

Dr. Fareed I. Siddiqui

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PROFESSIONAL SUMMARY

Ph. D. Petroleum Engineering with 38+ years of relevant experience with last 27+ years in Exploration and Production (E&P) operating companies in the Middle East, USA and Pakistan. Have worked as a bridge between academia and industry being a part of Industry Advisory Board and the Board of Studies for the Petroleum Engineering Department of NED University of Engineering and Technology for last 18 years. Supervised final year projects, Conducted industry academia joint research projects. As member of Board of Studies recommended revisions in curriculum to align with the Industry needs and the top 3 ranked Petroleum Engineering Programs internationally. Visiting Professor at NED University - Taught full year course to final year BE students. External Examiner for NED University and Mehran University of Engineering. Member Curriculum Committee for Pakistan's Higher Education Commission (HEC) for more than 5 years, Member UET Lahore Faculty Promotion Committee. Member Institute of Business Management (IoBM) Industrial Advisory Board for Capstone Projects.

Hands-on experience of full spectrum of E&P cycle - exploration, appraisal, field development planning, static and dynamic reservoir modeling, production & reserves optimization, facilities planning & EPCC Project awards. Developed Company's short-term and long-term Strategic Plans. Lead the "Value Assurance and Peer Review" team for 7 years. Certified Company Reserves Bi-Annually based on SPE – PRMS guidelines and relevant regulatory requirements.

Experienced in Petroleum contracts and contract negotiations, won international competitive bid for Exploration and Development of ~6200 sq km block in Abu Dhabi for Pakistani consortium. Negotiated final contracts with internal and external stakeholders.

Multilingual: English (fully proficient), Arabic (intermediate level proficiency), Urdu (fully proficient)

RESEARCH AND TEACHING INTERESTS

Fundamental research on the process of hydrocarbon migration and trapping including the impact of viscous forces (which are usually neglected) on the fluid distribution profile in the reservoirs. Accurate determination will potentially add billions of barrels of oil to reserves.

The findings of the theory are actively being used in Carbon Sequestration trapping theory can be extended for more accurately defining the capacities of CO₂ Storage facilities. Our initial review suggests that under dynamic conditions capacities of underground CO₂ defining can also be used to define storage capacities and propose storage designing and operating philosophies to reduce storage space requirements and improve the economics for achieving "Net Zero" goal for CO₂ emissions. (Bo Ren et al SPE Res Eval & Eng Aug 2023 etc)

Some Recent Referrals to Dr Fareed's Research:

- Syed Haider et al (KAUST), AAPG Bulletin July 2023: *Numerical modeling of microfracturing and primary hydrocarbon expulsion in the Jurassic Lower Tuwaiq Mountain Shale: A conceptual framework*
- A Zhuravljov, Z Lanetc, N Khoperskaya, Computers & Geoscience, Elsevier 2021: *A simple approach to increasing computational efficiency of numerical simulations of hydrocarbon migration based on the Darcy flow concept*

Teaching Interests:

I can teach almost all undergraduate and graduate courses specially Reservoir and Production Engineering, Production Optimization, Reservoir Simulation, PVT, Field Development Planning, Well Testing, EOR (Miscible/Immiscible), Well Testing, DST, Wireline Formation Testing, Production logging, Petrophysics. Since 80% of Pakistan's HC production is gas, I have special expertise in Gas Specialized Gas related courses such as: Integrated Gas Field Development, Gas Well Reservoir Engineering and Gas Well Testing, Production System Optimization (tubing flow, Surface pipelines, Gas Sweetening-Dehydration, Compression).

HIGHLIGHTS OF INDUSTRY EXPERIENCE

Petroleum Engineering Consultant – CarbonTech Energy (March 2022 – to date)

- Asset valuation and acquisition advisory
 - Conducted valuation of green field with exploration potential in the middle east for investment by a far-eastern major.
- Upstream Oil and Gas Training
 - Oil and Gas Production and Reservoir Engineering Instructor Schlumberger NEXt
- PRMS based Petroleum Reserves Certification
- Carbon Sequestration studies

Managing Director / CEO – Pakistan International Oil Limited (15 July 2021 – Feb 2022)

Additional assignment as the first MD/CEO of the international company formed by the consortium of big four Pakistani companies. Formed the consortium and led the technical and commercial teams to submit the winning bid Abu Dhabi Bid round 2019. Got all required regulatory approvals, successfully negotiated final Concession Documents with ADNOC. Post concession award staffed the company with the best resources from PPL submitted for approval exploration/appraisal work program after reviewing G&G and engineering data on existing discoveries meeting ADNOC's requirements.

