
SUBIR K. SANYAL

PRESENT POSITION

President and Manager of Reservoir Engineering Services

EXPERTISE

- Management of geothermal field development and operation
- Assessment and numerical simulation of geothermal reservoirs
- Economic evaluation and risk analysis
- Review and negotiation of power sales and power purchase contracts
- Supervision and training of geothermal reservoir engineers
- Software development

EDUCATION

Ph.D. in Petroleum Engineering, Stanford University, 1971

M.S. in Petroleum Engineering, Birmingham University (England), 1967

M.S. in Applied Geology, Indian Institute of Technology, 1966

First language: English; speaks and reads Spanish; reads Russian.

EXPERIENCE

GeothermEx, Inc., 1980 - present

- Joined GeothermEx, Inc. in 1980 as Vice President of Reservoir Engineering, and became President in 1995. Directs a staff of drilling engineers, reservoir engineers, computer scientists and well-test specialists in the testing, analysis, numerical modeling, development and operation of geothermal reservoirs.
- Conducted reservoir engineering studies of most geothermal fields which have been explored or developed to date in the United States for a total installed capacity of approximately 3,000 MW, including those in California, Nevada, Idaho, Utah and Hawaii. He has performed resource analyses in 20 other countries with proven geothermal fields, for international funding agencies, government agencies, private developers, financial institutions, and electric utilities: Canada, Mexico, Nicaragua, Costa Rica, Guatemala, El Salvador, Italy, Yugoslavia, Bulgaria, Republic of Georgia,

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Portugal, Kenya, Japan, Indonesia, India, New Zealand, China, Taiwan, and The Philippines.

- Either conducted himself or supervised numerical simulation of more than 40 geothermal fields to date: Tiwi and McBan in the Philippines; Kokubu, Hakkoda, Minami Aizu, Niseko, Okuaizu, Takigami, Onikobe, Uenotai, Otake and Wasalizawa in Japan; Latera and Mofete in Italy; Zunil and Amatitlan in Guatemala; Miravalles and Las Pailas in Costa Rica; Cerro Prieto, Los Azufres, Los Humeros and Las Tres Virgenes in Mexico; Lihir Island in Papua New Guinea; Ribeira Grande/Pico Vermelho in Portugal; The Geysers, Coso, Salton Sea, Heber, East Mesa, South Brawley and Mammoth in California; Roosevelt Hot Springs in Utah; Desert Peak, Soda Lake, Stillwater, Steamboat Springs, Beowawe and Dixie Valley in Nevada, and Puna in Hawaii.
- His involvement as resource consultant for financial institutions has led to more than US\$10,000,000,000 in geothermal project financing, for a total installed capacity of over 6,000 MW. Has provided due diligence for numerous international and U.S. banks, such as, Barclay's Bank, Credit Suisse, Swiss Bank Corporation, Deutsche Bank, Bankers Trust, Morgan Guaranty Trust Company, Prudential Capital Corporation, Citibank, Fuji Bank, Bank of New England, Union Bank of California, Hudson United Bank, Merrill Lynch, Westinghouse Credit Corporation, General Electric Capital Corporation, Chrysler Capital Corporation, AT&T Capital and Newcourt Capital. Has conducted economic evaluation, risk analysis and contract review, and has taken part in contract negotiations for many geothermal power development projects in the U.S. and abroad.
- Invited speaker at numerous conferences, seminars and training courses offered by the Geothermal Resources Council and other industry organizations. Has conducted technology transfer and training courses in petroleum or geothermal engineering in the U.S., Bolivia, Brazil, Costa Rica, Greece, Italy, Portugal, Japan and The Philippines, where he was chief technical advisor in reservoir engineering to the United Nations Development Programme from 1981 to 1985.
- Author of or contributor to several geothermal technology manuals, including: "NEDO Well Test Manual" for the New Energy Development Organization (an agency of the Japanese government); "Reservoir Engineering Assessment of Geothermal Systems", published by Electrical Power Research Institute (EPRI); "Handbook of Geothermal Well Log Interpretation", published by the Society of Professional Well Log Analysts; "Low-to-Moderate Temperature Hydrothermal Reservoir Engineering Handbook", published by the US Department of Energy.
- Consultant to public organizations, such as the US Environmental Protection Agency, California Department of Water Resources, California Energy Commission, US Department of Energy, Lawrence Berkeley Laboratory, Lawrence Livermore Laboratory, Idaho National Laboratory, Los Alamos Scientific Laboratory, Electrical Power Research

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Institute, United Nations, and private organizations, such as petroleum and geothermal companies, utilities and financial institutions.

