I was an instructor in Amoco's petrophysical school from 1996 to 1999. My responsibility was teaching a course on "Naturally Fractured Reservoirs." As Chief of Production and Reservoir Engineering at Soquip (1977-1978) I interacted with geophysicists, geologists and other engineers to prepare integrated reservoir studies of gas-bearing fractured shales, carbonate reservoirs, oil and gas property evaluations, log analysis and economic appraisals. I wrote the first technical paper showing the geological, technical and economic potential of the Utica shale gas between Montreal and Quebec City (SPE 7445) in 1978. My paper was referenced by the USGS to propose a hypothetical Utica shale model for the United States parts of the Appalachian basin. The potential of the Utica shale under the giant Marcellus shale has been already corroborated by many companies operating in the North-Eastern part of the United States, corroborating thus my Utica shale theories developed in Quebec.

Assignments with Cities Service International (1974-1977) included reservoir engineering (primary and secondary recovery by water injection), oil property appraisals, economic evaluations and log analysis. I also conducted in-house short courses on the subjects of formation evaluation, economics and basic computer programming.

Assignments with H.K. van Poolen & Associates in U.S.A. included well testing, reservoir modelling and log evaluation. I was part of the team that performed some of the initial petrophysical and simulation studies on the Prudhoe Bay field for the government of Alaska in the early 1970s. I also assisted in conducting various short courses (well testing, modelling and log analysis) for the oil industry.

My experience with Intercol (EXXON) included general reservoir engineering in oil and gas fields, secondary recovery by gas injection, log interpretation and economic evaluations in Colombia.

My experience with Texaco in U.S.A. (1973-1974) included evaluation of gas reservoirs and secondary recovery by water injection in various Rocky Mountain reservoirs.

My job as a field production engineer with Texaco Inc., May 1968 to July 1969, included design, economic evaluation and supervision of workovers such as hydraulic fracturing, squeeze cementing, acidizing and gravel packing. Other assignments included batteries supervision, evaluation of emulsion breakers, and design of sucker rod and gas lift installations. My experience as a drilling engineer included design and supervision of drilling programs, wellbore construction and mud engineering. I served as witness in conventional log runs and perforating jobs.

MEng STUDENTS SUPERVISION

1. The Implications of Water in Tight Gas – A Case Study on Shell Canada’s Groundbirch Position in the Montney, MEng Thesis by David Lindsay Alexander Langille (April 2012).
2. Integration of Geomechanical Parameters and Numerical Simulation for an Offshore Reservoir in the Gulf of Mexico, MEng Thesis by David Manzano Angeles (September 2014).
3. Completion and Stimulation Optimization of Montney Wells in the Karr Field, MEng Thesis by Melanie Popp (December 2014).
4. A New Production Casing Design to Withstand Combined Installation Compression Loading and High Multi-Stage Hydraulic Fracturing Pressures in Montney Shale Horizontal Wells, MEng Thesis by Nino Suarez (January 2015).
5. Controlling Factors on Condensate Production from the Eagle Ford Shale, MEng Thesis by Wally Yi Wang (May 2015).
6. A New Method for Production Data Analysis Using Superposition-Rate, MEng Thesis by Peter Liang (December 2015).
7. Well Completions in Unconventional Reservoirs. MEng Thesis by Juan Carlos Arevalo (tentative title, in progress).

M.Sc. STUDENTS SUPERVISION

8. Stimulating Tight Gas Carbonate and Sandstone Reservoirs via Hydraulic Fracturing: Savannah, Sullivan Fields and Nikanassin Formation (Alberta, Canada), MSc Thesis by James Ohioma Arukhe (April 2009). Co-supervisor: Dr. Thomas Harding.
9. Reservoir Characterization of the Upper Jurassic – Lower Cretaceous Nikanassin Group, MSc Thesis by Nisael Antonio Solano (September 2010). Co-supervisor: Dr. Christopher Clarkson.
10. An Integrated Workflow for Reservoir Modeling and Flow Simulation of the Nikanassin Tight Gas Reservoir in the Western Canada Sedimentary Basin, MSc Thesis by Hui Deng (January 2011). Co-supervisor: Dr. Antonin (Tony) Settari.
11. A New Model for Flow Regime Recognition based on Pore Level Simulation Studies of Tight Gas Formations, MSc Thesis by Mohammad Reza Rahmanian Shahri (March 2011). Co-supervisor: Dr. Apostolos Kantzas.
12. Hydraulic Fracturing Optimization of Naturally Fractured Tight Gas Formations in the Western Canada Sedimentary Basin, MSc Thesis by Javier Antonio Leguizamon Paez (April 2011).
13. An Innovative Approach for Pore Pressure Prediction and Drilling Optimization in the Abnormally Sub-Pressured “Deep Basin” of the Western Canada Sedimentary Basin, MSc Thesis by Oscar Michel Contreras Puerto (June 2011). Co-supervisor: Dr. Geir Hareland.
14. Modeling Multi-Fractured Horizontal Wells as Linear Composite Reservoirs – Application to Single Phase Tight Gas, Shale Gas and Tight Oil Systems, MSc Thesis by Imad Brohi (September 2011). Co-supervisor: Dr. Mehran Pooladi-Darvish.
15. Drill Cuttings-based Methodology to Optimize Multi-Stage Hydraulic Fracturing in Horizontal Wells and Unconventional Gas Reservoirs, MSc Thesis by Camilo Ernesto Ortega Mercado (April 2012).
16. Numerical 3D Modeling of Multistage Hydraulic Fractures and Two-Way

Coupling Geomechanics - Fluid Flow Simulation of a Horizontal Well in the Nikanassin Tight Gas Formation (Canada), MSc Thesis by Laureano Gonzalez Rodriguez (August 2012). Co-supervisors: Dr. Gaisoni Nasreldin and Dr. Jose Rivero.

17. Petrophysics and Software Development, and 3D Analytical Modeling of Stimulated Reservoir Volume for Tight and Shale Reservoirs, MSc Thesis by Guang Yu (September 2012).
18. A Petrophysical Evaluation of Capillary Pressure for a Naturally Fractured Tight Gas Sandstone Reservoir: A Case Study, Co-Supervisor of MSc Thesis by Livia Sivila at the Colorado School of Mines. Supervisor: Dr. Ramona Graves Co-supervisor: Dr. R. Aguilera (April 2013).
19. Development of a 'Quad Porosity' Numerical Flow Model for Shale Gas Reservoirs, Co-Supervisor of MSc Thesis by Vivek Swami. Supervisor: Supervisor: Dr. Tony Settari. Co-supervisor: Dr. R. Aguilera (January 2013).
20. Drill Cuttings, Petrophysical, and Geomechanical Models for Evaluation of Conventional and Unconventional Petroleum Reservoirs, MSc Thesis by Bukola Korede Olusola (September 2013).
21. Use of a Variable Shape Distribution (VSD) Model to Populate Reservoir Properties in Tight Fractured Reservoirs for Numerical 3D Modeling. MSc Thesis by John Freddy Ramirez Vargas (January 2014).
22. Reservoir Characterization of the uppermost Monteith Formation -Tight Gas Sandstones in the Western Canada Sedimentary Basin in Alberta, Canada, MSc Thesis by Liliana Zambrano (January 2014). Co-supervisor: Dr. Per Pedersen.
23. Shale – from Nanopore Structure Investigation to Petrophysics and Reservoir Simulation, MSc Thesis by Peng Wu (April 2014).
24. Seismic Attribute Characterization of Monteith Formation -Tight Gas Sandstones in the Western Canada Sedimentary Basin, Alberta, Canada, MSc Thesis by Fernando Castillo (June 2014). Co-supervisor: Dr. Don Lawton.

25. Shale Gas Numerical Simulation: A Quintuple Porosity Approach, MSc Thesis by Bruno Lopez (July 2014).
26. A New Material Balance Methodology for Quintuple Porosity Shale Gas and Shale Condensate Reservoirs. MSc Thesis by Daniel Orozco (August 2016).
27. Improving Recovery of Liquids from Shale Petroleum Reservoirs, MSc Thesis by Alfonso Fragoso (August 2016).
28. Coupling Geochemical, Geomechanical and Petrophysical Data for Identifying Potential Moveable Hydrocarbon Zones in Shale Oil Reservoirs, MSc Thesis by Jaime Piedrahita (November 2016).
29. Evaluation of Cretaceous and Jurassic shales in Burgos Basin, Mexico, MSc Thesis by Marcela Cruz Luque (September 2017).
30. Oil Potential of Middle Cretaceous Tight Carbonates in Mexico, MSc Thesis by Brenda Azuara (January 2021).
31. Investigation on How to Improve Oil Recovery from the Chicontepec Paleochannel: A Giant Unconventional Petroleum Reservoir in Mexico, MSc Thesis by Alejandra Gutierrez Oseguera (August 2021).
32. Improved Heavy Oil Recovery from Mexican Heavy Oil Reservoir. MSc Thesis by Sandy Morales Zurita (Tentative title, in progress).
33. Simulation of Huff and Puff Gas injection, MSc thesis by Xiaolin Bao (tentative title, in progress).
34. Huff and Puff Gas Injection Potential of Shale Oil Reservoirs in Colombia, MSc Thesis by Claudia Marcela Herrera Tellez (in progress)

Ph.D. STUDENTS SUPERVISION

1. Modeling Electrical Properties in Complex Carbonate Reservoirs Using Well Logs with Geological and Petrophysical Evaluation, PhD Thesis by Ali Al-Ghamdi (May 2012). Co-supervisor: Dr. Christopher Clarkson.

2. Modelling Multi-Fractured, Multi-Well, Tight Gas Reservoirs, PhD Thesis by Michael Morgan (September 2013). Co-supervisor: Dr. Raj Mehta.
3. Production Data Analysis of Tight and Shale Reservoirs, PhD Thesis by Mohammad Sadeq Shahamat (April 2014). Co-supervisor: Mr. Louis Mattar.
4. Characterization and Construction of 3D Numerical Simulators for Oil and Liquids-Rich Multi-Porosity Shale Reservoirs, PhD Thesis by Bruno Lopez (May 2017).
5. Microseismic Based Reservoir Characterization (SBRC): Stimulated Reservoir Volume, Diffusivity, Geomechanics and Probabilistic Modeling, PhD Thesis by Qi Li (April 2018).
6. 3D Modeling of Fracturing and Refracturing in Unconventional Reservoirs, PhD Thesis by Edgar Urban Rascon (September 2019).
7. Characterization and Derivative-Free Algorithms for Faster Field Development Optimization of Liquids-Rich Shale Reservoirs., PhD Thesis by Bukola Olusola (May 2019).
8. Diffusion in Shale Reservoirs, Binglin Lich, PhD, 1-year visiting student from China, co-supervised by Dr, Maen Hussein and Dr Roberto Aguilera (Sep. 2018 - Sept. 2019).
9. Pore Pressure Prediction, Hydraulic Fracture Propagation and Huff-and-Puff Gas Injection in Naturally Fractured Shale and Tight Petroleum Reservoirs, PhD Thesis by Daniel Orozco (September 2021).
10. Two-Way Coupling of Geomechanics and Fluid Flow Simulation in Multi-Porosity Shale Reservoirs, PhD Thesis by Alfonso Fragoso (tentative title, in progress).
11. An Investigation on the Potential of the Vaca Muerta Shale in Argentina. PhD Thesis by Rahimah Karim (tentative title, in progress).
12. Deep Reinforcement Learning for Optimizing Huff and Puff Gas Injection in Multiporosity Liquid-Rich Shale Reservoirs, PhD Thesis by Christian

Aranguren (tentative title, in progress).

13. Development of a Methodology for Evaluation of Unconventional Petroleum Reservoir in Angola, PhD Thesis by Antonio Sicuna Suami Gomes (tentative title, in progress).
14. Intelligent Production Optimization in Real-Time by Implementing Hybrid Data-Physics Simulation, PhD Thesis by Raya Matorian (tentative title, in progress). Co-supervised with Dr. Roman Shor.
15. Machine Learning and Data Analytics in Shale Petroleum Reservoirs, PhD Thesis by Xiaolin Bao (tentative title, in progress).

POST-DOCTORAL FELLOW SUPERVISION

1. Dr. Li Ping Qiao. Geomechanics of Tight Formations.
2. Dr. Ali Ziarani. Flow in Nanopores.
3. Dr. Adam Yousefzadeh. Evaluation of Microseismic Data.

CURRENT GFREE RESEARCH TEAM

1. Alfonso Fragoso, PHD Student
2. Juan Carlos Arevalo, MEng Student
3. Sandy Morales Zurita, MSc Student
4. Xiaolin Bao, MSc student
5. Rahimah Karim, PhD student.
6. Claudia Marcela Herrera Tellez. MSc student
7. Cristhian Aranguren, PhD student
8. Antonio Sicuna Suami Gomes, PhD student

Ph.D. EXTERNAL EXAMINER

1. Geostatistical Modelling of Naturally Fractured Reservoirs, PhD Thesis by Eric B. Niven, University of Alberta (February 2013). Advisor: Dr. Clayton V. Deutsch.
2. Thermo-Hydro-Mechanical Behavior of Conductive Fractures using a Hybrid Finite Difference – Displacement Discontinuity Method, PhD Thesis by

Mohammadreza Jalali, University of Waterloo (June 2013). Advisor: Dr. Maurice Dusseault.