Deputy Managing Director, Pakistan Petroleum Limited (PPL) - (Jan 1998-Feb 2022):

Joined PPL in 1998 and progressed thru to Deputy Managing Director position

- Responsibilities covered entire spectrum of E&P cycle starting from Exploration peer review to leading Drilling/Completion, Production, Projects, New Field Development, Reservoir Modelling, Reserves Optimization and Reporting, HSEQ, Information Technology Departments. Mentored staff from Exploration, Petroleum Engineering, Finance, Audit, and Information Technology Department
- Responsible for making decisions on testing of exploratory wells, evaluation of discoveries for appraisal/development, submittal of field development plans, production enhancement opportunities, execution of Plants and Facilities development projects etc.
- Acted as Mentor for several staff from Exploration, Petroleum Engineers, Finance, Audit, and Information Technology Department staff. Developed technical teams of with commercial acumen in Reservoir, Production and Drilling functions through on the job training and coaching
- Introduced new technologies, promoted innovative ideas, and helped in developing human resources to achieve exceptional operational and commercial efficiencies. Introduced latest technology to optimize production in PPL fields
- More than 50 fracs – Hydraulic and Acid Fracs including horizontal wells with multi fracs, 23 Horizontal wells

ACHIEVEMENTS AND CONTRIBUTIONS

Reserves and Production Enhancement

Led Reservoir Engineering and Petroleum Engineering teams to identify Reserves and Production enhancement opportunities. Reservoir and Production data gathering and monitoring planning, analyzing data to identify production and reserves enhancement. Supervised reservoir studies.

- Reserves Addition from recommended projects and studies more than 110 MM boe from brown fields
- Successfully drilled 85+ exploratory and development wells since 2015 with parallel 13-string rig operation
 - New benchmarks and performance records set - reduced drilling time by more than 40% and cost by 30%: brought efficiency in operations, better planning, redesigning, used new technology, used mechanical earth model for wellbore stability
- Multistage frac and pack in horizontal wells for tight gas development

Field wise production/reserves optimization

Sui Gas Field (Pakistan's Largest Gas field with GIIP of more than 13 TCF)

- Reduced the production decline rate from 5% to 3.5 (50-60 MMscfd increase in production)

- Added 200 Bcf reserves by recommending timely installation of booster compression

Adhi Retrograde Condensate and Oil Field)

- Revitalized abandoned oil field, added 6 MM barrels of oil and 20 Bcf gas in reserves. The reservoir has been producing since 2002 and has produced ~6 MMbbls oil and 14 Bcf of gas till now
- Recommended Phase II and Phase III expansion of Adhi Plant, additional reserves of ~150 Bcf gas, 20 MMbbls oil.
- Hydraulic fracturing of Wells which increased the well productivities by 2-3 times

Reservoir Modeling and New Field Development

- Developed a highly skilled team for inhouse static and dynamic modeling using latest industry software Petrel, ECLIPSE, TNavigator
- Made in house models for all major PPL fields, Kandhkot, Adhi, Shadadpur, Adam. Identified infill drilling and production enhancement opportunities.

Tight Gas development

- Achieved the milestone of drilling longest and deepest horizontal well in carbonate reservoirs in Pakistan. A 1.3 Km long lateral ~ 5000 m deep was drilled and completed with 10-stage packers to conduct most extensive Fracking stimulation job in the history of Pakistan
- Continuous effective use of hydraulic/Acid fracturing for production optimization Adhi adopting new technology of multi-stage open-hole fracturing

Facilities Projects and Construction

- Revamping of Sui SML Turbo Compressors well within time, with a net savings of PKR 1 Billion. This resulted in addition of 217 BCF gas reserves and 44 MMscfd increase in gas production from Sui