Manager, Stanford University Petroleum Research Institute, 1977 - 1980

- Administration and technical supervision of contract research in oil recovery processes.
- Design and execution of a five-year field pilot program for *in situ* foaming to increase oil recovery by steam injection.
- Research and development in various areas of reservoir engineering, well logging and well test interpretation techniques.

Consulting Professor, Petroleum Engineering, Stanford University, 1977 - 1985

- Graduate and undergraduate teaching of three reservoir engineering courses per year (one-third-time appointment).

Vice President, Geonomics, Inc., Berkeley, California, 1975 - 1977

- Management of all reservoir engineering and well logging services.
- Administration of geothermal projects.
- Research and development in reservoir engineering and well logging.

Senior Staff Specialist (Petroleum Engineer), US Geological Survey, New Orleans, 1975

- Training of USGS engineers and geologists in reservoir engineering.
- Research and development in reservoir engineering and well logging.
- Computer simulation of offshore oil and gas reservoirs, Louisiana.

Consulting Engineer, Scientific Software Corporation, Denver, 1974 - 1975

- Training of geologists and engineers in reservoir simulation under contract to the U.S. Geological Survey.
- Research and development in reservoir engineering and well logging.
- Computer simulation of water coning in an Indonesian oil field.

Senior Petroleum Engineer, Texaco, Inc., Houma, Louisiana and Houston, Texas, 1969 - 1974

- Reservoir engineering, numerical simulation and well log interpretation.
- Engineering studies of deep oil and gas wells.
- Designing workover and drilling programs.
- Field engineering.

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- Design of monitoring programs for enhanced oil recovery.
- Research and development in reservoir engineering and well logging.

OTHER ACHIEVEMENTS

- Member of the Board of Directors, Geothermal Resources Council, Davis, California.
- Former member of the Board of Directors, Geothermal Energy Association, Washington, D.C.
- Former member of the Board of Directors, International Geothermal Association, Pisa, Italy.
- Former Editor, "The Log Analyst" (publication of the Society of Professional Well Log Analysts, Houston, Texas).
- Presented 40 technical short courses on various aspects of geothermal industry.
- Winner of Geothermal Resources Council's "Best Paper Award" in 1982, 2000, 2001 and 2004 (as a co-author).
- Author of nearly 100 technical publications.
- Winner of the Joseph W. Aidlin Award, 1997, for "outstanding contribution to the Geothermal Resources Council and to the development of geothermal energy."
- Former member of the Board of Directors, John Muir Land Trust (an environmental land trust).
- Former member of the Board of Directors, California Rare Fruit Growers.
- Has been an expert witness in two-dozen litigations and arbitrations.
- Has published a dozen articles on rare fruit growing and wild edibles.
- Writes stories, essays and poems.

CITIZENSHIP

USA

SELECTED PUBLICATIONS

Dr. Sanyal has published more than 100 technical papers on reservoir engineering and related topics, a list of which follows:

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“Net Power Capacity of Geothermal Wells Versus Reservoir Temperature – A Practical Perspective,” The 32nd Stanford Geothermal Workshop, Stanford, California, January 2007 (with James Morrow and Steven Butler)

“Cost of Electricity from Enhanced Geothermal Systems,” The 32nd Stanford Geothermal Workshop, Stanford, California, January 2007 (with James Morrow, Steven Butler and Ann Robertson-Tait)

“Booking Geothermal Energy Reserves,” Annual Meeting of the Geothermal Resources Council Annual Meeting, 2005 (with Zosimo Sarmiento)

“An Alternative and Modular Approach to Enhanced Geothermal Systems,” World Geothermal Congress, Antalya, Turkey, April 2005 (with Eduardo E. Granados, Steven J. Butler and Roland N. Horne)

“An Analysis of Power Generation Prospects from Enhanced Geothermal Systems,” World Geothermal Congress, Antalya, Turkey, April 2005 (with Steven J. Butler)

“Cost of Geothermal Power and Factors that Affect it,” World Geothermal Congress, Antalya, Turkey, April 2005

“Optimization of Power Generation from Moderate Temperature Geothermal Systems – A Case History,” World Geothermal Congress, Antalya, Turkey, April 2005 (with Kevin Kitz and Douglas Glaspey)