3. Analysis of Water Flowback and Gas Production Data for Fracture Characterization in the Horn River Basin, PhD Thesis by Yanmin Xu, University of Alberta (September 2018). Advisor: Dr. Hassan Dehghanpour.

PROFESSIONAL SOCIETIES

I am a member of the SPE, SPWLA, AAPG, Petroleum Society of CIM, APEGGA, CSPG, CWLS and the Colombian Society of Petroleum Engineers (ACIPET).

I served on the Publications Committee of The Log Analyst and the Technological Committee of SPWLA from 1976 to 1979.

I was a member of SPE Committee organizing a forum on the subject of "Naturally Fractured Reservoirs", Jackson Hole, Wyoming (1985).

I was a Director of the Petroleum Society of CIM, Calgary section (1987-1990), where I served as director of Technical Programs, General Programs and Technical Publications.

I was Chairman and co-author of the Petroleum Society of CIM committee that prepared Monograph No. 1 on the subject of "Determination of Oil and Gas Reserves," (First Edition, 1995; Second Edition, 2004). I managed over 40 authors and reviewers to produce this document.

I was a member of the Scientific Committee of the Petroleum Society of CIM that prepared Monograph No. 2 on the subject of "Horizontal Wells for the Recovery of Oil, Gas and Bitumen," by Roger M. Butler. (1993-1994).

I was Chairman of the Committee organizing a session on "Naturally Fractured Reservoirs" presented at the Canadian SPE/CIM/CANMET International Conference on Recent Advances in Horizontal Well Applications, Calgary, Alberta (March 20-23, 1994).

I have been invited to make presentations for local SPE chapters in the USA, Mexico and Australia, the Argentine Petroleum Institute in Bariloche, Argentina, the Colombian Society of Petroleum Engineers in Bogota, Colombia, and the SPWLA and NGWA in the USA.

I was an SPE Distinguished Lecturer on the subject of "Naturally Fractured Reservoirs" for the 2000-2001 Season. As such I lectured in 25 cities of North America, South America, Europe and North Africa.

I was co-Chair of the 2002 SPE Gas Technology Symposium held in Calgary on April 30-May 2, 2002.

I was member of the Conference Advisory Council for the 2004 U.S. EPA/NGWA Fractured Rock Conference dealing with State of the Science and Measuring Success in Remediation of Fractured Rocks, held in Portland, Maine, September 13-15, 2004.

I was a member of the committee organizing the SPE Gas Technology Symposium held in Calgary, Canada in May 2006.

I was Technical Program Chair of the committee organizing the 2008 SPE Gas Technology Symposium held in Calgary, Canada, June 16-18, 2008.

I was a member of the Board of Directors of the Canadian Society for Unconventional Gas (CSUG) for the term May 2007 – April 2009.

I was Chairman of the Journal of Canadian Petroleum Technology Editorial Review Board starting November 2007 to September 2009.

I was Executive Editor (Chairman of the Editorial Review Board) of the SPE Journal of Canadian Petroleum Technology from October 2009 to August 2011.

I was Technical Editor of SPE Reservoir Evaluation and Engineering Editorial Review Committee starting on September 2007.

I am Technical Editor of SPE Economics and Management Editorial Review Committee starting on December 2009.

I was member of the Technical Program Committee that organized the CSUG SPE Canadian Unconventional Resources Conference (Calgary, Canada, 15-17 November 2011).

I was member of the Technical Program Committee organizing the SPE Latin America and Caribbean Petroleum Engineering Conference (Cartagena, Colombia, 2009; Lima, Peru, 2011; Mexico City, 2012; Maracaibo, Venezuela, 2014; Quito, Ecuador, 2015).

Periodically, I have been Chair/co-Chair of technical presentations at meetings of the Petroleum Society of Canada and the Society of Petroleum Engineers since 1980.

I wrote the segment on "Tight Gas Formations" for the "Guidelines for Application of the Petroleum Resources Management System" (PRMS) published in an effort to standardize reserves definitions throughout the world. The PRMS is a joint publication of the most important oil and gas societies of the world including the Society of Petroleum Engineers (SPE), American Association of Petroleum Geologists (AAPG), World Petroleum Council (WPC), Society of Petroleum Evaluation Engineers (SPEE), and Society of Exploration Geophysicists (SEG). The PRMS was published in November 2011.

I was co-Chair of the SPE Canadian Unconventional Resources Conference held in Calgary, Canada (30 October- 1 November 2012).

I was session lead on Multidisciplinary studies at the CSPG Gussow Conference on "Importance of Rock Properties on Unconventional Reservoirs" held in Banff, Canada. Other session leads: Dr. Juergen Schieber, Indiana University; Dr. Jon Olson, University of Texas at Austin; Dr. Quinn Passey, ExxonMobil Upstream Research Co.; Mirko van der Baan, University of Alberta (October 15-17, 2013).

I was panelist at 4th World Petroleum Youth Forum held in Calgary, Canada discussing the topic "Natural Gas: Unlocking the Unconventional." Other panelists: Greg Gersib, Vice President Exploration - ConocoPhillips, Canada; Valerie Jochem, Technical Director, Unconventional Resources - Schlumberger, United States; Mike Wood, Vice President, Canada Development - Talisman Energy; Moderator: Doug Ashton, Resource, Evaluation and Advisory Team - Deloitte, Canada (October 22-25, 2013)

I was Editor in Chief and co-author of a Society of Petroleum Engineers (SPE) Monograph dealing with "Tight Oil and Unconventional Gas" (July 2018).

I was Executive Editor of the SPE Journal (2019-2021).

I am member of the SPE Reservoirs Advisory Committee (RAC), in the area of subsurface technologies (2021-2024).

COMMUNITY ACTIVITIES

I served as Director of the Knights of Columbus, Council 8636 in Calgary, Alberta,

1984 and 1985. I am still a member of the Knights.

I was president of the Colombian Volcano Relief Committee which headed efforts in Alberta to raise funds for victims of the Colombian volcano, 1985.

Coach, Strathcona Soccer Team, children 10-12 years of age, 1987.

OTHER ACTIVITIES

Actor, University of America, Bogota, Colombia, Group of Theatre and Drama, 1966 and 1967.

I was a member of a non-profit team formed to assist the president of Ecopetrol, the Colombian National Oil Company, during 1984 and 1985.

Author of articles on Civic Duties and Critic of Theatre Presentations, Oro Negro, a newspaper at the University of America, Bogota, Colombia, 1965 and 1966.

Very active and successful soccer player during my primary school, high school, and university years in Colombia. Varsity Soccer Team, goal-keeper of the Universidad de America, Bogota, Colombia (1963-1967).

HONOURS

1992 Distinguished Service Award presented by the Petroleum Society of CIM, Calgary Section (May 1992).

1993 Distinguished Author of the Journal of Canadian Petroleum Technology (May 1993 and July 1999).

1994 Outstanding Service Award presented by the Petroleum Society of CIM (June 1994).

2000 SPE Distinguished Lecturer on the subject of "Naturally Fractured Reservoirs" (2000-2001 Season).

2006 Distinguished Service Award presented by the Petroleum Society of CIM (October 2006).

2008 Dr. R. M. Butler Memorial Best Paper Presented at the 2008 Canadian International Petroleum Conference Award (tie).

2009 Dr. R. M. Butler Memorial Best Paper Presented at the CIPC 2009 Canadian International Petroleum Conference Award (First Runner Up).

2011 SPE Canada Regional Distinguished Achievement Award for Petroleum Engineering Faculty.

2011 SPE A Peer Apart Award (for completing more than 100 peer reviews for SPE)

2011 Guest Professor of the China University of Petroleum (Eastern China) (2011 – 2016).

2015 ACIPET (Colombian Society of Petroleum Engineers) Award of the Year for Academic Innovation in the Hydrocarbon Sector.

2017 SPE Life Member

2018 SPE Legion of Honor

2019 SPE Distinguished Achievement Award for Petroleum Engineering Faculty

2021 SPE Reservoir Description and Dynamics Award

SPECIAL PUBLICATIONS

THESIS

"Squeeze Cementing" (written in Spanish) by Roberto Aguilera and Daniel Velandia. Thesis presented as partial fulfillment for a degree as a petroleum engineer, Petroleum Engineering Department, Universidad de America, Bogota, Colombia, 1967.

"Bridger Lake Field Reservoir Study" by Roberto Aguilera, Master of Engineering thesis 1375, Colorado School of Mines (May 1971).

"Evaluation of Fine-Grained Laminated Systems from Logs, Wasatch Formation, Utah" by Roberto Aguilera, Ph.D. thesis 1569, Colorado School of Mines, (1976).

BOOKS

Naturally Fractured Reservoirs by Roberto Aguilera, PennWell Books, Tulsa, Oklahoma (First Edition, 1980; Second Edition 1995; working at present on Third Edition).

The Technology of Artificial Lift Methods, Vol.4, Production Optimization of Oil and Gas Wells by Nodal System Analysis. Senior author: Dr. Kermit E. Brown of the University of Tulsa, Chapter on Water Coning by Roberto Aguilera and Luis Acevedo, PennWell Books, Tulsa, Oklahoma (1984).

Horizontal Wells by Roberto Aguilera et al., Contributions in Petroleum Geology and Engineering, Volume 9, Gulf Publishing Company, Houston, Texas (1991).

Roberto Aguilera was Co-author and Chairman of Committee that prepared Determination of Oil and Gas Reserves, Petroleum Society of CIM Monograph No. 1, Calgary, Canada (First Edition:1994; Second Edition: 2004).

Co-Editor and co-author of Advances in the Study of Fractured Reservoirs, The Geological Society of London, SP 374, Edited by G.H. Spence, J. Redfern, R. Aguilera, T. G. Bevan, J. W. Cosgrove, G. D. Couples and J. M. Daniel (September 2014).

Roberto Aguilera was Editor-in-Chief and co-author of SPE Monograph on Unconventional Gas and Tight Oil Exploitation, Society of Petroleum Engineers SPE (July 2018).

Member of the SPE Legion of Honor (2018).

Lifetime Member of SPE.

ENCYCLOPEDIA

Roberto Aguilera was contributor on the subject of Horizontal Wells to the 1993 McGRAW-HILL YEARBOOK OF SCIENCE & TECHNOLOGY (p. 275), an annual publication to supplement the information of the 20-volume ENCYCLOPEDIA OF SCIENCE & TECHNOLOGY.

SOFTWARE

Roberto Aguilera: Co-developer of the Fracture Completion Log (FCL), Servipetrol's log interpretation package for evaluation of naturally fractured reservoirs.

Roberto Aguilera: Involved in the development of other Servipetrol software products, such as WELLTEST-NFR (used for transient pressure analysis), GASDEL (used to determine gas deliverability), WELLHOR (used for drawdown and buildup analysis of horizontal wells), and DECLINE-NFR (used for production decline analysis).

Roberto Aguilera: Contributor to the original version of IMEX-DP for dual porosity-systems. IMEX-DP was developed jointly by Servipetrol Ltd. and the Computer Modelling Group of Calgary.

MANUALS

Author of Naturally Fractured Reservoirs, Roberto Aguilera & Associates, Inc., Dallas, Texas (1978).

Roberto Aguilera was co-author of Fractured Reservoir Analysis, an AAPG School (1984, 1985, 1986, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996). Other contributors: Dr. David Stearns (professor of geology at the University of Oklahoma), Dr. Melvin Friedman (professor of geology at Texas A&M), and Dr. Ronald Nelson (structural geologist at Amoco).

Roberto Aguilera was co-author of Practical Log Analysis, a 22-part series published in the Oil and Gas Journal (1979). Several other contributors.

Roberto Aguilera was author Geologic Aspects of Naturally Fractured Reservoirs, in "AAPG Treatise of Petroleum Geology", Reprint Series No. 3, compiled by Edward A. Beaumont and Norman H. Foster (1987), p. 260.

Roberto Aguilera was co-author of New Core Analysis Techniques, A Geotech publication (1988).

Roberto Aguilera was author of Coalbed Methane, Formation Evaluation by Well Logs, Pressure Transient Testing and Well Deliverability, prepared for the China-Alberta Petroleum Center as part of a seminar on Gas Reservoir Management presented in Beijing, China (September 1992).

Roberto Aguilera was author of Formation Evaluation of Naturally Fractured Reservoirs, in "Development Geology Reference Manual," AAPG Methods in

Exploration Series No. 10, edited by Diana Morton-Thompson and Arnold M. Woods (1992), p. 192.

Roberto Aguilera was author of Fractured Reservoirs, Regional Exploration Seminar - Part III, prepared for Petro-Vietnam, Philippines National Oil Company, and Philippines Department of Energy. A Seminar sponsored by Petro-Canada on behalf of Canadian International Development Agency, CIDA (February 1994).