QHSE

- Introduced Management Safety Audits showing Management ultimate commitment to HSE issues
- Process Safety Management (PSM): workshops conducted for middle and top management. PSM Competency Matrix prepared for each job and gaps identified. Plans to fill the gaps being implemented
- Road Transport Safety Management System Introduced
- Emphasis increased on Occupational Health. Dedicated Occupational Health Specialist Deputed in QHSE Department

Visiting Professor: *NED University of Engineering and Technology*

Jan 2008 – Dec 2008

- Taught Reservoir Well Testing Course to Senior Level Students
- Trained Junior Faculty to Teach the Course in subsequent years

Research Scientist: *Mobil Exploration & Production Technical Center, Dallas, USA*

Feb 1995-Jan 1998

- De-risking of exploration assets for Mobil USA by studying migration pathway for exploration prospects in Gulf of Mexico by integrating the available structural, production, PVT, log, geo-chemical data in combination with using fault-plane analysis using Allan Diagrams Fault Seal Analysis and adding migration pathway risk as additional risk in POS matrix
- Added Dynamic Migration and Trapping concept based on my Ph.D. research to Mobil's latest 3D – three phase Basin Simulator formulation. This made Mobil's Basin Simulators to be most accurate predictors of trapped hydrocarbon volumes. The simulator helped Mobil identify exploration prospects world-wide, de-risk them and optimize their exploration portfolio

Research Assistant: *The University of Texas at Austin, USA*

June 1990-Feb 1995

- Developed Dynamic Theory of Hydrocarbon Migration and Entrapment including the effects of viscous, capillary and gravity forces. This forms the basis of more accurate Basin Simulators which are used for exploration de-risking
- Used University of Texas Chemical Flooding Simulator (UTCHEM) for Modeling counter current oil and water flow with gravity and viscous forces

Research Assistant: King Fahd University of Petroleum & Minerals, Dhahran, S Arabia Aug 1984 - Jan 1987

- Developed correlations for drainage area shape-factors for bounded reservoirs for help in Well Test analysis
- Conducted PVT laboratory studies for Saudi oil samples

Co-Op Internee Engineer: Saudi ARAMCO, Ras Tanura, Saudi Arabia, Feb 1983 - Sept 1983

- Monitored production activities from the wells and GOSPS for offshore Zuluf and Marjan fields
- Flow assurance - Participated in the field testing for slug-flow effects in offshore risers and pipelines; Compared steady-state and dynamic flow effects, made recommendations to reduce slugging in offshore risers

OTHER ACHIEVEMENTS

- Chairman **Technical Program for SPE and PAPG Annual Technical Conferences: 2005 and 2011**
- Director **Society of Petroleum Engineers International (SPE), Pakistan Chapter**
- Member **Middle East Petroleum Club**
- Full Member **American Association of Petroleum Geologists (AAPG)**
- Member **Advisory Board - Petroleum Engineering Department, NED University of Engineering and Technology**
- Expert Member - **Board of Studies, Petroleum Engineering Department, NED University of Engineering and Technology**
- Member, **Curriculum Review Committee, Higher Education Commission, Government of Pakistan**

EDUCATION

Ph. D. Petroleum Engineering, GPA: 3.9/4.0

The University of Texas at Austin

Dissertation Title: *A Dynamic Theory of Hydrocarbon Migration and Entrapment*, Supervisor Dr Larry Lake