“Numerical Simulation and Performance Evaluation of the Uenotai Geothermal Field, Akita Prefecture,” World Geothermal Congress, Antalya, Turkey, April 2005 (with Steven J. Butler, Christopher W. Klein, Shun Iwata and Masahiro Itoh)

“Sustainability and Renewability of Geothermal Power Capacity,” World Geothermal Congress, Antalya, Turkey, April 2005

“National Assessment of U.S. Geothermal Resources – A Perspective,” Annual Meeting of the Geothermal Resource Council, Palm Spring, California, August – September 2004 (with Christopher W. Klein, James W. Lovekin and Roger C. Henneberger)

“National Assessment of U.S. Enhanced Geothermal Resources Base – A Perspective,” Annual Meeting of the Geothermal Resource Council, Palm Spring, California August – September 2004 (with Steven J. Butler)

“Numerical Simulation and Performance Evaluation of the Uenotai Geothermal Field, Akita Prefecture,” Annual Meeting of the Geothermal Resource Council, Palm Spring, California, August – September 2004 (with Steven J. Butler, Christopher W. Klein, Shun Iwata and Masahiro Itoh)

“Status of the South Meager Geothermal Project British Columbia, Canada: Resource Evaluation and Plans for Development,” Annual Meeting of the Geothermal Resource

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Council, Palm Spring, California, August – September 2004 (with M. Ghomshei, K. MacLeod, R. Henneberger, A. Ryder, J. Meech, and B. Fairbank)

“Sustainability and Renewability of Geothermal Power Capacity,” Annual Meeting of the Geothermal Resource Council, Palm Spring, California, August – September 2004

“On Definition of Sustainability and Renewability of Geothermal Power Capacity,” Bulletin of the Geothermal Resources Council, Vol. 33, No. 3, July – August 2004

“New geothermal site identification and qualification,” consultant report for California Energy Commission, Publication No. P500-04-051, April 2004 (with Christopher W. Klein and James W. Lovekin). Report and accompanying PIER Geothermal Database available on the web at: http://www.energy.ca.gov/pier/final_project_reports/500-04-051.html.

“Cost of Geothermal Power and Factors that Affect it,” Geothermal Energy, Ser. No. 105, Vol. 29, No. 1 (Translated into Japanese), January 2004

“Cost of Geothermal Power and Factors that Affect it,” The 29th Stanford Geothermal Workshop, Stanford, California, January 2004

“A Numerical Simulation Study of The Performance of Enhanced Geothermal Systems,” The 29th Stanford Geothermal Workshop, Stanford, California, January 2004 (with Steve J. Butler and Ann Robertson-Tait)

“Injection Testing for an Enhanced Geothermal System Project at Desert Peak, Nevada,” Annual Meeting of the Geothermal Resources Council, Morelia, Mexico, October 2003 (with J. W. Lovekin, R. C. Henneberger, A. Robertson-Tait, P. J. Brown, C. L. Morris and D. Schochet)

“One Discipline, Two Arenas – Reservoir Engineering in Geothermal and Petroleum Industries,” The 28th Stanford Geothermal Workshop, Stanford, California, January 2003

“A Methodology for Assessment of Geothermal Energy Reserves Associated with Volcanic Systems,” (with Roger C. Henneberger, Christopher W. Klein, and R. W. Decker), Annual Meeting of the Geothermal Resources Council, Reno, Nevada, September 2002

“A Case History of Numerical Modeling of a Fault-Controlled Geothermal System at Beowawe, Nevada,” The 26th Stanford Geothermal Workshop, Stanford, California, January 2001 (with Steven J. Butler, Ann Robertson-Tait, James W. Lovekin and Dick Benoit)

“Reducing Cost and Environmental Impact of Geothermal Power Through Modeling of Chemical Processes in the Reservoir,” The 26th Stanford Geothermal Workshop, Stanford, California, January 2001 (with Minh Pham and Christopher Klein)

“Forty Years of Production History at The Geysers Geothermal Field, California—The Lessons Learned,” Annual Meeting of the Geothermal Resources Council, San Francisco, California, September 2000

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“Development of Injection Capacity for the Expansion of the Ribeira Grande Geothermal Project, São Miguel, Açores, Portugal,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with E. Granados, R. Henneberger, C. Klein, C. Bicudo da Ponte and V. Forjaz).