Roberto Aguilera was author of Naturally Fractured Reservoirs, presented at the CSEG/CSPG Joint Convention, Calgary, Canada (May 9, 1994).

Roberto Aguilera was co-author of "Gas and Gas-Condensate Well Testing," presented at the Southwest Petroleum Institute, Nanchong, Sichuan, People's Republic of China (January 8-26, 1996).

Co-author of "Development and Production of Low Permeability Gas Reservoirs," presented at the Southwest Petroleum Institute, Nanchong, Sichuan, People's Republic of China (June 16-27, 1997).

Roberto Aguilera was author of Naturally Fractured Gas Reservoirs, presented at the SPE Gas Technology Symposium held in Calgary, Canada (March 15, 1998).

Roberto Aguilera was co-author of Geological and Engineering Aspects of Naturally Fractured Reservoirs, oil and gas industry short course (2000 and 2001), co-author: Dr. William Jamison.

Roberto Aguilera was co-author of Shale Gas Reservoirs, a monthly 9-part series published for the Canadian Society of Petroleum Geologists CSPG (2011).

PUBLICATIONS AND PRESENTATIONS

As a result of research conducted throughout the years, I authored or co-authored the following articles/discussions/abstracts starting in 1972:

1. "A Comparison of Water Saturation Values Determined from Capillary Pressure Measurements and Logs," Roberto Aguilera, presented at the SPE Regional Student Paper Contest held in Tulsa, Oklahoma (April 16, 1972).
2. "Analysis of Naturally Fractured Reservoirs from Sonic and Resistivity Logs," Roberto Aguilera, Journal of Petroleum Technology (November 1974) 1233-1238 ([Refereed Journal](#)).

3. "Graphical Solution of Imbibition Equations Used to Predict Oil Recovery by Water Influx in Naturally Fractured Reservoirs," Roberto Aguilera, Journal of Petroleum Technology (November 1975) 1526-1528 ([Refereed Journal](#)).
4. "Analysis of Naturally Fractured Reservoirs from Conventional Well Logs," Roberto Aguilera, Journal of Petroleum Technology (July 1976) 764-772 ([Refereed Journal](#)).
5. "Economic Analysis of Acceleration Projects," Roberto Aguilera, SPE paper 6086 presented at the 51st Annual Fall Technical Conference and Exhibition held in New Orleans, La. (October 3-6, 1976) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
6. "Current Status on the Study of Naturally Fractured Reservoirs," The Log Analyst (May - June 1977) 3-23. Roberto Aguilera, H. K. van Poolen ([Refereed Journal](#)).
7. "Discussion on Dual-Spacing TDT Applications in Marginal Conditions," Roberto Aguilera, Journal of Petroleum Technology (January 1978).
8. "Combined Log Analysis and Material Balance Help to Explain Performance of Naturally Fractured Reservoirs below the Bubble Point," Roberto Aguilera, The Log Analyst (November - December 1977) ([Refereed Journal](#)).
9. "The Uncertainty of Evaluating Original Oil-In-Place in Naturally Fractured Reservoirs," Roberto Aguilera, Trans., 19th Annual Symposium of SPWLA, El Paso, Texas (June 13-15, 1978) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
10. "Log Analysis of Gas Bearing Fracture Shales in the Saint Lawrence Lowlands of Quebec," Roberto Aguilera, Paper SPE 7445 presented at the Annual Fall Meeting held in Houston (October 1 - 3, 1978) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
11. "Geologic Aspects of Naturally Fractured Reservoirs Explained," Roberto Aguilera, H. K. van Poolen. Oil and Gas Journal (December 18, 1978) 47-51.
12. "Naturally Fractured Reservoirs - Several Techniques Evaluate Well Test Data," Roberto Aguilera, Roberto Aguilera, Oil and Gas Journal (January 22, 1979) 68-73. Co-author: Dr. H. K. van Poolen.

13. "Naturally Fractured Reservoirs - Porosity and Water Saturation Can Be Estimated from Well Logs," Roberto Aguilera, Oil and Gas Journal (January 8, 1979) 101-108. Co-author: Dr. H. K. van Poolen.
14. "Naturally Fractured Reservoirs - Type Curves, Pressure Interference Aid Well Test Evaluation," Roberto Aguilera, Oil and Gas Journal (February 5, 1979) 56-62. Co-author: Dr. H. K. van Poolen.
15. "Naturally Fractured Reservoirs - Choice of Completion Method Affects Productivity," Roberto Aguilera, Oil and Gas Journal (February 19, 1979) 106-108. Co-author: Dr. H. K. van Poolen.
16. "Fractured Shales Present an Attractive Gas Potential," Roberto Aguilera, Oil and Gas Journal (March 5, 1979) 167-178. Co-author: Dr. H. K. van Poolen.
17. "Naturally Fractured Reservoirs - How to Determine Primary Reservoir Performance," Roberto Aguilera, Oil and Gas Journal (March 19, 1979), 98-102. Co-author: Dr. H. K. van Poolen.
18. "A New Approach for Log Analysis of the Pulsed Neutron and Resistivity Log Combination," Roberto Aguilera, Journal of Petroleum Technology (April 1979), 415-418 ([Refereed Journal](#)).
19. "Naturally Fractured Reservoirs - Evaluating the Effects of Dispersed Gas Injection," Roberto Aguilera, Oil and Gas Journal (April 2, 1979), 131-137. Co-author: Dr. H. K. van Poolen.
20. "Naturally Fractured Reservoirs - Imbibition Displacement and Fracture Orientation Effects," Roberto Aguilera, Oil and Gas Journal (April 16, 1979) 75-78. Co-author: Dr. H. K. van Poolen.
21. "Numerical Simulation Applies to Fractured Reservoirs," Roberto Aguilera, Oil and Gas Journal (May 7, 1979) 72-74. Co-author: Dr. H. K. van Pollen.
22. "Studies Show Occurrence of Fractured Reservoirs," Roberto Aguilera, Oil and Gas Journal (May 21, 1979) 70-76. Co-author: Dr. H. K. van Pollen.
23. "Naturally Fractured Reservoirs - How to Analyze Reservoir Economics," Roberto Aguilera, Oil and Gas Journal (June 4, 1979) 157-160. Co-author: Dr. H. K. van Poolen.

24. "Uncertainty in Log Calculations Can Be Measured," Roberto Aguilera, Oil and Gas Journal (September 10, 1979) 126-128.
25. "Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional (September 1979) 50-56.
26. "Análisis de Presiones en Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional (October 1979).
27. "Recuperación Primaria y Secundaria de Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional (November 1979).
28. "Naturally Fractured Reservoirs Performance Forecast Below the Bubble Point," Roberto Aguilera, Fifth Technical Symposium, Doha, Qatar (January 1981). Co-author: Dan Tappmeyer ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
29. "Interpretación de Pórfiles en Yacimientos Naturalmente Fracturados," (In Spanish), Petróleo Internacional (October 1981). Roberto Aguilera, Co-authors: Luis Acevedo and Néstor Martínez.
30. "Evaluación de Presiones en Yacimientos Naturalmente Fracturados," (In Spanish), Petróleo Internacional, (November 1981). Roberto Aguilera, Co-authors: Luis Acevedo and Néstor Martínez.
31. "Cálculo del Caudal Máximo de Producción sin Generar Problemas Prematuros de Conificación de Gas y/o Agua en Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional, (December 1981). Co-authors: Luis Acevedo and Néstor Martínez.
32. "Pronóstico de Recuperación Primaria en Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional, (January 1982). Co-authors: Luis Acevedo and Néstor Martínez.
33. "Pronóstico de Recuperación Secundaria en Yacimientos Naturalmente Fracturados," Roberto Aguilera, (In Spanish), Petróleo Internacional, (February 1982). Co-authors: Luis Acevedo and Néstor Martínez.
34. "Conceptos para Evaluaciones Económicas," Roberto Aguilera, (In Spanish),

- Petróleo Internacional, (March 1982). Co-authors: Luis Acevedo and Néstor Martínez.
35. "Exploring for Naturally Fractured Reservoirs - A Petroleum Engineer's Point of View." Roberto Aguilera, Abstract in AAPG Bulletin (February 1982) v. 66, p. 242.
 36. "FCL - A Computerized Well Log Interpretation Process for the Evaluation of Naturally Fractured Reservoirs," Roberto Aguilera, Journal of Canadian Petroleum Technology (January-February 1982) 31-37, co-author: Luis Acevedo ([Refereed Journal](#)).
 37. "Relative Permeability Concepts for Predicting the Performance of Naturally Fractured Reservoirs," Roberto Aguilera, Journal of Canadian Petroleum Technology (September - October 1982) 41-48 ([Refereed Journal](#)).
 38. "Exploring for Naturally Fractured Reservoirs," Roberto Aguilera, SPWLA Twenty-Fourth Annual Logging Symposium, paper C (June 27-30, 1983) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
 39. "Discussion of New Pressure Transient Analysis Methods for Naturally Fractured Reservoirs," Roberto Aguilera, Journal of Petroleum Technology (May 1984) 849-581.
 40. "Discussion of a Variable Cementation Exponent, m , for Fractured Carbonates", Roberto Aguilera, in Letters to Editor," The Log Analyst (May-June 1984) 3-6.
 41. "Some Important Considerations in Naturally Fractured Reservoir Simulation," Roberto Aguilera, Computer Modelling Group Report R8.06 (September 1985), co-authors: L. X. Nghiem and D. A. Collins.
 42. "Discussion of What Discounted Cash Flow Rate of Return Never Did Require," Roberto Aguilera, Journal of Petroleum Technology (June 1986) 676-678.
 43. "An Approximate Solution of Linear Flow in Naturally Fractured Reservoirs," Roberto Aguilera, SPE paper 16442 listed in New Papers, Journal of Petroleum Technology (February 1987).
 44. "Reservoir Engineering Considerations for Naturally Fractured Reservoirs," in

Naturally Fractured Reservoirs: Analysis and Evaluation, Roberto Aguilera, a Geotechnical Resources Seminar, Calgary, Alberta (October 1987).

45. "Well Test Analysis of Naturally Fractured Reservoirs," Roberto Aguilera, SPE Formation Evaluation (September 1987) 239-252 ([Refereed Journal](#)).
46. "Multiple Rate Analysis for Pressure Buildup Test in Reservoir with Tectonic, Regional and Contractional Fractures," Roberto Aguilera, SPE Formation Evaluation (September 1987) 253-260 ([Refereed Journal](#)).
47. "Effect of Wellbore Storage and Skin in the Transient Testing of Bounded Naturally Fractured Reservoirs," Roberto Aguilera, SPE paper 17001 listed under New Papers, Journal of Petroleum Technology (June 1987), page 648.
48. "Geologic Aspects of Naturally Fractured Reservoirs," Roberto Aguilera, AAPG Treatise of Petroleum Geology, No. 3, Reservoir Properties I, compiled by E.A. Beaumont and N.H. Foster, Tulsa Oklahoma (1987) 260-305 ([Refereed Journal](#)).
49. "Effect of Wellbore Storage, Skin and Outer Reservoir Boundaries on the Transient Behaviour of Naturally Fractured Reservoirs with Hydraulic Vertical Fractures," Roberto Aguilera, SPE paper 17023 listed under New Papers, Journal of Petroleum Technology (January 1988).
50. "Well Test Analysis of Pumping Wells in Multiphase Naturally Fractured Reservoirs," Roberto Aguilera, SPE 17545 presented at the 1988 Rocky Mountain Regional Meeting, Casper, Wyoming (May 16-18, 1988), Co-authors: Matt Houston, S.L. Podio, S.J. Song ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
51. "New Methods for Evaluation of Shaly Formations by Well Logs," Roberto Aguilera, SPE 17517 presented at the 1988 Rocky Mountain Regional Meeting, Casper, Wyoming (May 16-18, 1988) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
52. "WELLTEST-NFR: A computerized Process for Transient Pressure Analysis of Multiphase Reservoirs with Single, Dual or Triple Porosity Behaviour," Roberto Aguilera, paper No. 88-39-52 presented at the 39th Annual Technical Meeting of the Petroleum Society of CIM held in Calgary, Alberta (June 12-16, 1988), Co-author: Se Jong Song ([Refereed Abstract, Full Paper in Conference Proceedings](#)).