MS Petroleum Engineering, GPA: 3.5/4.0

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

BS Petroleum Engineering, GPA: 3.5/4.0, Deans High Honors List

King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia

PUBLICATIONS

1. Hamza Ali, Abdul Rahman Shah, Agha Hasan Akram, Waqar Ali Khan, Fareed Iqbal Siddiqui, Abdul Waheed, Faizan Ahmed, *"Modelling Complex Fluid Production Behaviour in a Gas Condensate Field: A Case Study"*
Paper: SPE-194771-MS, SPE Middle East Oil and Gas Show and Conference, Manama, Bahrain, March 2019.
2. Siddiqui, F. I., Naseem, M. O., Khan, F. B. and Asrar, M., *"Successful Integration of Innovative Technologies Enabled Operator to Drill and Complete First Horizontal Well in Depleted Shale Interbedded Limestone Reservoir in Pakistan"*, Paper SPE-171966, Abu Dhabi International Petroleum Exhibition and Conference, UAE, November 2014.
3. Siddiqui, F. I., Adhami, A., Asghar, A., Hussain, A., Khan, M. W., , *"Shale Gas Potential of the Lower Goru Formation Over Lakhra High in Lower Indus Basin, Pakistan"*, AAPG Annual Convention and Exhibition, Pittsburgh, 19-22 May 2013, Search and Discovery Article # 80373(2014))
4. Siddiqui, F. I., Syed, A. A., Hussain, H., Gilani, S. R. H. and Faisal, M., *"Geo-Chemistry – A Tool for Identification of Compartmentalization for Pab Sandstone (Sui Gas Field) Pakistan"*, presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, November 2011, (Search and Discovery Article #20138(2012))
5. Siddiqui, F. I., Mansur, S., Salam, A., Noor, S. M., *"Remedial Treatment Cures Induced Fracture/Formation Damages to Rejuvenate Frac'd Well"*, paper SPE 156202 presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, November 2011
6. Siddiqui, F. I., Khan, M. N., Rehman, Z., Bandal, M., *"Compositional Reservoir Simulation of Adhi Field with Sharp Changes in Oil Gravity with Production"*, paper SPE 156212 presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, November 2011

7. Khan, M. N., Siddiqui, F. I., Mansur, S., and Syed D. A., "Hydraulic Fracturing in Gas Condensate Reservoirs: Successes, Setbacks and Lessons Learnt", paper SPE 142848 presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, November 2010
8. Jadoon, I. A. K., Bhatti, K. M., Siddiqui, F. I., Jadoon, S. K., Gilani, S. R. H., and Afzal, M., 2007. *Subsurface fracture analysis in carbonate reservoirs: Kohat/Potwar Plateau, North Pakistan*. Pakistan Journal of Hydrocarbon Research, v. 17, (June 2007), p. 73-93.
9. Siddiqui, F. I., Khan, M. N., Gilani, S. R. H., Minner, W. A., Hai, L., "First Hydraulic Fracturing Job in Tobra and Khewra Sandstones at Adhi Gas Condensate Field, A Case Study", presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, March 2007
10. Brohi, I., Siddiqui, F. I., Akram, A. H., "Micro-fracturing Stress Testing Using Wireline Conveyed Formation Tester in Sandstone Formations in Potohar Region of Pakistan", presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, Nov. 2007
11. Siddiqui, F. I., Akram, A. H., Khan, M. N. and Brohi, I., "Application of Straddle Packer Wireline Formation Testing to Fractured Carbonates – Cased Hole and Open Hole Applications", presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, Nov. 2005
12. Siddiqui, F. I., Haider, S. A. and Khan, M. N., "Re-Discovery of Sakesar Reservoir at Adhi Field – Result of New Technology Application", presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, Oct. 2004
13. Siddiqui, F. I. and Khan, Z. H., "Importance of Experimental Determination of Relative Permeability Curves in Predicting the Performance of Gas Condensate Reservoirs Under Depletion Drive", presented at the SPE-PAPG Annual Technical Conference, Islamabad, Pakistan, Nov. 2001
14. Siddiqui, F. I., "Defining Fluid Distribution and Fluid Contacts for Dynamically Charged Reservoirs", paper SPE 56513, presented at the 74th SPE Annual Technical Conference, Houston, Texas, 1999
15. Siddiqui, F. I. and Lake, L. W., "A Comprehensive Dynamic Theory of Hydrocarbon Migration and Trapping", paper SPE 38682 presented at the 72nd SPE Annual Technical Conference, San Antonio, Texas, 1997
16. Siddiqui, F. I. and Lake, L. W., "A Dynamic Theory of Hydrocarbon Migration", Mathematical Geology, v.24, no. 3, 1992
17. Siddiqui, F. I., "A Dynamic Theory of Hydrocarbon Migration", May 1996, Ph D Dissertation, The University of Texas at Austin, UT Electronic Theses and Dissertations. <https://hdl.handle.net/2152/80647>
18. Siddiqui, F. I., "Development of Shape Factor Equations as a Function of Drainage Area Geometry and Well Location" MS Thesis, Jan 1987, King Fahd University of Petroleum and Minerals, Saudi Arabia.