Numerical Simulation of the Wasabizawa Geothermal Field, Akita Prefecture, Japan,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with M. Pham, S. Iwata, M. Suzuki, T. Inoue, K. Yamada and M. Futagoishi).

“Development of a Geothermal Master Plan for Nicaragua,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with E.E. Granados, R.C. Henneberger, C.W. Klein, L. Velásquez M. and A. Zúñiga M.).

“Numerical Modeling of the Cerro Prieto Geothermal Field, Baja California, Mexico,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with S.J. Butler, R.C. Henneberger, C.W. Klein, H. Gutierrez P. and J.S. de León V.).

“Assessment of Steam Supply for the Expansion of Generation Capacity from 140 to 200 MW, Kamojang Geothermal Field, West Java, Indonesia,” May 2000 (in press), World Geothermal Conference, Beppu and Morioka, Japan (with A. Robertson-Tait, C.W. Klein, S.J. Butler, J.W. Lovekin, P.J. Brown, S. Sudarman and S. Sulaiman).

“Results of a Comprehensive Well Test Program to Assess the Zugdidi-Tsaishi Geothermal Field, Republic of Georgia,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with E.E. Granados, P.J. Brown, J. Hallberg, Z. Menteshashvili, D. Bachakashvili, G. Buachidze, O. Vardigoreli and N. Tsertsvadze).

“Review of the State-of-the-Art of Numerical Simulation of Enhanced Geothermal Systems,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with S.J. Butler, D. Swenson and B. Hardeman).

“Numerical Modeling of the Miravalles Geothermal Field, Guanacaste, Costa Rica,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with M. Pham, E. Granados, A. Mainieri and C. Gonzales).

“An Investigation of Productivity and Pressure Decline Trends in Geothermal Steam Reservoirs,” June, 2000, World Geothermal Conference, Beppu and Morioka, Japan (with S.J. Butler, P.J. Brown, K.S. Goyal and Tom Box).

“Numerical Modeling of the High-Temperature Geothermal System of Amatitlán, Guatemala,” 1996 Annual Meeting of the Geothermal Resources Council, Portland, Oregon (with Minh Pham, Anthony Menzies, E. Lima, K. Shimada, J. Juarez and A. Cuevas).

“Analysis of Well Test Data from the High-Temperature Geothermal System of Amatitlán, Guatemala,” 1996 Annual Meeting of the Geothermal Resources Council, Portland, Oregon (with Anthony J. Menzies, Eduardo E. Granados, Minh Pham, E. Lima, A. Cuevas and J. Torres)

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"Resource Risk and its Mitigation for the Financing of Geothermal Projects," World Geothermal Congress, Florence, Italy, May 1995 (with James B. Koenig).

"The Nature and Occurrence of Geopressured Resource Areas in the State of California, USA," World Geothermal Congress, Florence, Italy, May 1995 (with Ann Robertson-Tait, M. Kramer and N. Buening).

"Injection Related Problems Encountered in Geothermal Projects and Their Mitigation: the United States Experience," World Geothermal Congress, Florence, Italy, May 1995 (with Eduardo E. Granados and Anthony J. Menzies).

"Analysis of the Environmental Impact of the Injection of Treated Municipal Waste Waters into a Portion of The Geysers Geothermal Field, California, USA," The 16th Annual PNOO-EDC Geothermal Conference Manila, Philippines, March 2-3, 1995 (with Minh Pham, Christopher W. Klein, R.W. Greensfelder).

"Some Aspects of Geopressured Resources in California", Trans., Geothermal Resources Council Annual Meeting, San Francisco, Calif., October, 1993 (with A. Robertson-Tait, M. Kramer and N. Buening).

"Problems and Solutions Related to Injection of Geothermal Fluids," A Workshop on the Injection of Geothermal Fluids, Mexicali, Mexico, May 1993 (with Eduardo E. Granados, Anthony J. Menzies and Christopher W. Klein).

"A Survey of Potential Geopressured Resource Areas in California", Proceedings, Eighteenth Workshop on Geothermal Reservoir Engineering, Stanford University, California, January 26-28, 1993 (with A. Robertson-Tait, M. Kramer and N. Buening).

"Simulating a Challenging Water Dominated Geothermal System: The Cerro Prieto Field, Baja California, Mexico" Proceedings, Sixteenth Workshop on Geothermal Reservoir Engineering, Stanford University, California, January 23-25, 1991 (with E.U. Antunez and A.J. Menzies).