53. "Unsteady State Water Influx in Naturally Fractured Reservoirs," Roberto Aguilera, paper No. 88-39-64 presented at the 39th Annual Technical Meeting of the Petroleum Society of CIM held in Calgary, Alberta (June 12-16, 1988) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
54. "An Overview of Log Interpretation, Well Test Analysis and Reservoir Performance of Naturally Fractured Reservoirs - Their Relationship to Geomechanics," Roberto Aguilera, Petroleum Society of CIM Geomechanics Seminar, Calgary, Alberta (April 21-22, 1988).
55. "Determination of Subsurface Distance between Vertical Parallel Natural Fractures Based on Core Data," Roberto Aguilera, AAPG Bulletin, vol.72 (July 1988) 845-851 ([Refereed Journal](#)).
56. "Well Test Analysis of Dual-Porosity Systems Intercepted by Hydraulic Vertical Fractures of Finite Conductivity," Roberto Aguilera, SPE paper 18948 presented at the SPE Joint Rocky Mountain Regional/Low Permeability Reservoirs Symposium and Exhibition held in Denver, Colorado (March 6-8, 1989) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
57. "A New Method for Analysis of the Nuclear Magnetic Log-Resistivity Log Combination," Roberto Aguilera, Journal of Canadian Petroleum Technology (January-February 1990) 67-71 ([Refereed Journal](#)).
58. "Extensions of Pickett Plots for the Evaluation of Shaly Formations by Well Logs," Roberto Aguilera, The Log Analyst (December 1990) ([Refereed Journal](#)).
59. "Transient Pressure Analysis of Horizontal Wells in Anisotropic Naturally Fractured Reservoirs," Roberto Aguilera, SPE Formation Evaluation (March 1991) 95-100. Co-author: M.C. Ng ([Refereed Journal](#)).
60. "An Approximate Solution of Linear Flow in Naturally Fractured Reservoirs," Roberto Aguilera, The Journal of Canadian Petroleum Technology (May - June, 1991) vol. 30, No. 3, p. 86-90 ([Refereed Journal](#)).
61. "Testing of Horizontal Gas Wells in Anisotropic Naturally Fractured Reservoirs," Roberto Aguilera, SPE paper 22674 presented at the 66th Annual Technical Conference and Exhibition, Dallas, Texas (October 6-9, 1991) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).

62. "Decline Curve Analysis of Hydraulically Fractured Wells in Dual-Porosity Reservoirs," Roberto Aguilera, SPE paper 22938 presented at the 66th Annual Technical Conference and Exhibition, Dallas, Texas (October 6-9, 1991). Co-author: M. C. Ng ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
63. "Simulation of a Gas Naturally Fractured Reservoir: A Case History," Roberto Aguilera, SPE paper 22920 presented at the 66th Annual Technical Conference and Exhibition, Dallas, Texas (October 6-9, 1991). Co-authors: L.N. Franks and A.D. Au ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
64. "Transient Pressure Analysis of Multiphase Naturally Fractured Reservoirs - Recent Developments in Multiphase Transport in Porous Media," Roberto Aguilera, Third Symposium on Multiphase Transport in Porous Media, Winter Annual Meeting of the American Society of Mechanical Engineers, Atlanta, Georgia (Dec. 1-6, 1991).
65. "Well Test Analysis of a Naturally Fractured Gas Reservoir - A Case History," Roberto Aguilera, The Journal of Canadian Petroleum Technology (April 1992). Co-authors: L.N. Franks and A.D. Au ([Refereed Journal](#)).
66. "DECLINE-NFR, A Computerized Process for Decline Curve Analysis of Reservoirs with Single and Dual-Porosity Behavior," Roberto Aguilera, CIM paper 92-76 presented at the Annual Technical Conference, Calgary, Canada (June 7-10, 1992) Co-author: M.C. Ng ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
67. "Undiscovered Naturally Fractured Reservoirs - Why and How, A Petroleum Engineer's Point of View," Roberto Aguilera, presented at the AAPG Annual Convention, Calgary, Canada (June 21-24, 1992) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
68. "Discussion of Advances in Practical Well Test Analysis," Roberto Aguilera, Journal of Petroleum Technology (March 1993), pp. 278-279. Co-author: M.C. Ng.
69. "Advances in the Study of Naturally Fractured Reservoirs," Roberto Aguilera, Distinguished Author Series, The Journal of Canadian Petroleum Technology (May 1993), vol. 32, No. 5, pp. 24-26 ([Refereed Journal](#)).
70. "Isochronal Testing of a Gas Naturally Fractured Reservoir - A Case History,"

Roberto Aguilera, CIM paper 92-91 presented at the Annual Technical Conference, Calgary, Canada (June 7-10, 1992) Co-authors: L.N. Franks and A.D. Au. Published in The Journal of Canadian Petroleum Technology (October 1993) Vol. 32, No. 8 ([Refereed Journal](#)).

71. "Formation Evaluation of Naturally Fracture Reservoirs," Roberto Aguilera, in Development Geology Reference Manual, edited by Diana Morton-Thompson and Arnold M. Woods, AAPG Methods in Exploration Series No. 10, Tulsa, Oklahoma (1993), pp. 192-194.
72. "Definitions and Determination of Oil and Gas Reserves," Roberto Aguilera, presented at the 14th World Petroleum Congress, Stavanger, Norway, John Wiley & Sons Ltd. (May 19-June 1, 1994). Co-authors: Petroleum Society of CIM Monograph Committee ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
73. "Well Test Analysis of Horizontal Wells in Bounded Naturally Fractured Reservoirs," Roberto Aguilera, paper CIM 94-13 presented at the Petroleum Society of CIM and AOSTRA Technical Conference held in Calgary, Alberta (June 12-15, 1994). Co-author: M.C. Ng. Published in The Journal of Canadian Petroleum Technology (July 1999) Vol.38, No. 7, pp. 20-24 ([Refereed Journal](#)).
74. "Micro-Simulation of Naturally Fractured Cores," Roberto Aguilera, paper CIM 94-79 presented at the Petroleum Society of CIM and AOSTRA Technical Conference held in Calgary, Alberta (June 12-15, 1994). Co-author: A.D. Au ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
75. "Formation Evaluation of Coalbed Methane Reservoirs," Roberto Aguilera, The Journal of Canadian Petroleum Technology (November 1994), Vol. 33, No. 9, pp. 22-28 ([Refereed Journal](#)).
76. "Pressure Analysis of Infinite, Semi-Infinite and Closed Rectangular Naturally Fractured Reservoirs," Roberto Aguilera, presented at the 46th Annual Technical Meeting of the Petroleum Society of CIM, Banff, Alberta, Canada (May 14-17, 1995). Co-author: M.C. Ng. Published in The Journal of Canadian Petroleum Technology (November 1997) Vol. 36, No. 10 ([Refereed Journal](#)).
77. "Formation Evaluation of Triassic Naturally Fractured Carbonates in British Columbia," Roberto Aguilera, paper No. 96-48 presented at the 47th Annual Technical Meeting of the Petroleum Society of CIM, Calgary, Alberta, Canada (June 10-12, 1996). Published in The Journal of Canadian Petroleum

Technology (July 1998) Vol. 37, No. 7 ([Refereed Journal](#)).

78. "Well Test Analysis of Naturally Fractured Condensate Reservoirs," Roberto Aguilera, paper No 97-33 presented at the 48th Annual Technical Meeting of the Petroleum Society of CIM, Calgary, Alberta, Canada (June 8-11, 1997). Co-author: M. C. Ng. Published in The Journal of Canadian Petroleum Technology (July 1999) Vol. 38, No. 7, pp. 55-60 ([Refereed Journal](#)).
79. "Well Test Analysis of Multi-Layered Naturally Fractured Reservoirs," Roberto Aguilera, paper No 98-49 presented at the 49th Annual Technical Meeting of the Petroleum Society of CIM in Calgary, Alberta (June 8-10, 1998). Published in The Journal of Canadian Petroleum Technology (July 2000) Vol. 39, No. 7, pp. 31-37 ([Refereed Journal](#)).
80. "Comparison of Water Saturation Values Determined from Capillary Pressure Measurements and Old Logs," Roberto Aguilera, paper No 98-82 presented at the 49th Annual Technical Meeting of the Petroleum Society of CIM held in Calgary, Alberta (June 8-10, 1998). Published in The Journal of Canadian Petroleum technology (September 2000) Vol. 39, No. 9 ([Refereed Journal](#)).
81. "Geologic Aspects of Naturally Fractured Reservoirs," Roberto Aguilera, The Leading Edge (December 1998), pp. 1667-1670.
82. "Controversial: Is It Possible to Have Two (or more) Different, Well-Defined Water-Oil Contacts Within a Single, Closed Naturally Fractured Reservoir?" Roberto Aguilera, paper No. 99-32 presented at the CSPG and Petroleum Society of CIM Joint Convention held in Calgary, Alberta (June 14-18, 1999) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
83. "Recovery Factors and Reserves in Naturally Fractured Reservoirs," Roberto Aguilera, Distinguished Author Series, Journal of Canadian Petroleum Technology (July 1999) Vol. 38, No. 7, pp. 15-18 ([Refereed Journal](#)).
84. "The Use of Pickett Plots for Reservoir Enhancement Characterization," Roberto Aguilera, presented at the 16th World Petroleum Congress held in Calgary, Canada (June 11-15, 2000). Co-author: Maria S. Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
85. "Geology and Reservoir Characterization of the Fractured Cimarrona Formation (Maestrichtian) in the Guaduas Field, Magdalena Valley of Colombia - A Potential Giant Oil Field," Roberto Aguilera, presented at the

16th World Petroleum Congress held in Calgary, Canada (June 11-15, 2000), Co-author: Russ D. Cunningham (The GHK Companies) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).

86. "Well Test Analysis of Multi-Layered Naturally Fractured Reservoirs with Variable Thickness and Variable Fracture Spacing," Roberto Aguilera, presented at the Canadian International Petroleum Conference Held in Calgary (June 12-14, 2001) ([Refereed Abstract, Full Paper in Conference Proceedings](#)). Published in Journal of Canadian Petroleum Technology (December 2001), vol. 12, pp. 9-12. Co-author: Maria S. Aguilera.
87. "The Integration of Capillary Pressures and Pickett Plots for determination of Flow Units and Reservoir Containers," Roberto Aguilera, SPE 81196-PA presented at the 2001 SPE Annual Technical Conference and Exhibition held in New Orleans, Louisiana (September 30-October 3, 2001). Co-author: Maria S. Aguilera. Published in SPE Reservoir Evaluation and Engineering (December 2002) ([Refereed Journal](#)).
88. "Aspectos Geológicos y de Ingeniería en Yacimientos Naturalmente Fracturados," Roberto Aguilera, Revista Fuentes, Universidad Industrial de Santander, Bucaramanga, Colombia (2001), pp. 9-18. Co-author: Maria S. Aguilera ([Refereed Journal](#)).
89. "Incorporating Capillary Pressure, Pore Throat Aperture Radii, Height Above Free Water Table, and Winland r35 Values on Pickett Plots", Roberto Aguilera, AAPG Bulletin (April 2002), vol. 86, No. 4, pp. 605-624 ([Refereed Journal](#)).
90. "Reducing Gas Production Decline Through Dewatering: A Case History from the Naturally Fractured Aguarague Field, Salta, Argentina," Roberto Aguilera, SPE 75512 presented at the Gas Technology Symposium held in Calgary, Canada (April 30-May 2, 2002). Co-authors: J. J. Conti and E. Lagrenade. Published in SPE Reservoir Evaluation and Engineering (December 2003), pp. 376-386 ([Refereed Journal](#)).
91. "Trucking of Compressed Natural Gas (CNG) from the Naturally Fractured Galt Field in the Gaspé Area of Quebec, Canada," Roberto Aguilera, SPE 75673 presented at the Gas Technology Symposium held in Calgary, Canada (April 30-May 2, 2002). Co-author: Jean Yves Lavoie ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
92. "Exploration Efforts in the Galt Area: First Economic Hydrocarbon Discovery

- in the Eastern Gaspe Peninsula," Roberto Aguilera, presented at the CSPG Diamond Jubilee Convention, Calgary, Canada (June 3-7, 2002). Co-authors: Jean-Yves Lavoie and Jean-Sebastien Marcil (Abstract) ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
93. "Determination of Matrix Flow Units in Naturally Fractured Reservoirs," Roberto Aguilera, Petroleum Society of CIM paper 2002-157 presented at the Canadian International Petroleum Conference held in Calgary, Canada (June 11-13, 2002). Published in Journal of Canadian Petroleum Technology (December 2003), vol. 12, pp. 9-12 ([Refereed Journal](#)).
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128. "Solutions for Better Production in Tight Gas Reservoirs Through Hydraulic Fracturing," Roberto Aguilera, SPE paper 121357 presented at the SPE Western Regional Conference held in San Jose, California (March 24-26, 2009). Co-authors: James Arukhe and Thomas Harding ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
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139. "Reservoir Sampling and Analysis," Roberto Aguilera, presented by invitation at Forum on Future of Stimulation in Tight Gas and Shale Gas held in Kananaskis, Alberta, Canada (August 17-21, 2009).
140. "GFREE: An In-Progress Report for Evaluating the Nikanassin Tight Gas Formation," Roberto Aguilera, presented by invitation at the Nikanassin-Cadomin ConocoPhillips Workshop (September 16-17, 2009)
141. "GFREE Approach for Geologic Characterization of 'Tight Gas' Reservoirs," Roberto Aguilera, poster presented at the Geoscience Department Open House, University of Calgary (September 18, 2009). Co-authors: Nisael Solano and Christopher Clarkson.
142. "Oil, Natural Gas and NGL Endowment in North, Central and South America," Roberto Aguilera, SPE paper 124490 presented at the Annual Technical Conference and Exhibition held in New Orleans, Louisiana, USA (October 4-7, 2009). Co-author: Roberto F. Aguilera, SPE Economics and Management (October 2010). ([Refereed Journal](#)).
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146. "Storage and Output Flow from Shale and Tight Gas Reservoirs," Roberto Aguilera, paper SPE 133611 presented at the SPE Western Regional Meeting held in Anaheim, California, USA (May 27-29, 2010). Co-authors: Mohammad Rahmanian and Nisael Solano ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
147. "Flow Units: From Conventional to Tight Gas to Shale Gas Reservoirs," Roberto Aguilera, SPE Paper 132845 presented at the Trinidad and Tobago Energy Resources Conference held in Port of Spain, Trinidad (June 27-30, 2010) ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
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149. "Cumulative Gas Production Distribution on the Nikanassin Tight Gas Formation, Alberta and British Columbia, Canada," Roberto Aguilera, SPE Paper 132923 presented at the Trinidad and Tobago Energy Resources Conference held in Port of Spain, Trinidad (June 27-30, 2010). Co-authors: Nisael Solano and Liliana Zambrano. Published in SPE Reservoir Evaluation & Engineering – Formation Evaluation (June 2011). ([Refereed Journal](#)).
150. "Shale Gas Series, Part 1, Introduction," CSPG Reservoir (September 2010). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.

