

**Brooks A. Patterson**  
**Senior Project Geochemist**

Brooks Patterson received his B.A. degree (Earth Science, 1977) from California State University Fullerton and M.S. degree (Geology, 1984) from University California at Riverside. He has more than 29 years of petroleum industry experience with ChevronTexaco, which included operation of state-of-the-art geochemistry instrumentation, development of hardware and technical methodologies, and interpretation of source rock, oil, gas, and water data. While working for Chevron's oil field research company, Brooks participated in the field trial of the Rock-Eval pyrolysis instrument and consulted with the developers of the US-designed-and-built Rock-Eval II instrument. He also participated in the development Chevron's oil fingerprinting techniques and software, which put Chevron in the lead in reservoir geochemistry. As a geochemist he has completed numerous source rock and reservoir geochemistry studies of Congo, Angola, Nigeria, United Kingdom, Kazakhstan, Saudi Arabia, Venezuela, and US oil fields. He carried out numerous allocation studies in San Joaquin Valley, California, providing accurate data in steam flood monitoring of commingled Antelope and Belridge diatomite reservoirs. Between 1998 and 2002 Brooks supervised geochemists, palynologist, and technicians in a state-of-the-art laboratory located in a remote area outside Lagos, Nigeria. The laboratory successfully resolved exploration, reservoir geochemistry, and environmental problems with high-quality analysis of rocks, oils, and waters and interpretation of data. Following his years at Chevron, Brooks was a Senior Project Geochemist at OilTracers LLC. In 2010, OilTracers was acquired by Weatherford Laboratories.

**EDUCATION**

*M.S. University of California at Riverside, Geology, 1984. Thesis: Biodegradation of Oils from the Southern San Joaquin Valley, California.*

*B.A. California State University at Fullerton, Earth Science, 1977.*

**INDUSTRY EXPERIENCE**

*Weatherford Laboratories, Penn Valley, California:*

**Senior Project Geochemist.** Interpretation of geochemical data including rock, gas, oil and water for resolution of exploration, field development, production and environmental problems. Primary work areas include Africa (Nigeria, Angola, Congo, Uganda), Middle east, Turkey, Egypt, UK, South America (Colombia, Peru, Argentina), Gulf of Mexico, and California San Joaquin Valley (2010-present).

*OilTracers LLC, Dallas, Texas:*

**Senior Project Geochemist.** Interpretation of geochemical data in order to evaluate source rock potential and reservoir properties such as fluid quality, continuity, fluid allocation and producibility. (2004-2010).

*ChevronTexaco Exploration Research Technology Company, San Ramon, California:*

**Staff Geochemist.** Integrated geochemical and geological data to determine lateral and vertical reservoir continuity, oil quality, and oil producibility. Work focused primarily on West African business units. (Congo, Angola and Nigeria). Carried out in-depth studies on the quantity, solubility, and mobility of reservoir bitumen for Cabinda, Angola oil field depletion models. (2002-2003).

*Chevron Nigeria LTD, Exploration, Lagos, Nigeria:*

**Laboratory Supervisor.** Supervised geochemists, palynologist, and technicians. Maintained analytical equipment in a remote location for the analysis of oils (gas chromatography, liquid chromatography, gas chromatography-mass selective detector), and waters (titration, ion chromatography, inductively coupled plasma spectrophotometer). Mentored Nigerian geochemist. Interpreted source rock, oil, water, and gas data in order to reduce exploration and production costs, determine spill origin, and meet environmental standards. (1998-2002).

***Chevron Overseas Petroleum Inc., Exploration Technology, San Ramon, California:***

**Senior Geochemist.** Integrated geochemical and geological data in order to determine lateral and vertical reservoir continuity and oil producibility. Studies involved West Africa, United Kingdom, Kazakhstan, and South America business units. Evaluated the quantity, solubility, and mobility of reservoir bitumen in several Cabinda, Angola oil fields. Monitored steam flood production in several San Joaquin Valley oil fields. Researched the capability of oils to become overprinted when contacting immature organic matter during migration. (1990-1998).

***Chevron USA, Western Region, Development Geology, San Ramon California:***

**Geochemical Laboratory Project Coordinator.** Maintained source rock evaluation instrumentation (Rock-Eval, Leco TOC) and oil analysis equipment (gas chromatography). Supervised and trained technical personnel. Interpreted source rock and reservoir geochemistry data. Worked extensively with oils from San Joaquin Valley Antelope and diatomite reservoirs and offshore California Monterey Formation reservoirs. Carried out numerous production allocation projects in San Joaquin Valley oil fields. (1986-1990).

***Chevron Oil Field Research Company, Geology Division, La Habra, California:***

**Research Geochemist.** Interpreted source rock and reservoir geochemistry data for overseas and domestic business units. Participated with others in the development of oil correlation software, gas chromatography hardware, and prediction of oil quality in Saudi Arabian reservoirs. Trained Chevron personnel in source rock and oil correlation analysis in Saudi Arabia and Bakersfield, California. (1984-1986).

