
STEVEN J. BUTLER

PRESENT POSITION

Senior Reservoir Engineer

EXPERTISE

- Numerical reservoir simulation
- Wellbore modeling
- Two-phase flow in pipelines and vessels
- Trouble-shooting of geothermal surface facilities
- Production and process engineering
- Scale control and mineral recovery
- Software development

EDUCATION

M.S. in Petroleum Engineering, University of Southern California, 1987

B.S. in Chemical Engineering, California Polytechnic University, Pomona, 1981

B.S. in Chemistry, California State University, Fullerton, 1979

EXPERIENCE

Senior Reservoir Engineer, GeothermEx, Inc., 1997 to present

- Development of numerical models of geothermal fields in California (The Geysers, Salton Sea, Mammoth, Heber, East Mesa), Hawaii (Puna), Nevada (Beowawe, Steamboat), Costa Rica (Miravalles), Mexico (Cerro Prieto), Portugal (Azores), and Japan (Uenotai, Okuaizu); the effort included initial-state modeling, history matching and prediction of well and reservoir performance under various operating scenarios.
- Trouble-shooting of unusual flow metering problems at the Ribeira Grande (Portugal) and Leyte (Philippines) projects.
- Trouble-shooting of the start-up the Salak power plant (330 MW) in Indonesia and Salton Sea Units 2-5 (159 MW).

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- Design of piping systems, control valves and vessels to optimize the operation of geothermal power plants (400MW) supplied by the world's most saline brine at Salton Sea (California).
- Wellbore simulation and well performance trouble shooting in many fields.
- Assistance in development of pre- and post-processors (PETRASIM) for TOUGH2 and TETRAD software.
- Code development for various reservoir and process engineering problems.

Reservoir Engineer, CalEnergy Company, Inc. (and Magma Operating Company), 1993 to 1997

- Development of heat and material balance programs to predict brine demand for power plants based on operating conditions.
- Well performance monitoring and prediction of well workover schedules for production and injection wells; performance prediction of make-up wells.
- Development of a spreadsheet-based revenue allocation program to replace an older mainframe program.
- Development of a set of functions to perform PVT calculations that can be called from spreadsheet and database programs, based on published correlations for H₂O-CO₂-NaCl systems.
- Evaluation of resource-related concerns associated with mineral recovery at Salton Sea geothermal field.
- Development of a silica scale control system based on pH reduction for a low-pressure separator at Coso geothermal field.

Reservoir and Production Engineer, Unocal Geothermal Division, 1988 to 1993

- Development of a reservoir simulation model of the Salton Sea geothermal field to evaluate future behavior and the impact of additional generation from the field.
- Development of a numerical simulation model of the "Shallow Heat Anomaly" within the Salton Sea field to investigate the potential for the development of surface geothermal manifestations with continued deep production.
- Development of an injection simulation program to model two-phase flow in injection wells.
- Design and construction of injection pipelines and injection well hook-ups.
- Development of a production data acquisition system for the Salton Sea power plants.

Research Engineer, Unocal Science and Technology Division, 1981 to 1988

- Numerical simulation of an offshore oil reservoir and identification of production-related problems.
- Pilot testing and numerical simulation of enhanced oil recovery technology (primarily multi-contact miscible CO₂ flooding).
- Development of chemical rate kinetics and field test procedures for an in situ acidizing system for deep gas wells and geothermal wells.
- Development and implementation of two-phase flow measurement methods for flow rate and enthalpy prediction, wellbore and pipeline pressure drops, elimination of “slug” flow, and heat loss modeling.

MEMBERSHIPS

- Geothermal Resources Council
- Society of Petroleum Engineers
- International Geothermal Association

CITIZENSHIP

USA

SELECTED PUBLICATIONS

Feasibility of Geothermal Power Generation from Petroleum Wells. Transactions, Geothermal Resources Council 2009 (with Subir K. Sanyal).

Numerical Reservoir-Wellbore-Pipeline Simulation Model of The Geysers Geothermal Field, California, USA. Proceedings, SPE Western Regional Meeting 2009 (with Steven J. Eneydy).

Cost of Electricity from Enhanced Geothermal Systems. Proceedings, The 32ed Stanford Geothermal Workshop, Stanford, California, January 2007 (with Subir K. Sanyal, James W. Morrow, and Ann Robertson-Tait).

Geothermal Well Productivity; Why Hotter is Not Always Better. Geothermal Resources Council Transactions 2007 (with S.K. Sanyal and J.W. Morrow).

Is EGS Commercially Feasible? Geothermal Resources Council Transactions 2007 (with S.K. Sanyal, J.W. Morrow, and A. Robertson-Tait).

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Assessing the Rye Patch Geothermal Field, a Classic Basin-and-Range Resource. Geothermal Resources Council Transactions 2006 (with S.K. Sanyal, J.R. McNitt, C.W. Klein, and R.E. Ellis).

Arsenic and Old Lake – Solving a Geothermal Mystery. Geothermal Resources Council Transactions 2006 (with Subir K. Sanyal and Fredrik A. Tornatore).

An Alternative and Modular Approach to Enhanced Geothermal Systems. Proceedings, World Geothermal Congress 2005 (with Subir K. Sanyal, Eduardo E. Granados, and Roland N. Horne).

An Analysis of Power Generation Prospects from Enhanced Geothermal Systems. Proceedings, World Geothermal Congress 2005 (with Subir K. Sanyal).

Numerical Simulation and Performance Evaluation of the Uenotai Geothermal Field, Akita Prefecture. Proceedings, World Geothermal Congress 2005 (with Subir K. Sanyal, Christopher W. Klein, Shun Iwata and Masahiro Itoh).

National Assessment of U.S. Enhanced Geothermal Resources Base – A Perspective. Transactions, Geothermal Resources Council 2004 (with Subir K. Sanyal).

A Numerical Simulation Study of The Performance of Enhanced Geothermal Systems. The 29th Stanford Geothermal Workshop, Stanford, California, January 2004.

Mitigation of Cyclic Production Behavior in a Geothermal Well at the Uenotai Geothermal Field, Akita, Japan. Transactions, Geothermal Resources Council, 2002.

A Feasibility Study of the Potential Benefits of Low-Rate Water Injection in Superheat Steam Production Wells. Transactions, Geothermal Resources Council, 2002.

A case history of numerical modeling of a fault-controlled geothermal system at Beowawe, Nevada. Transactions, Geothermal Resources Council, Volume 24, 2000.

Numerical modeling of the Cerro Prieto geothermal field, Mexico. Proceedings, World Geothermal Congress, 2000.

Assessment of the steam supply for the expansion of generating capacity from 140 to 200 MW, Kamaojang geothermal field, West Java, Indonesia. Proceedings, World Geothermal Congress, 2000.

An investigation of productivity and pressure decline trends in geothermal reservoirs. Proceedings, World Geothermal Congress, 2000.

Review of the state-of-the-art of numerical simulation of Enhanced Geothermal Systems. Proceedings, World Geothermal Congress, 2000.

Accounting for the effects of TDS and NCG on Salton Sea reservoir response. Proceedings, Stanford Workshop on Geothermal Reservoir Engineering, 1992.