151. "A Process to Evaluate Unconventional Resources," SPE Paper 134602 presented at the 2010 SPE Annual Technical Conference and Exhibition (ATCE) held in Florence, Italy (September 19-22, 2010). Co-authors: Roberto Aguilera, Phillip B. Chan and John Etherington ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
152. "Optimization of Horizontal Wellbore and Fracture Spacing Using an Interactive Combination of Reservoir and Fracturing Simulation," SPE paper 137416 presented at the CSUG/SPE Unconventional Resources and International Petroleum Conference held in Calgary, Canada (October 19-21, 2010). Co-authors: Robert S. Taylor, Roberto Aguilera, Mark Glaser, James Kim, Brad Wilson, Gary Nikiforuk, Vic Noble, Lorne Rosenthal, Ottmar Hoch, Mohamed Soliman, Ken Storozkenko, Nathan Riviere, Troy Palidwar, and Roch Romanson ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
153. "Reservoir Characterization and Flow Simulation of a Low-Permeability Gas Reservoir: An Integrated Approach for Modeling Tommy Lakes Gas Field," SPE paper 137507 presented at the CSUG/SPE Unconventional Resources and International Petroleum Conference held in Calgary, Canada (October 19-21, 2010). Co-authors: Hui Deng, Roberto Aguilera, University of Calgary; Mohammed Alfarhan, Lionel S. White, John S. Oldow, Carlos L. Aiken, University of Texas at Dallas. Journal of Canadian Petroleum Technology (May 2011) ([Refereed Journal](#)).
154. "Natural Gas Potential in the Saint Lawrence Lowlands of Quebec: A Case Study," SPE paper 137593 presented at the CSUG/SPE Unconventional Resources and International Petroleum Conference held in Calgary, Canada (October 19-21, 2010). Co-authors: Roberto Aguilera, Jean-Yves Lavoie, Jean-Sebastien Marcil, Peter K. Dorrins and Jeremie Lavoie. Journal of Canadian Petroleum Technology (December 2011) ([Refereed Journal](#)).
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157. "Shale Gas Series, Part 3, Shale Properties," CSPG Reservoir (November 2010). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
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159. "Indexing and Normalizing Natural-Gas Endowment," SPE paper 139247 presented at the Latin America and the Caribbean Petroleum Engineering Conference (LACPEC) held in Lima, Peru (December 1-3, 2010). Co-authors: Roberto Aguilera, Roberto F. Aguilera (Curtin University) ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
160. "Shale Gas Series, Part 5, Shale Gas vs. Tight Gas vs. Conventional Gas," CSPG Reservoir (January 2011). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
161. "Petrophysics of Naturally Fractured Reservoirs with a Link to Oil and Gas Productivity," Roberto Aguilera, keynote speaker; presented by invitation at the University of Manchester's North African Research Group Workshop on Naturally Fractured Reservoirs: Outcrop Analogues, Subsurface Studies and Case Histories, University of Manchester, England (January 12-13, 2011).
162. "Petrophysics of Multi-Porosity Tight Gas Reservoirs with a Link to Oil and Gas Productivity," Roberto Aguilera, presented by invitation at the Canadian Society for Unconventional Gas (CSUG) Technical Luncheon, Calgary, Canada (January 18, 2011).
163. "Optimizing Hydraulic Fracturing of Naturally Fractured Tight Gas Formations," SPE paper 142727 presented at the SPE Middle East Unconventional Gas Conference and Exhibition held in Muscat, Oman (31 January–2 February, 2011). Co-authors: Javier Leguizamon, Roberto Aguilera, ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).

164. "Shale Gas Series, Part 6, Influence of Technology on Shales Gas Development," CSPG Reservoir (February 2011). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
165. "Original-Gas-In-Place Sensitivity Analysis of the Manville Group in the Western Canada Sedimentary Basin," SPE paper 142349-PP presented at the 2011 Production and Operations Symposium held in Oklahoma City, Oklahoma (27 - 29 March 2011). Co-authors: O. M. Contreras, Roberto Aguilera, ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
166. "Shale Gas Series, Part 7, Shale Gas Production Analysis and Forecasting," CSPG Reservoir (March 2011). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
167. "Shale Gas Series, Part 8, Shale Gas Development Optimization," CSPG Reservoir (April 2011). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
168. "Shale Gas Series, Part 9, Comparison of Shale Basins, Original Gas-in-Place, Resources and Reserves," CSPG Reservoir (May 2011). Co-authors: Roberto Aguilera, R. J. Spencer, P.K. Pedersen and C.R. Clarkson.
169. "Tight Gas Commingled Completions: Hydraulic Fracturing and Gas Production Allocation," Roberto Aguilera, poster presented at the Tight Gas Completions SPE ATW held in Banff, Canada (May 3-5, 2011). Co-authors: Hui Deng and Javier Leguizamon.
170. "Modeling Fractured Horizontal Wells as Dual Porosity Composite Reservoirs - Application to Tight Gas, Shale Gas and Tight Oil Cases," SPE paper 144057-PP presented at the 2011 SPE Western Regional Meeting held in Anchorage, Alaska (7 - 11 May 2011). Co-authors: I. G. Brohi, Mehran Pooladi-Darvish, Roberto Aguilera, ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
171. "Petrophysics of Triple Porosity Tight Gas Reservoirs with a Link to Gas Productivity," Roberto Aguilera, SPE paper 144590-PP presented at the 2011 SPE Western Regional Meeting held in Anchorage, Alaska (7 - 11 May 2011). Co-authors: Hui Deng and Javier Leguizamon. SPE Reservoir Evaluation & Engineering – Formation Evaluation (October 2011). ([Refereed Journal](#)).

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173. "Flow Units for Shale Gas Formations: An Innovative Vision," Roberto Aguilera, presented at the CSPG-CSEG-CWLS Joint Annual Convention held in Calgary, Canada (May 9-13, 2011).
174. "Upper Monteith and Lower Beattie Peaks at the Sinclair and Albright fields in West Central Alberta: Some Views into the Reservoir Properties," presented at the Core Conference of the CSPG-CSEG-CWLS Joint Annual Convention held in Calgary, Canada (May 9-13, 2011). Co-authors: N. Solano, C. Clarkson, F.F. Krause, Roberto Aguilera, ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
175. "Cementation Exponent Estimation for Complex Carbonate Reservoirs Using a Triple Porosity Model," SPE paper SAS-825 presented at the SPE Saudi Arabia Section/Dahran Geoscience Society (DGS) Annual Technical Symposium and Exhibition held in Al Khobar, Saudi Arabia (May 15-18, 2011). Co-authors: Ali Al-Ghamdi and C. R. Clarkson ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
176. "Unlocking Shale Gas Reservoirs in the Middle East," presented by invitation, Panelist at the Panel Discussion of the 2011 SPE/DGS Annual Technical Symposium and Exhibition (ATS&E) held in Al Khobar, Saudi Arabia (May 15-18, 2011). Panelists: Brian Gratto (Exploration Manager, Aramco), Peter Richter (Vice-president of Marketing and Technology, Schlumberger), David Kemekhem, Manager of Unconventional Gas, Exxon-Mobil, Mathieu Neagel, Manager of Unconventional Resources, Total and Roberto Aguilera, Schulich School of Engineering, University of Calgary).
177. "Pore Pressure Prediction in an Abnormally Sub-Pressured Basin: Case Study in the Western Canada Sedimentary Basin," paper ARMA 11-456 presented at the 45th US Rock Mechanics / Geomechanics Symposium held in San Francisco, California (June 26-29, 2011). Co-authors: O. M. Contreras, A. N. Tutuncu, G. Hareland and Roberto Aguilera, ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
178. "Investigating the Effect of Sorption Time on Coalbed Methane Recovery through Numerical Simulation," [Fuel](#) (Elsevier). Co-authors: Ali S. Ziarani,

- Roberto Aguilera, and C. R. Clarkson (July, 2011). ([Refereed Journal](#)).
179. "Knudsen Permeability Correction for Tight Porous Media," Transport in Porous Media (Springer). Co-authors: Ali S. Ziarani, Roberto Aguilera (September 16, 2011). ([Refereed Journal](#)).
180. "Use of Pickett Plots for Evaluation of Shale Gas Formations," SPE paper 146948-PP presented at the 2011 SPE Annual Technical Conference and Exhibition (ATCE) held in Denver, Colorado (30 October - 2 November, 2011). Co-authors: Guang Yu, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
181. "An Integrated Workflow for Reservoir Modeling and Flow Simulation of the Nikanassin Tight Gas Reservoir in the Western Canada Sedimentary Basin," SPE paper 146953-PP presented at the 2011 SPE Annual Technical Conference and Exhibition (ATCE) held in Denver, Colorado (30 October - 2 November, 2011). Co-authors: Hui Deng, Roberto Aguilera, Tony Settari ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
182. "GFREE Research Program," SPE paper 147282-PP presented at the 2011 SPE Annual Technical Conference and Exhibition (ATCE) held in Denver, Colorado (30 October - 2 November 2011). Co-authors: Roberto Aguilera, Thomas Harding ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
183. "A Multiple-Porosity Model for Evaluation of Giant Naturally Fractured Gas Sandstone Reservoirs in Bolivia," SPE paper 147511-PP presented at the 2011 SPE Annual Technical Conference and Exhibition (ATCE) held in Denver, Colorado (30 October - 2 November 2011). Co-authors: Livia Sivila, Ramona Graves and Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
184. "Why Not to Base Economic Evaluations on Initial Production Alone," SPE paper 148680 presented at the 2011 CSUG/SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (15 - 17 November 2011). Co-authors: Robert S. Taylor, Roberto Aguilera, and others ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
185. "An Innovative Approach for Pore Pressure Prediction and Drilling Optimization in an Abnormally Sub-Pressured Basin," SPE paper 148947

presented at the 2011 CSUG/SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (15 - 17 November 2011). Co-authors: Oscar Contreras, Geir Hareland, Roberto Aguilera, SPE Drilling & Completion (December 2012) ([Refereed Journal](#)).

186. "Effect of Natural Fracture Density on Production Variability of Individual Wells in the Tight Gas Nikanassin Formation," SPE paper 149222 presented at the 2011 CSUG/SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (15 - 17 November, 2011). Co-authors: Laureano Gonzalez, Roberto Aguilera. Published in SPE Journal of Canadian Petroleum Technology (March 2013). ([Refereed Journal](#)).
187. "A New Unified Diffusion-Viscous Flow Model Based on Pore Level Studies of Tight Gas Formations," SPE paper 149223 presented at the 2011 CSUG/SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (15 - 17 November 2011). Co-authors: Mohammad Rahmanian, Roberto Aguilera and Apostolos Kantzas. SPE Journal (February 2013) ([Refereed Journal](#)).
188. "Integration of Seismic Data and a triple Porosity Model for Interpretation of Tight Gas Formations in the Western Canada Sedimentary Basin," SPE paper 149496 presented at the 2011 CSUG/SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (15 - 17 November, 2011). Co-authors: Fernando Castillo, Roberto Aguilera and Don Lawton ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
189. "World Natural Gas Endowment as a Bridge towards Zero Carbon Emissions," presented at the 3rd International Association for Energy Economics (IAEE) Asian Conference, Kyoto, Japan (20-22 February 2012). Co-authors: Roberto F. Aguilera and Roberto Aguilera.
190. "Indexation and Normalization Modeling of Natural Gas Endowment." Co-authors: Roberto F. Aguilera and Roberto Aguilera. Mathematical Geosciences" (Springer). (April 2012). ([Refereed Journal](#)).
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274. "Improved Liquids Recovery from Shale Reservoirs by Gas Injection," Roberto Aguilera, presented at the SPE Reservoir Evaluation and Production Optimization luncheon held in Calgary, Alberta (September 19, 2017).
275. "Moveable Oil Detection in a Shale Reservoir by Integrating Simultaneously Geochemical, Petrophysical and Geomechanical Models Developed from Well Logs and Laboratory Tests," presented at Congreso Colombiano del Petróleo organized by ACIPET, Bogotá, Colombia (October 18-20, 2017). Co-Authors: Jaime Piedrahita, Roberto Aguilera.
276. "Linking the Emerging Mexican Eagle Ford Shale in Burgos Basin with the Eagle Ford in Mexico," presented at EAGE/AMGP/AMGE in Mexico City (23-24 November 2017). Co-authors: Marcela Cruz Luque, Roberto Aguilera.
277. "Revisiting the Long-Run Energy Mix with The Global Energy Market Model (GEM)," Springer *Mineral Economics*, (May 2018). Co-authors: Roberto F. Aguilera, Roberto Aguilera, Roberto Aguilera ([Refereed Journal](#)).
278. "Forecasting the Performance of Multiporosity Shale Oil Reservoirs Under Primary Recovery and Huff-and-Puff Gas Injection Using a New Material Balance Technique," paper SPE 189783 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). Co-authors: Daniel Orozco, Karthik Selvan, Roberto Aguilera, Roberto Aguilera, ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
279. "Breaking a Paradigm: Can Oil Recovery from Shales be Larger Than Oil Recovery from Conventional Reservoirs? The Answer Is Yes!" paper SPE 189784 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). Co-authors: Alfonso Fragoso, Karthik Selvan, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
280. "Determination of Thermal Maturity and Maturation Trajectories in Shale Petroleum Reservoirs with the Use of Modified Pickett Plots," paper SPE 189791 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). Co-authors:

Bukola Olusola Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).