**Research Technician.** Operated analytical equipment and carried out wet chemical procedures associated with source rock evaluation, oil quality evaluation, and oil correlation. Participated in development of new gas chromatography columns and sulfur gas chromatography using electron capture detection. Participated in the field trial of the first Rock Eval and consulted with the US manufacture of Rock-Eval II. Participated in development of various pyrolysis techniques including hydrous pyrolysis. (1973-1984).

## **ADDITIONAL EXPERIENCE AND CREDENTIALS**

**Society Memberships:** Member of AAPG

**Other:** Received special recognition award for leading a team to enhance trust between Chevron Nigeria Ltd employees and junior and senior oil worker unions (NUPANG and PENGASSAN) with CNL management (2002). Brooks retired from Chevron in September-2003. He and his wife, Bobi, have spent ten months completing a new home in the foothills of Sierra Nevada Mountains.

## **PUBLICATIONS AND PRESENTATIONS**

McCaffrey, M. A., D. K. Baskin, B. A. Patterson, D. H. Ohms., C. Stone, D. Reisdorf (2012) Oil fingerprinting dramatically reduces production allocation costs. World Oil, March 2012, p 55-59.

McCaffrey, M. A., D. H. Ohms., M. Werner, C. Stone, D. K. Baskin, and B. A. Patterson (2011) Geochemical allocation of commingled oil production or commingled gas production. Society of Petroleum Engineers Paper Number 144618. p 1-19.

McCaffrey, M. A., D. K. Baskin, M. A. Beeunas, and B. A. Patterson, 2006, Reducing the Cost of Production Allocation by 95% Using a Geochemical Technique: Abstract, AAPG 2006 Annual Convention, Houston, Texas, April 9-12, 2006.

Eneogwe, C., O. Ekundayo, and B. Patterson, 2002, Source-derived Oleanenes Identified in Niger Delta Oils: Journal of Petroleum Geology, v.25, p.83-95.

- I. C. Okoro, E. N. Olaniyan, J.O. Umurhohwo, B. A. Patterson, and D. D. Kennedy, 2000, Potential Uses of Injected Sea Water as a Tracer in Water Flood Management: Pennwell et al ed., Offshore West Africa Conference, (Abidjan, Cote D'Ivoire, 3/21-3/23/2000).
- Patterson, B. A., C. Bluhm, E. U. Adokpaye, F. M. Kpenkaan, and B. A. Onasanya, 1995, An Interdisciplinary Approach to Reservoir Management: The Malu Field, West Niger Delta, Nigeria. AAPG International Conference (Nice, France 9/10-9/13/1995), Abstract: AAPG Bulletin v.97 No.8 p.1241-1242.
- Patterson, B. A., H. Gamero De Villarroel, and L. Rondon, 1996, Oil Geochemistry Study: Blocks III and IV Bachaquero Field, Lake Maracaibo, Venezuela. AAPG International Conference (Caracas, Venezuela 9/8-9/11/96) Abstract: AAPG Bulletin v.80, No.8, p.1322.
- Patterson, B., J. Garrity, and F. Kpenkaan, 2003, Two Reservoirs — Several Different Oil and Water Compositions, Swamp Field, Nigeria: in J. Cubbitt, W. England, S. Larter, and G. Macleod, ed., Conference Abstracts: Geochemistry of Reservoirs II: Linking Reservoirs Engineering and Geochemical Models (Geological Society of London, February 3-4, 2003).
- Patterson, B. A., B. T. Robertson, and J. Dahl, 1994, Preliminary Reservoir Geochemistry Study of Oils and Bitumens from the Tengiz Field, Kazakhstan, CIS: AAPG Conference, (Denver, Co. 1994), Abstract: AAPG Bulletin, v. 78, p.230.
- Schoellkopf, N. B. and B. A. Patterson, 2000, Chapter 25 Petroleum Systems of Offshore Cabinda, Angola: in M. R. Mello and B. J. Katz, ed, Petroleum Systems of South Atlantic Margins: AAPG Memoir, v. 73: Tulsa, AAPG.
- Schoellkopf, N. B., B. A. Patterson, and J. G. Gaulier, 1998, Unsnarling of Petroleum Systems Through Geochemical Methods, Offshore Cabinda, Angola, AAPG International Conference (Rio de Janeiro, Brazil, 11/8-11/11/1998), Conference abstract: AAPG Bulletin v.82 no.10 p. 1964.
- Sundaraman, P., B. A. Patterson, and O. T. Udo, 1995, Reservoir Geochemistry: Applications and Case Studies in Nigeria: in J. O. Grimalt and C. Dorronsoro, ed., Organic Geochemistry: Developments and Applications to Energy, Climate, Environment and Human History. Selected Papers from the 17<sup>th</sup> International Meeting on Organic Geochemistry, Donostia-San Sebastian, The Basque Country, Spain: San Sebastian, AIGOA, p.369-371.
- Ukpabio, E. J., C.I. Eneogwe, and B. A. Patterson, 2000, Geochemistry and Source Determination of Coastal Bitumens from Nigerian Beaches: Afro-Asian Association of Petroleum Geologist, 5th International Conference in Petroleum Geochemistry and Exploration in Afro-Asian Region, New Delhi, India.