"Numerical Modeling of the Initial State and Matching of Well Test Data from the Zunil Geothermal Field, Guatemala", Proceedings, Sixteenth Workshop on Geothermal Reservoir Engineering, Stanford University, California, January 23-25, 1991 (with A.J. Menzies, E.E. Granados, L. Merida, A. Caicedo-A.).

"A Case History of a Multi-Well Interference Test Program at The Uenotai Geothermal Field, Akita Prefecture, Japan," 1990 Annual Meeting of Geothermal Resources Council, Kailua-Kona, Hawaii, August 20-24, 1990 (with A.J. Menzies, E.U. Antunez, T. Naka, R. Takeuchi, S. Iwata, Y. Saeki, and T. Inoue).

"Corrosion vs. Temperature: Field Development Options at Onikobe Geothermal Field, Miyagi Prefecture, Japan", Trans., Geothermal Resources Council Annual Meeting, Kailua-Kona, Hawaii, August 20-24, 1990 (with C.W. Klein, J.R. McNitt, M. Abe and S. Nakanishi).

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"Numerical Simulation of a Mature, High Temperature Geothermal Reservoir: A Case History from the Onikobe Field, Miyagi Prefecture, Japan", Trans., Geothermal Resources Council Annual Meeting, Kailua-Kona, Hawaii, August 20-24, 1990 (with E.U. Antunez, M. Abe and S. Nakanishi).

"Forecasting Well and Reservoir Behavior Using Numerical Simulation, Uenotai Geothermal Field, Akita Prefecture, Japan", Trans., Geothermal Resources Council Annual Meeting, Kailua-Kona, Hawaii, August 20-24, 1990 (with A.J. Menzies, E.U. Antunez, T. Naka, R. Takeuchi and S. Iwata).

"An Integrated Test Program for the Definition of a High Temperature Geothermal Reservoir: A Case Study from Zunil Geothermal Field, Guatemala", Trans., Geothermal Resources Council Annual Meeting, Kailua-Kona, Hawaii, August 20-24, 1990 (with A.J. Menzies, E.E. Granados, L.L. Mink, L. Merida-I and A. Caicedo-A).

"Quantitative Verification of the Hydrogeological Model of the Mofete Geothermal Field, Campania, Italy", Trans., Geothermal Resources Council Annual Meeting, Kailua-Kona, Hawaii, August 20-24, 1990 (with E.U. Antunez, R. Carella, and A. Guidi).

"Economic Analysis of Steam Production at The Geysers Geothermal Field, California", Trans., Geothermal Resources Council Annual Meeting, Vol. 13, Santa Rosa, California, October 1-4, 1989 (with R. Henneberger and P. Brown).

"A Systematic Approach to Decline Curve Analysis for The Geysers Steam Field, California", Trans., Geothermal Resources Council Annual Meeting, Vol. 13, Santa Rosa, California, October 1-4, 1989 (with R. Henneberger, P. Brown, K. Eney and S. Eney).

"A Statistical Data Base for U.S. Geothermal Wells", Proceedings, Eleventh EPRI Geothermal Conference and Workshop, Electrical Power Research Institute, Palo Alto, June, 1989 (with R.C. Henneberger).

"Practical Problems in Numerical Simulation of Geothermal Reservoirs", Proceedings, International Symposium of Geothermal Energy, Kumamoto and Beppu, Japan, November 10-14, 1988 (with A. Menzies and E. Antunez).

"Development of Low-Temperature Geothermal Reservoirs for Commercial Power- The U.S. Experience", Proceedings, International Symposium of Geothermal Energy, Kumamoto and Beppu, Japan, November 10-14, 1988 (with J. Koenig, A. Robertson-Tait, and A. Menzies).

"An Integrated Approach to Conceptual Modeling of Geothermal Reservoirs", Proceedings, International Symposium of Geothermal Energy, Kumamoto and Beppu, Japan, November 10-14, 1988 (with J. McNitt, A. Robertson-Tait, and C. Klein).

"Exploratory Drilling at Coso Geothermal Field, California", Proceedings, Ninth Annual Geothermal and Second IIE-EPRI Geothermal Conference and Workshop", Electrical Power Research Institute, Palo Alto, California, August, 1987 (with C.W. Klein, M.C. Gardner and R. Briffett).