281. "Eagle Ford and Pimienta Shales in Mexico: A Case Study," paper SPE 189797 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). Co-authors: Marcela Cruz, Roberto Aguilera. SPE Reservoir Evaluation & Engineering (November 2019). ([Refereed Journal](#)).
282. "A New Simple Analytic Equation for Estimating Asymmetric Growth of Stimulated Reservoir Volume in Anisotropic Shale Petroleum Reservoirs using Microseismic Data," paper SPE 189812 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). SPE Production and Operations (November 2019), SPE 189812-PA. Co-authors: Qi Li, Roberto Aguilera ([Refereed Journal](#)).
283. "3D Geomechanical Modeling in the Complex Fracture Network of the Horn River Shale: Permeability Evolution and Depletion." paper SPE 189795 prepared for presentation at the SPE Unconventional Resources Conference held in Calgary, Alberta, Canada (13-14 March 2018). Co-authors Edgar Urban, Claudio Virues, Roberto Aguilera, ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
284. "An Investigation on the Feasibility of Combined Refracturing of Horizontal Wells and Huff and Puff Gas Injection for Improving Oil Recovery from Shale Petroleum Reservoirs." Paper SPE 190284 prepared for the SPE Improved Oil Recovery Conference, Tulsa, Oklahoma, USA (14-16 April 2018). Co-authors: Alfonso Fragoso, Karthik Selvan, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
285. "Parametric Probabilistic Models for Fluid Diffusivity Inversion and Forward Microseismic Generation Using Seismicity Rates." Paper SPE 190018-MS prepared for presentation at the SPE Western Regional Meeting, Garden Grove, California, USA (22-27 April 2018). Co-authors: Qi Li, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
286. "Optimization of Horizontal Wellbore Trajectory and Placement of Hydraulic Fracturing Stages in Tight Heterogeneous Gas Condensate Reservoirs Using Derivative Free Algorithms." Paper SPE 190071-MS prepared for presentation

- at the SPE Western Regional Meeting, Garden Grove, California, USA (22-27 April 2018). Co-authors: Bukola Olusola, Roberto Aguilera ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
287. "Unsupervised Statistical Learning with Integrated Pattern-Based Geostatistical Simulation." Paper SPE 190087-MS prepared for presentation at the SPE Western Regional Meeting, Garden Grove, California, USA (22-27 April 2018). Co-authors: Qi Li, Roberto Aguilera ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).
288. "Breaking a Paradigm: Can Oil Recovery from Shales be Larger Than Oil Recovery from Conventional Reservoirs? The Answer Is Yes," Best of SPE Papers Presented at the SPE Co-located Conferences, GEOCONVENTION, Canadian Society of Petroleum Geologists CSPG, Canadian Society of Exploration Geophysicists CSEG, Calgary, Alberta (May 7-9, 2018). Co-authors: Alfonso Fragoso, Karthik Selvan, Roberto Aguilera.
289. "Improved Oil Recovery from Shale Reservoirs by Huff and Puff Gas Injection," Roberto Aguilera, prepared for presentation at the International Symposium on Carbonate and Unconventional Oil and Gas Reservoir Development, PetroChina Research Institute of Petroleum Exploration & Development, RIPED, Beijing, Peoples Republic of China (July 24-27, 2018).
290. "Physics-Based Fluid Flow Modeling of Liquids-Rich Shale Reservoirs Using a 3D 3-Phase Multiporosity Numerical Simulation Model." SPE 191459-MS prepared for presentation at the SPE Annual Technical Conference and Exhibition held 24 – 26 September 2018 in Dallas, Texas, USA. Co-authors: Bruno Lopez Jimenez, Roberto Aguilera. [SPE Reservoir Evaluation & Engineering](#) (November 2019) ([Refereed Journal](#)).
291. "Eagle Ford Huff and Puff Gas Injection Pilot: Comparison of Reservoir Simulation, Material Balance and Real Performance of the Pilot Well." SPE 191575-MS prepared for presentation at the SPE Annual Technical Conference and Exhibition held 24 – 26 September 2018 in Dallas, Texas, USA. Co-authors: Alfonso Fragoso, Daniel Orozco, Graham Noble, Karthik Selvan, Roberto Aguilera. [SPE Reservoir Evaluation & Engineering](#) (February 2020). ([Refereed Journal](#)).
292. "Geochemical Productivity Index, Igp: An Innovative Way to Identify

- Potential Zones with Moveable Oil in Shale Reservoirs." SPE 191644-MS prepared for presentation at the SPE Annual Technical Conference and Exhibition held 24 – 26 September 2018 in Dallas, Texas, USA. Co-authors: Jaime Piedrahita, Roberto Aguilera. SPE Reservoir Evaluation & Engineering (November 2019). [\(Refereed Journal\)](#).
293. "Temporal Scale Analysis of Shale Gas Dynamic Coupling Flow." Fuel Journal (Elsevier) (March 2019). Co-authors: Binglin Li, Yuliang Su, Xianwen Li, Wendong Wang, Maen M. Husein, Roberto Aguilera. [\(Refereed Journal\)](#).
294. "A Correlation for Estimating Biot Coefficient." SPE195359-PA prepared for presentation at the SPE Western Regional Meeting held 23 - 26 April 2019 in San Jose, California, USA. June 2020. SPE Drilling and Completion. Co-authors: Qi Li, Roberto Aguilera, Heber Cinco-Ley [\(Refereed Journal\)](#).
295. "Matching of Pilot Huff-and-Puff Gas Injection Project in the Eagle Ford Shale Using a 3D 3-Phase Multiporosity Numerical Simulation Model." SPE 195822-MS prepared for presentation at the SPE Annual Technical and Conference exhibition in Calgary, Canada (Sept 30-Oct 2, 2019). Co-authors: Alfonso Fragoso, Bruno Lopez Jimenez, Graham Noble, Roberto Aguilera, Roberto Aguilera [\(Refereed Abstract, Full Paper in Conference Proceedings\)](#).
296. "Revisiting the Role of Natural Gas as a Transition Fuel." Springer Mineral Economics (July 2020). Co-authors: Roberto F. Aguilera, Roberto Aguilera [\(Refereed Journal\)](#).
297. "A New Approach for Geomechanical Evaluations with Modified Pickett Plot," SPE 198936-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Mohammadreza Malaieri, Raya Matorian, Roberto Aguilera [\(Refereed Abstract, Full Paper in Conference Proceedings\)](#). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).**
298. "Migration of Liquid Hydrocarbons in Organic-Rich Reservoirs based on Geochemical and Well Log Analysis Explained with the use of New Practical Model," SPE 198938-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Jaime Piedrahita, Roberto Aguilera [\(Refereed Abstract, Full Paper in Conference Proceedings\)](#). **Postponed due to COVID-19.**

Presented at Virtual LACPEC (July 27-31, 2020).

299. "Integration of Petrophysics and Biot Poroelastic Coefficient in Pickett Plots," SPE 198959-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Bukola Olusola, Roberto Aguilera and Heber Cinco Ley ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).**
300. "Improving Recovery By Huff And Puff Gas Injection In Shale Oil Reservoirs," SPE 199028-PA prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Bukola Olusola, Daniel Orozco, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).** Published in SPE Reservoir Evaluation and Engineering, February 2021 ([Refereed Journal](#)).
301. "Effect of Oil Price on Oil Production," SPE 199064-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Roberto F. Aguilera, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).**
302. "Naturally Fractured Reservoirs and their Link to Tight and Shale Petroleum Reservoirs," Roberto Aguilera, SPE 199073-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020) ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).**
303. "Machine learning Applied to SRV Modeling, Fracture Characterization, Well Interference and Production Forecasting in Low Permeability Reservoirs," SPE 199082-MS prepared for presentation at the SPE Latin American and Caribbean Petroleum Conference (LACPEC) in Bogota, Colombia (March 17-19, 2020). Co-authors: Edgar Urban-Rascon, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual LACPEC (July 27-31, 2020).**

304. "Hydraulic Fracturing Modeling, Fracture Network and Microseismic Monitoring," SPE-199976-MS prepared for presentation at the SPE Unconventional Resources Conference in Calgary, Alberta, Canada. Co-authors: Edgar Urban Rascon, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual Unconventional Resources Conference (28 Sept – 2 Oct 2020).**
305. "Permeability of Tight Sand And Shale Formations: A Dual Mechanism Approach For Micro And Nanodarcy Reservoirs," SPE-200010-MS prepared for presentation at the SPE Unconventional Resources Conference in Calgary, Alberta, Canada. Co-authors: Ali Ziarani, Roberto Aguilera and Albert Cui ([Refereed Abstract, Full Paper in Conference Proceedings](#)). **Postponed due to COVID-19. Presented at Virtual Unconventional Resources Conference (28 Sept – 2 Oct 2020).**
306. "Temporal Scale Analysis of Gas Flow in Tight Gas Reservoirs considering the Nonequilibrium Effect," Geofluid Journal (April 2021). Co-authors: Binglin Li, Yuliang Su, Maen Husein, Roberto Aguilera, and Mingjing Lu ([Refereed Journal](#)).
307. "A New Pore Pressure Prediction Model for Naturally Fractured Shales and Stacked Plays: The Effect of Active Hydrocarbon Generation - A Powder River Basin Case Study," prepared for presentation at the 2021 Unconventional Resources Technology Conference (URTeC) in Houston, Texas. Co-authors: Daniel Orozco Ibarra and Roberto Aguilera (26-28 July 2021). ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
308. "Improving Oil Recovery from Shale Reservoirs by Huff and Puff Gas Injection," Special Session at Asia Pacific SPE/IATMI APOGCE (October 14, 2021). Presenter: Roberto Aguilera
309. "Vaca Muerta: An Emerging Shale Petroleum Reservoir," SPE-205573-MS, presented at the virtual SPE/IATMI Asia Pacific Oil & Gas Conference and Exhibition (12 – 14 October 2021). Co-authors: Rahimah Abd Karim, Roberto Aguilera ([Refereed Abstract, Full Paper in Conference Proceedings](#)).
310. "From Petroleum System Evaluation to Geomodeling, Production Forecasting and Reserves Determination in Unconventional Reservoirs,"

paper URTEC-208389-MS presented at the virtual Asia Pacific URTeC (16 – 18 November 2021). Co-authors: Cristhian F. Aranguren Silva, Antonio Ch. S. Gomes, Roberto Aguilera ([Refereed Abstract](#), [Full Paper in Conference Proceedings](#)).

