Mohammad Sarwaruddin, PhD
Senior Reservoir / Simulation Engineer

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EDUCATION

- PhD (Reservoir Engineering) Norwegian University of Science & Technology (NTNU) Norway, 2003
- MS (Petroleum Engineering) Norwegian University of Science & Technology (NTNU) Norway, 1995
- BS (Chemical Engineering) Bangladesh University of Engineering & Technology (BUET), 1987

PROFESSIONAL PROFILE

Over 30 years of petroleum engineering experience including:

- Field development planning, project management, forecasting, reservoir characterization, simulation, and mature field re-developments
- Heavy oil and extra heavy oil development experience by SAGD and CSS techniques
- Well rounded petroleum engineering background with experience in production and reservoir engineering
- Excellent written and verbal communication skills
- Extensive international experience

WORK EXPERIENCE

MHA PETROLEUM CONSULTANTS LLC, Bakersfield, California

(2015 – Present) **Lead Reservoir Engineer**

Conduct reservoir simulation studies for heavy oil reservoirs in South American and California.

OCCIDENTAL PETROLEUM /CRC, BAKERSFIELD, CALIFORNIA, USA

(Apr 2013 to Apr 2015) **Sr. Advisor Reservoir Engineer**

Lead a team of junior and senior engineers in California to complete several heavy oil projects - Kern Front, Round Mountain, Lost Hills Fields on time enabling the business units to accomplish field development decisions with satisfaction and greater confidence. Review and recommend end-of-life field development scenarios for two marginal reservoirs by reservoir simulation and economic analysis to optimize different development strategies. Demonstrate effective communication skills among cross disciplines-geology, petrophysics, planning, reserve and

operation engineers. Managed and completed several special projects with other BU(s) Vintage and Elk Hills. Provide Advisory supports to California Heavy oil Business unit to develop the PVT experimental protocol.

STATOIL CANADA, LTD

(July 2008 to Apr 2013) **Principal Reservoir Engineer**

Represent Statoil and lead a technology group in a multi company technical group where ConocoPhillips, Nexen, Suncor, Total and Siemens AG Germany are partners in developing alternate recovery methods for extra heavy oil using combination of electromagnetic heating and rich gas injection techniques with steam. Prepared experimental data management document for a Tax rebate application to Canada Revenue Agency (CRA) under Scientific Research & Experimental development (SR&ED) program that brings generous tax rebate for Statoil Canada. Prepared a significant part of Best practice document for extra heavy oil simulation for Statoil, Canada. Developed a Wind-Down model for extra heavy oil production management in the late phase when continuous steam injection becomes uneconomical. The tasks includes comprehensive PVT model building by EOS package WinProp, simulation recommendation and implementation of a non-condensable gas injection scheme during wind-down phase of the steam Assisted Gravity Drainage (SAGD) process. Characterized various solvent and Bitumen using Equation of state (EOS). Design, select and simulate a steam-solvent scheme to enhance SAGD performance. Review and design experimental PVT programs. Up scaled Geo-model in RMS/Petrel. Completed CO2, N2 and C1 based gas injection study by thermal simulation during wind-down phase SAGD process. Designed a set of screening criteria for ranking and selecting technologies for developing the challenging mud dominated non SAGD-able reservoirs. In addition, the effectiveness of selected technologies are tested by thermal simulator STARS.

SPROULE INTERNATIONAL, LTD, CALGARY, CANADA

(July 2006 to July 2008) **Senior Reservoir Engineer**

Conduct a history match on a Syrian heavy oil reservoir for Tanganyika Oil Co., and predicted cyclic steam stimulation (CSS) performance using CMG STARS simulator. A history matches on an Argentine medium heavy oil reservoir for REPSOL YPF and investigate IOR possibilities by Polymer flooding using IMEX. A history match on an Egyptian gas condensate reservoir for Centurion Petroleum Corp., and predicted future performance using Schlumberger compositional simulator Eclipse300. The history match tasks included RFT, Static and wellhead pressure and OGR matching. Two waterflood simulation studies one in Alberta (TWP-33, Rng-28W4), Canada and the other one in offshore Tunisia operated by Storm ventures. History matching various gas storage pools in Southern Ontario, Canada, operated by Enbridge and recommended infill drilling locations for increased gas deliverability. Review simulation results and evaluate Balmoral field in the North Sea operated by OilExco, Canada.

UNITED OIL AND GAS CONSULTING, LTD, CALGARY, CANADA

(September 2003 to June 2006) **Senior Reservoir / Simulation Engineer**

Involved in many different reservoir engineering and simulation projects including structural model building from surface and property maps. Meetings and discussions with clients, geologists, engineers and technologist were maintained at various forms to accomplish the projects on time and budget. After completion of projects, reports were prepared to assist clients to take useful decisions.

NORSK HYDRO (NTNU), BERGEN, NORWAY

(1998 to June 2003) **Reservoir Engineer**

SINTEF (IKU), TRONDHEIM, NORWAY

(1997 to 1998) **Project Engineer**

PETRO-BANGLA DHAKA, BANGLADESH

(1988-1997) **Project Engineer, Pipeline Engineer**

PROFESSIONAL MEMBERSHIPS

- Society of Petroleum Engineers (SPE)
- Association of Professional Engineers and Geoscientists of Alberta (APEGA)

PUBLICATIONS

1. "Comparing Different Methods for Capillary Pressure Measurements" included in the Society of Core Analyst (SCA) proceedings held in Abu Dhabi Oct. 2000.
2. "Modelling of Capillary Pressure for Heterogeneous Reservoirs by a Modified J-Function" included in Society of Core Analyst 2001 proceedings, 17-19 September, Edinburgh., UK
3. "Fluid Distribution in Transition Zones" included in Society of Core Analyst 2001 proceedings, 17-19 September, Edinburgh, UK.
4. “Impact on SAGD production of Initial Gas Oil Ratio and Methane Solubility in Water” presented in World Heavy Oil Congress, Edmonton, March 14-17, 2011
5. “Effect of In Situ Emulsification on Heavy Oil and Water Relative Permeability”, SPE-185657 Conference Paper for the SPE Western Regional Meeting, Bakersfield, CA, April 23-27, 2017