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"Long-Term Testing of Geothermal Wells in the Coso Hot Springs KGRA", Proceedings, Twelfth Workshop on Geothermal Reservoir Engineering, Stanford University, California, January 20-22, 1987 (with A. Menzies, E. Granados, S. Sugine and R. Gentner).

"Investigation of Wellbore Scaling at the Miravalles Geothermal Field, Costa Rica", Proceedings, Tenth Workshop on Geothermal Reservoir Engineering, Stanford University, California, January 22-24, 1985.

"A Sensitivity Study of the Economic Parameters for The Geysers Geothermal Field, California", Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October, 1982 (with M. Che).

"Theoretical Nuclear Log Response of the Components of The Geysers Geothermal Reservoir, California", Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October 1982, (with M. Che, R. Dunlap, and M. Twichell).

"Qualitative Response Pattern on Geophysical Well Logs from The Geysers, California" Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October, 1982 (with M. Che, R. Dunlap and M. Twichell).

"Geochemistry of the Palimpinon Geothermal Field, Southern Negros, Philippines", Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October 1982 (with C. Klein, J. McNitt, M. Che, B. Tolentino, A. Alcaraz and R. Datuin).

"Temperature and Pressure Distribution in the Palimpinon Geothermal Field, Southern Negros, Philippines", Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October 1982 (with C. Klein, J. McNitt, M. Che, B. Tolentino, A. Alcaraz and R. Datuin).

"Drilling Problems and the Learning Curve-An example from Palimpinon Geothermal Field, The Philippines", Trans., Geothermal Resources Council Annual Meeting, San Diego, California, October, 1982 (with M. Che, J. McNitt, N. Vasquez, B. Tolentino, A. Alcaraz and R. Datuin).

"Definition of a Fractured Geothermal Reservoir-A Case History from The Philippines", Proceedings, Fractures in Geothermal Reservoirs Conference of the American Association of Petroleum Geologists and Geothermal Resources Council, Honolulu, Hawaii, August 27-28, 1982 (with M. Che, J. McNitt, C. Klein, B. Tolentino, A. Alcaraz and R. Datuin).

"Geothermal Reservoir Assessment," Trans., Second ASEAN Council on Petroleum (ASCOPE) Conference, Manila, The Philippines, October 7-11, 1981.

"Synergistic Interpretation of Formation Characteristics of a Low Temperature Geothermal Well in Susanville, California," Trans., Geothermal Resources Council Annual Meeting, Vol. 5, 1981, p. 303 (with J. McNitt and C. Peterson).

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"Lithology Determination from Digitized Well Logs-Examples from Ore-Ida No. 1 Geothermal Well, Ontario, Oregon," Trans., Geothermal Resources Council Annual Meeting, Vol. 5, 1981, p. 311 (with W.E. Glenn).

"Estimation of Steam Saturation and Rock Alteration from Geothermal Well Logs-A Theoretical Inquiry," Trans., Geothermal Resources Council Annual Meeting, Vol. 5, 1981, p. 373.

"A Handheld Calculator Program for Estimation of Water Salinity from Well Logs," Log Analyst, March-April, 1981 (with B. Gobran and S. Brown).

"A Practical Approach and a Handheld Calculator Program for Analysis of Shaly Gas Sands," Paper presented at the California Regional Meeting of the Society of Petroleum Engineers, Bakersfield, California, March 25-27, 1981 (with M. Saldana, W. O'Brien, B. Gobran and S. Brown).

"Determination of Geothermal Water Quality from Well Logs," Trans., Sixth Annual Workshop on Geothermal Reservoir Engineering, Stanford University, December 16-18, 1980 (with S. Brown and B. Gobran).

"Geothermal Well Logging-The State of the Art," Proceedings, National Conference on Renewable Energy Technologies, Honolulu, Hawaii, December 7-13, 1980.

"A Comprehensive Mathematical Approach and a Handheld Calculator Program for Analysis of Shaly Gas Sands," The Log Analyst, September-October 1980 (with B. Gobran, M. Saldana and S. Brown).

"A Review of Geothermal Reservoir Modeling Techniques," Trans., Geothermal Resources Council Annual Meeting, Salt Lake City, Utah, September 9-11, 1980 (with L. Castanier).

"Effect of Temperature on Absolute Permeability," Trans., Geothermal Resources Council Annual Meeting, Salt Lake City, Utah, September 9-11, 1980 (with B. Gobran and W. Brigham).