311. "Evaluacion del Potencial de Aceite en el Cretacico Medio del Campo A, por Medio del Uso de Registros Geofisicos, Revista Petrolera, Colegio de Ingenieros Petroleros de Mexico (December 2021). Co-authors: Brenda L. Azuara Diliegros and Roberto Aguilera.
312. "Characterization of the Giant Chicontepec Tight Oil Paleochannel in Mexico and Integration with Actual Cumulative Oil Production," Paper SPE-208888-MS presented at the SPE Canadian Energy Technology Conference, Calgary Canada (March 16-17, 2022). Co-authors: Alejandra Gutierrez Oseguera and Roberto Aguilera.
313. "A New Method for Determination of Rock Fabric Number from Well Logs in Unconventional Tight Oil Carbonates," Paper SPE-208893-MS presented at the SPE Canadian Energy Technology Conference, Calgary Canada (March 16-17, 2022). Co-authors: Brenda Azuara Diliegros and Roberto Aguilera.
314. "Method for Drawdown Analysis of a Multi-stage Hydraulically Fractured Horizontal Well That Penetrates an Unconventional Naturally Fractured Reservoir," Paper SPE-208926-MS presented at the SPE Canadian Energy Technology Conference, Calgary Canada (March 16-17, 2022). Co-authors: Alejandra Gutierrez Oseguera and Roberto Aguilera.
315. "Sequence-to-Sequence (Seq2Seq) Long Short-Term Memory (LSTM) for Oil Production Forecast of Shale Reservoirs," paper URTeC: 3722179 presented at the Unconventional Resources Technology Conference held in Houston, Texas, USA (20-22 June 2022). Co-authors: Cristhian Aranguren, Alfonso Fragoso and Roberto Aguilera.
316. "Geological Containment vs. Well Containment for Huff and Puff (H&P) Gas Injection in Shale Oil Reservoirs," paper URTeC: 3723651 presented at the Unconventional Resources Technology Conference held in Houston, Texas, USA (20-22 June 2022). Co-authors: Xiaolin, Alfonso Fragoso and Roberto Aguilera.

INTERNET ARTICLES

I have authored/co-authored the following review articles for Servipetrol's web site (<http://www.servipetrol.com>):

1. "How Big is Fracture Porosity?" Technical Note # 1 (December 29, 1995).
2. "Hydrocarbon Production from Naturally Fractured Granite," Technical Note # 2 (April 18, 1996).
3. "Undiscovered Naturally Fractured Reservoirs," Technical Note # 3 (August 9, 1996).
4. "Oil and Gas Reserves in Naturally Fractured Reservoirs," Technical Note # 4 (October 15, 1996).
5. "The Power of Natural Fractures," Technical Note # 5 (January 2, 1997).
6. "Oil Production from Volcanic Rocks," Technical Note # 6 (March 16, 1998).
7. "Pitfalls in the Evaluation of Naturally Fractured Reservoirs," Technical Note # 7 (April 1998).
8. "Fracture Compressibility," Technical Note # 8 (November 23, 1999).
9. "Oil and Gas Recovery Factors in Naturally Fractured reservoirs," Technical Note # 9 (September 22, 2000).
10. "Recognizing Natural Fractures Not Intersected by the Wellbore," Technical Note # 10 (December 28, 2001).
11. "Net Pay in Naturally Fractured Reservoirs," Technical Note # 11 (May 2003).
12. "Dual and Triple Porosity Models for Petrophysical Evaluation of Naturally Fractured Reservoirs," Technical Note # 12 (July 24, 2004). Co-authored with Maria S. Aguilera and Roberto F. Aguilera.

IN-HOUSE COURSES

I have presented in-house petroleum engineering short courses worldwide for the following companies:

- 1.Sunmark Exploration Co. Irving, Texas
- 2.Intercol Bogota, Colombia
- 3.Instituto Mexicano del Petroleo Mexico City, Mexico
- 4.Delta Drilling Tyler, Texas
- 5.Conoco Ponca City, Oklahoma
- 6.Corpoven Maracaibo, Venezuela
- 7.Petro-Peru Lima, Peru
- 8.Amoco Denver, Colorado
- 9.Texaco Los Angeles, California
- 10.Inlab-YPF Buenos Aires, Argentina
- 11.Perez Companc Buenos Aires, Argentina
- 12.Arco Dallas, Texas
- 13.Shamrock Denver, Colorado
- 14.Phillips Petroleum Grand Junction, Colorado
- 15.Pemex Reynosa, Mexico
- 16.FLSTP Maracaibo, Venezuela
- 17.Casco S.A. Guatemala City, Guatemala
- 18.Chevron U.S.A. La Habra, California
- 19.Corpoven Caracas, Venezuela
- 20.Petrobras Rio de Janeiro, Brazil
- 21.Gulf Oil Company Bakersfield, California
- 22.Suez Oil Company Cairo, Egypt
- 23.Oil and Natural Gas Commission Dehra Dum, India
- 24.Japan Exploration Company Tokyo, Japan
- 25.Danish Energy Agency Copenhagen, Denmark
- 26.Montedison Milan, Italy
- 27.Pecten Syria Company Roumeilan, Syria
- 28.Getty Oil Houston, Texas
- 29.Gulf Oil E & P Co. Houston, Texas
- 30.BP Petroleum Development Ltd. London, England
- 31.Oil and Natural Gas Commission Madras, India
- 32.Ina-Naftaplin Zagreb, Yugoslavia
- 33.NIOC Ahwaz, Iran
- 34.Exxon Company U.S.A. Thousand Oaks, California
- 35.Occidental Bakersfield, California
- 36.Lawrence Allison & Assoc.(D.O.E.) Casper, Wyoming
- 37.Champlin Petroleum Denver, Colorado
- 38.Sohio Dallas, Texas
- 39.ARCO Anchorage, Alaska
- 40.Cepet Caracas, Venezuela

41. Kuwait Oil Company
 42. Indonesian Petroleum Association
 43. Texaco
 44. National Oil Corporation
 45. Instituto Colombiano del Petroleo
 46. Sirte Oil Company
 47. Petrocorp Exploration Ltd.
 48. Indian Oil and Gas
 49. Husky Oil Company
 50. Bankeno Resources
 51. Marathon Oil Company
 52. BP Resources Canada Limited
 53. Pennzoil Co.
 54. Marathon Oil Company
 55. Public Petroleum Corporation
 56. Apex Energy
 57. Proserca
 58. Texaco
 59. China National Pet. Corp.
 60. Turkish Petroleum Corporation
 61. Veba Oel
 62. Petro-Vietnam
 63. Southwest Petroleum Institute
 64. Bangladesh University of Engineering and Technology
 65. Amoco Exploration and Production
 66. Cuba Petroleo
 67. Burlington Resources
 68. Conex
 69. Society of Petroleum Engineers
 70. Instituto Argentino del Petroleo y del Gas
 71. BP Exploration
 72. Hocol
 73. GHK Colombia
 74. Cupet
 75. Canadian Occidental
 76. Astra
 77. QPDTRC
 78. PetroCanada
 79. Perez Companc
- Ahmadi, Kuwait
Jakarta, Indonesia
Midland, Texas
Tripoli, Libya
Bucaramanga, Colombia
Brega Field, Libya
Wellington, New Zealand
Calgary, Canada
Calgary, Canada
Calgary, Canada
Cody, Wyoming
Calgary, Canada
Houston, Texas
Midland, Texas
Athens, Greece
Calgary, Canada
Maracaibo, Venezuela
Denver, Colorado
Beijing, China
Gulluk, Turkey
Gelsenkirchen, Germany
Vung Tau, Vietnam
Nanchong, China
- Dakha, Bangladesh
Tulsa, Oklahoma
Ciego de Avila, Cuba
Farmington, New Mexico
Lima, Peru
Calgary, Canada
- Buenos Aires, Argentina
Aberdeen, Scotland
Bogota, Colombia
Bogota, Colombia
Habana, Cuba
Calgary, Canada
Neuquen, Argentina
Gansu, China
Calgary, Canada
Neuquen, Argentina

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| 80.Aramco | Dhahran, Saudi Arabia |
| 81.Perez Companc | Talara, Peru |
| 82.Total | Paris, France |
| 83.Kufpec | Safat, Kuwait |
| 84.Petrobras Internacional | Bogota, Colombia |
| 85.Wintershell, Germany | Kassel, Germany |
| 86.Anderson Exploration | Calgary, Canada |
| 87.Canadian Forest | Calgary, Canada |
| 88.Kufpec | Jakarta, Indonesia |
| 89.Canadian Hunter | Calgary, Canada |
| 90.NExT | Tulsa, Oklahoma |
| 91.University of Calgary | Calgary, Canada |
| 92.Repsol-YPF | Santa Cruz, Bolivia |
| 93.ESP Oil Corporation | Margarita Island, Venezuela |
| 94.Al-Khafji Joint Operations | Al-Khafji, Saudi Arabia |
| 95.Repsol-YPF | Madrid, Spain |
| 96.ESP Oil Corporation | Maracaibo, Venezuela |
| 97.Shell International E & P | Rijswijk, The Netherlands |
| 98.MOL Hungarian Oil and Gas Plc. | Szolnok, Hungary |
| 99.Universidad Industrial de Santander | Bucaramanga, Colombia |
| 100.Pluspetrol S.A. | Tartagal, Argentina |
| 101.Petroleum University of Technology | Tehran, Iran |
| 102.ESP Oil - PDVSA | Tamare, Venezuela |
| 103.Unocal 86 | Jakarta, Indonesia |
| 104.Drillmar/Pemex | Villahermosa, Mexico |
| 105.Copyr y BVPA/Pemex | Comalcalco, Mexico |
| 106.Norsk Hydro | Oslo, Norway |
| 107.Rosneft Oil Company | Moscow, Russia |
| 108.Copyr y BVPA/Pemex | Veracruz, Mexico |
| 109.Petroleum Society of Canada | Calgary, Canada |
| 110.Empresa Petrolera Chaco | Santa Cruz, Bolivia |
| 111.Talisman Energy | Calgary, Canada |
| 112.Soc. of Petroleum Engineers (SPE) | Buenos Aires, Argentina |
| 113.Soc. of Explor. Geophysicists (CSEG) | Calgary, Canada |
| 114.Camara Boliviana Hidrocarb y Energia | Santa Cruz, Bolivia |
| 115.PDVSA/POES | Maracaibo, Venezuela |
| 116.PDVSA/POES | Lecheria, Venezuela |
| 117 Samson Resources | Tulsa, Oklahoma |
| 118 Maersk Oil | Copenhagen, Denmark |
| 119 Devon Energy | Oklahoma City, Oklahoma |
| 120 Skoltech | Moscow, Russia |

PUBLIC COURSES

I have instructed representatives of over 400 companies in short courses on "Naturally Fractured Reservoirs" that I have presented in Dallas, Houston, Denver, Golden, Calgary, London and other cities.

Adams Pearson Associates Ltd., Canada
AEC Oil & Gas, Canada
Agip Petroleum Company, Libya
Agoco, Libya
Alberta Oil Sands Authority, Canada
American Frontier Exploration, U.S.A.
American Minerals Corporation, U.S.A.
American Petrofina Co. of Texas, U.S.A.
Amerada Minerals Corporation, U.S.A.
Aminoil, U.S.A.
Amoco, Canada
Amoco Europe, Inc.
Amoco Netherlands Petroleum Company
Amoco Norway Oil Company
Amoco Production Company, U.S.A.
Anadarco Production Company, U.S.A.
Anderson Exploration Ltd., Calgary, Canada
Andex Oil Company, U.S.A.
ANR Production, U.S.A.
Apex Petroleum, Inc., U.S.A.
Aramco, Saudi Arabia
Arco Alaska, Inc., U.S.A.
Arco Exploration Company, U.S.A.
Arco International Oil & Gas Co., U.S.A.
Arco Oil & Gas Company, U.S.A.
ARGO Petroleum Company, U.S.A.
Arguello Inc., U.S.A.
Asamera Oil, U.S.A.
Asamera Inc., Canada
Astra Produccion Petrolera, Venezuela
Atomic Energy Establishment, England
Baker Hughes Oasis, Canada
Baroid, Libya
Barrett Resources Corporation, U.S.A.

BG Bolivia Corporation, Bolivia
B.M. Hester & Son, U.S.A.
B.P. Alaska Exploration, Inc., U.S.A.
B.P. Exploration, Colombia
B.P. Exploration, U.S.A.
B.P. Petroleum Development Brazil Ltd.
B.P. Resources, Canada
Bass Enterprises Production Co., U.S.A.
Beb Erdgas un Erdol GMBH, Germany
Bechtel Petroleum Operations, Inc., U.S.A.
Belco Petroleum of Peru
BG Bolivia Corporation, Bolivia
BHP Billiton Petroleum, London, U.K.
Bitech Petroleum Corporation, U.K.
Bligh Oil & Minerals N.L., Australia
Blue Sky Oil & Gas, Ltd., Canada
Brady Energy, U.S.A.
British Gas Corporation, England
British Petroleum, Canada
British Petroleum, Colombia
British Petroleum Exploration, England
Bow Valley Petroleum, Canada
Buckhorn Petroleum Company, Canada
Bumper Development Corporation, Canada
Burlington Resources, Canada
Burlington Resources, U.S.A.
Burns Operating, U.S.A.
Buttes Resources Company, U.S.A.
Cabre Exploration, Canada
Canada Cities Service, Canada
Canada Northwest Energy, Calgary
Canadian Forest Oil, Canada
Canadian Hunter Exploration Limited, Canada
Canadian Natural Resources, Canada
Canadian Occidental, Canada
Canadian Petroleum International Resources, Canada
Canadian Superior Oil Ltd., Canada
CanArgo Ltd., Republic of Georgia
Canterra Energy, Canada
Carless Exploration Ltd., England
Carpentaria Exploration Company Pty, Australia

Casco S.A., Guatemala
Cenex, U.S.A.
Central Canada Potash Inc., Canada
Champlin Petroleum Company, U.S.A.
Charterhouse Petroleum, England
Chautauqua Energy, Inc., Canada
Chevron Canada Resources, Canada
Chevron Overseas Petroleum, Inc., U.S.A.
Chevron U.S.A.
Cities Service Company, U.S.A.
Cities Service International, U.S.A.
Cities Service Oil & Gas Corporation, U.S.A.
Clayton Williams, U.S.A.
CNG Development Company, U.S.A.
CNG Producing Company, U.S.A.
Coamps, Guatemala
Coastal Oil and Gas Corporation, U.S.A.
Coles Gilbert Associates Ltd., Canada
Colorado National Bank of Denver, U.S.A.
Columbia Gas Development, U.S.A.
Columbia Gas Transmission Corporation, U.S.A.
Compton Petroleum Corporation, Canada
Computalog Ltd., Canada
Computer Modelling Group, Canada
Conoco, U.S.A.
Conoco Canada Limited, Canada
Conoco (U.K) Ltd., United Kingdom
Conoco Phillips Canada
Core Laboratories International, U.S.A.
Corexcal Inc., Canada
Corpoven, S.A., Venezuela
Crown Central Petroleum Corporation, U.S.A.
Czar Resources, U.S.A.
Danison Oil Corporation, Canada
Dansk Borelskab, Denmark
Dart Oil and Gas Corporation, U.S.A.
Delta Drilling Company, U.S.A.
Devon Energy Corporation, Canada
Diamond Shamrock Exploration Company, U.S.A.
Direccion General Minería & Hidrocarburos, Guatemala
Dome Petroleum Corporation, U.S.A.