"Well-Site Evaluation of Logs from a Geothermal Well," Trans., Geothermal Resources Council Annual Meeting, Salt Lake City, Utah, September 9-11, 1980 (with J. Koenig, M. Gardner and J. McIntyre).

"Computer Analysis of a Limited Well Log Suite in a Geothermal Well-A Case History," Trans., Geothermal Resources Council Annual Meeting, Salt Lake City, Utah, September 9-11, 1980 (with L. Wells, C. Cleaneay and M. Mathews).

"Un Modele Semi-Analytique de Simulation de Reservoirs Geothermiques," Trans., Fifth Annual Symposium of the International Association of Hydraulic Research, Toulouse, France, August 28-29, 1980 (with L. Castanier and W. Brigham).

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"An Improved Approach to Estimating True Reservoir Temperature from Transient Temperature Data," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with B. Roux).

"Foam as a Mobility Control Agent in Steam Drive Processes, Part I-Gravity Override Reduction in Gas Drives," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with J. Chaing, L. Castanier, W. Brigham, A. Sufi and S. Mahmood).

"Foam as a Mobility Control Agent on Steam Drive Processes, Part II-Application to Steam Injection: Temperature Effects on Surfactants," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with A. Al-Khafaji, O. Owete, L. Castanier, W. Brigham and D. Shah).

"An Engineering Economic Model for Thermal Recovery Methods," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with J. Chaing, L. Castanier, W. Brigham, A. Sufi and S. Mahmood).

"A Practical Analytical Model for Geothermal Reservoir Simulation," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with R. Williams, S. Brown, J. Ramey and R. Raghavan).

"A Practical Analytical Model for Geothermal Reservoir Simulation," Paper presented at the 50th California Regional Meeting of the SPE, Pasadena, California, April 26-28, 1980 (with L. Castanier and W. Brigham).

"An Improved Approach to Estimating True Reservoir Temperature from Transient Temperature Data," Trans., Fifth Annual Workshop on Geothermal Reservoir Engineering, Stanford University, California, December 12-14, 1979 (with B. Roux).

"Fracture Detection from Geothermal Well Logs," Trans., Fifth Annual Workshop on Geothermal Reservoir Engineering, Stanford University, California, December 12-14, 1979 (with L. Wells, G. Bickham and M. Matthews).

"Sensitivity Study of Variables Affecting Fluid Flow in Geothermal Wells," Trans., Fifth Annual Workshop on Geothermal Reservoir Engineering, Stanford University, California, December 12-14, 1979 (with L. Fandriana, S. Juprasert and S. Brown).

"Calculation of Performance of Dry Steam Wells," Trans., Geothermal Resources Council Annual Meeting, Reno, Nevada, September 24-27, 1979 (with C. Morales-Gil, J. Baza and J. Ramey, Jr.).

"Calculation of Geothermal Water Salinity from Well Logs-A Statistical Approach," Trans., Geothermal Resources Council Annual Meeting, Reno, Nevada, September 24-27, 1979 (with J. Jusbasche).

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"In-Situ Combustion Studies at SUPRI," Proceedings, Fifth Annual DOE Symposium on Enhanced Oil & Gas Recovery & Improved Drilling Methods, U.S. Dept. of Energy, Tulsa, Oklahoma, August 22-24, 1979 (with A. Satman, M. Soliman, A. Zolotukhin and M. Fassihi).

"An Evaluation of a Rhyolite-Basalt-Volcanic Ash Sequence from Well Logs," Trans., SPWLA Twentieth Annual Logging Symposium, Tulsa, Oklahoma, June 3-6, 1979 (with S. Juprasert and M. Jusbasche).

"Classification of Geothermal Reservoirs from the Viewpoint of Log Analysis," Trans., SPWLA Twentieth Annual Logging Symposium, Tulsa, Oklahoma, June 3-6, 1979 (with L. Wells and M. Matthews).

"Matrix and Response Characteristics for Sonic, Density and Neutron," Trans., SPWLA, Twentieth Annual Logging Symposium, Tulsa Oklahoma, June 3-6, 1979 (with L. Wells and M. Matthews).

"Heavy Oil Recovery Research Program at SUPRI," Proceedings, Fourth Annual DOE Symposium on Enhanced Oil and Gas Recovery & Improved Drilling Methods, U.S. Department of Energy, Tulsa, Oklahoma, August 29-31, 1978 (with W. Brigham, J. Ramey, Jr., S. Marsden and F. Kucuk).

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