Dome Petroleum, Ltd., Canada
Don E. Lawson Consulting, U.S.A.
Doran and Associates, Inc., U.S.A.
Dubai Petroleum Company, Dubai, U.A.E.
DUC, Denmark, Denmark
ECL, Canada
Ecopetrol, Colombia
Edwin L. Cox & Berry R. Cox, U.S.A.
EGEP Consultores, Venezuela
Elf Aquitaine, Guatemala
Ellora Energy Inc., U.S.A.
Encana, Canada
Encana Oil & Gas, Canada
Encana Oil & Gas (USA) Inc., U.S.A.
Energy Reserves Group, U.S.A.
Energy Resources Conservation Board, Canada
ENI Exploration Company, Italy
Enron Oil and Gas, U.S.A.
Enserch Exploration, U.S.A.
Ensign Oil and Gas, U.S.A.
Enstar Petroleum Inc., U.S.A.
Enviro Gas, U.S.A.
Environmental Conservation Board, Albany, N.Y.
EOG Resources, Inc., U.S.A.
Equitable Production, U.S.A.
Esau, Finn & Associates, Canada
Esso Exploration, U.S.A.
Esso Prospeccao, Brazil
Esso Resources, Canada
Exploration Consultants Ltd., England
Exxon Company, U.S.A.
Exxon Production Research Company, U.S.A.
First City Bank of Dallas, U.S.A.
Florida Exploration Company, U.S.A.
FLSTP, Venezuela
Forest Oil Corporation, U.S.A.
Fraser Oil Ltd., U.S.A.
Gaerhart Industries, Inc., U.S.A.
Gary Energy Corporation, U.S.A.
Gary-Williams Oil Producer Inc., U.S.A.
Gas Research Institute, U.S.A.

GBOC, Republic of Georgia
Geocrude Energy Inc., Canada
Geoquest, U.S.A.
Geotechnical Resources Ltd., Canada
Getty Oil Company, U.S.A.
Getty Oil Ltd., Canada
Grace Petroleum, U.S.A.
Grad & Walker Energy Corp., Canada
Glover Petroleum Consultants, U.S.A.
Golden Eagle Oil & Gas, Ltd., Canada
Greenhill Petroleum Corp., U.S.A.
Gribble Oil Corporation, U.S.A.
Gruy Engineering Corporation, U.S.A.
Gulf Canada Resources, Ltd., Canada
Gulf Oil Exploration & Production Company, U.S.A.
Gulf Research and Development Co., U.S.A.
Gulf Science and Technology Co., U.S.A.
Hailay Energy Corporation, U.S.A.
Harold W. Bertholf, Inc., U.S.A.
Harper Oil Company, U.S.A.
Hispanoil, Guatemala
Home Oil Company, Canada
HS Resources, U.S.A.
Hudson's Bay Oil and Gas Co., Canada
Hugh Reid and Associates, Inc., Canada
Hunt Oil Company, U.S.A.
Husky Oil, Canada
ICG Resources Ltd., Canada
ICI Petroleum Ltd., England
Idaho National Engineering Labs., U.S.A.
Idemitsu Oil and Gas Co., Japan
Imperial Oil, Canada
Inlab, Argentina
Inpeluz, Venezuela
Instituto Mexicano del Petroleo, Mexico
Integrated Petroleum Tech., Inc., U.S.A.
Intercol, Colombia
International Reservoir Technologies, Inc., U.S.A.
Intevep, Venezuela
Intercomp, U.S.A.
Ioris Valley Oil & Gas, Canada

Isle Resources, Inc., U.S.A.
Japan Oil Sands Company, Japan
Japex, Japan
John R. Wilson & Associates Inc., U.S.A.
Johnston-Mizel Oil Co.
Johnston Testers, Canada
Junex, Inc., Canada
Juniper Petroleum Corporation, U.S.A.
Kenridge Oil Company, U.S.A.
Kerr McGee Corporation, Canada
Kerr McGee, U.S.A.
Kufpec, Kuwait
Kuwait Oil Company, Kuwait
Lagoven, S.A., Venezuela
Lawrence-Allison, U.S.A.
Lone Star Gas Company, U.S.A.
Los Alamos National Laboratory, U.S.A.
Louisiana Land & Exploration Company, U.S.A.
Lewis Engineering Company, Canada
Maersk Olie Og Gas As, Denmark
McCormick Oil & Gas, U.S.A.
Magellan Petroleum Australia Ltd., Australia
Mapco Production Company, U.S.A.
Marathon Oil Company, U.S.A.
Maraven, Venezuela
McMoran Exploration Company, U.S.A.
Meneven, Venezuela
Meridian Oil, U.S.A.
Michael Petroleum Corporation, U.S.A.
Milestone Petroleum Inc., U.S.A.
Minerals Management Service, U.S.A.
Ministry of Energy, New Zealand
Mitchell Energy & Development, U.S.A.
Mobil Oil, Canada
Mobil Oil Corporation, U.S.A.
Mobil Oil Exploration and Producing Services, U.S.A.
Mobil Oil Indonesia, Inc.
Mobil Oil, Libya
Mobil Producing Netherlands Inc.
Monsanto Oil Company, U.S.A.
Montana Tech., U.S.A.

Morrison Petroleum, Canada
Mountain Fuel Supply Company, U.S.A.
Murphy Oil Company, Canada
National Energy Board, Canada
National Oil Corporation, Libya
Natomas, U.S.A.
New Mexico Tech., U.S.A.
Nexen Inc., Canada
Nexen Petroleum International, Canada
Norske Shell, Norway
Norsk Hydro, Norway
North Rock Resources, Canada
Northstar Energy Corporation, Canada
Novus West Asia Limited, United Arab Emirates
Occidental Exploration & Production Co., U.S.A.
Occidental of Libya
Occidental of Pakistan
Occidental of Peru
Occidental Petroleum, U.S.A.
Ocelot Industries Limited, Canada
Olsen Energy, U.S.A.
Oryx Energy Co., U.S.A.
Paladin Petroleum Corporation, Canada
Pan American Energy LLC, Argentina
Pan Canadian Petroleum Limited, Canada
Pangaea Petroleum Limited, Canada
Page Petroleum, U.S.A.
Parker & Parsley Petroleum Co., U.S.A.
Patrick Petroleum Company, U.S.A.
PDVSA-Intevep, Venezuela
Petronas Carigali, Malaysia
Pemex, Mexico
Pembina Resources Ltd., Canada
Pennzoil Company, U.S.A.
Peoples Natural Gas Co., U.S.A.
Perez Compañía, Argentina
Petro-Canada Inc., Canada
Petro-Canada Resources, Canada
Petrokazakhstan Kumol Resources, Kazakhstan
Petroleos del Peru
Petroleum, Inc., U.S.A.

Petroleum Research Center, Libya
Petro Lewis Corporation, U.S.A.
Petrus Operating Co., U.S.A.
Petroleos de Venezuela
Pfizer OFPD, U.S.A.
Philippines Cities Service, Philippines
Phillips Petroleum, U.S.A.
Pioneer Natural Resources, Calgary, Canada
Placid Oil Company, U.S.A.
Pluspetrol, Argentina
Poco Petroleum, Canada
Pogo Producing Company, U.S.A.
Ponderay Exploration Company Ltd., Canada
Preussag Ag Erdoel und Frdgas, Germany
Prodeco Exploration, Inc., U.S.A.
Quintin Little Oil Company, U.S.A.
Quitral Co., Argentina
Ray Holifield and Associates, Inc., U.S.A.
Republic Geothermal, Inc., U.S.A.
Resman Oil and Gas, Canada
River Gas Corporation, U.S.A.
River Rouge Minerals, Inc., U.S.A.
Rogoland Research Institute, Norway
Rosetta Exploration, Inc., Canada
Sabine Canada Ltd., Canada
Samedan Oil Corporation, U.S.A.
Samson Resources, U.S.A.
Samuel Gary Oil Producer, U.S.A.
Sandale Petroleum Consulting, Canada
Santa Fe Energy, U.S.A.
Santa Fe Minerals, Inc., U.S.A.
Saskoil, Canada
Saskatchewan Oil & Gas Corporation, Canada
Saudi Aramco, Saudi Arabia
Schlumberger, Canada
Schlumberger Log Service, England
Schlumberger Offshore Services, Indonesia
Schlumberger Overseas S.A.
Schlumberger Well Services, U.S.A.
Schroeder Oil Financing & Investments, U.S.A.
Seagull Energy, Canada

Seven Seas Petroleum, U.S.A.
Shell Canada Resources Ltd., Canada
Shell Capsa, Argentina
Shell International Inc., USA
Shell Oil Company, U.S.A.
Shell Research, The Netherlands
Shell Western E & P, U.S.A.
Shepherd Miller, Inc., U.S.A.
Sherritt International, Canada
Sirte Oil Company, Libya
Skoltech, Moscow, Russia
Sohio Alaska Petroleum Company, U.S.A.
Sohio Petroleum Company, U.S.A.
Soquip, Canada
Southern Alberta Institute, Canada
Southland Royalty Company, U.S.A.
Spectrum Oil & Gas Company, Canada
Sproule International Limited, Canada
Standard Oil Producing Co., U.S.A.
Statoil ASA, Norway
Stocke & Sittler, Inc., U.S.A.
Suburban Propane Gas Company, U.S.A.
Sun Exploration & Production Company, Canada
Suncor Inc., Canada
Sunmark Exploration Company, U.S.A.
Superior Oil Company, U.S.A.
Talisman Energy, Canada
TCPL Resources, U.S.A.
TCPL Resources, Canada
Tecpetrol, Argentina
Tecpetrol, Venezuela
Tenneco Oil, U.S.A.
Terra Resources, U.S.A.
Texaco Canada Resources, Canada
Texaco Inc., U.S.A.
Texas Eastern Corporation, U.S.A.
Texas Eastern Transmission Corp., U.S.A.
Texas Petro Tech., U.S.A.
Tex/Con Oil and Gas, U.S.A.
The Exploration Co., U.S.A.
The Lanape Resources Corporation, U.S.A.

The Reserve Petroleum Company, U.S.A.
TMR Exploration, U.S.A.
Tom Brown, Inc., U.S.A.
Total, France
Trafalgar House Oil & Gas Ltd., England
Transco Exploration Co., Canada
Trans Ocean Oil, U.S.A.
Tricentrol Oil Corporation Ltd., U.S.A.
Tri-Ener-Tech Petroleum Services Ltd., Canada
Triple Dee Drilling Co., U.S.A.
Tricentrol, U.S.A.
Tundra Oil and Gas, Canada
UAB Minijos Nafta, Lithuania
Union Oil Company of California, U.S.A.
Union Oil Company of Canada
Union Pacific Resources, U.S.A.
Union Texas Petroleum Corporation, U.S.A.
United Canso Oil and Gas, Canada
Universal Well Services, Inc., U.S.A.
Universidad del Zulia, Venezuela
University of Wyoming, U.S.A.
Unocal, U.S.A.
Unocal Limited, Canada
Unocal Netherlands B.V.
U.S. Energy
Vastar Resources Inc., U.S.A.
Venoco Inc., U.S.A.
Veritas DGC Inc., Canada
Vessels Oil and Gas Co., U.S.A.
Wascana Energy, Inc., Canada
Welex, Argentina
Western Mining Corporation Limited, Australia
William Brothers Energy, Co., U.S.A.
Williams Exploration Co., U.S.A.
Wintershall, Germany
Yacimientos Petroliferos Fiscales, Argentina
Yates Petroleum Corporation, U.S.A.
Zueitina Oil Company, Libya