

# STEPHEN JAMES ADAMS

## OBJECTIVE

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In my nearly four decades as a technical professional I have enjoyed focussing on understanding and solving real-world problems. Excellent analysis and inter-personal skills, combined with a strong background in physics, geology, computing concepts and tools, are the keys to my success.

In future employment, I look forward to continuing to add value through appropriate analysis and innovation. I also look forward to educating other professionals where possible.

## SUMMARY OF QUALIFICATIONS

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- A track record of adding significant value to my employers and clients.
- Thirty-eight years experience working internationally as a Petrophysicist, with thirty-one years as an independent Consultant and seven years at the oil major Shell International.
- Master of Science in Physics with First Class Honours.
- After invitation, have served on the SPE Formation Evaluation Award and SPE Annual Technical Conference Formation Evaluation paper selection Committees. Have served as a Technical Editor for the SPE Reservoir Evaluation & Engineering Journal.
- Passed Chartered Member Assessment for New Zealand Institute of (Company) Directors.

## VALUE ADDED

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Some examples of where significant value was added or expertise transferred include;

- Recognition of significant overlooked gas pay offshore Western Australia resulting in new multi-billion dollar Field Development.
- Developing methodology and saturation history model to explain inconsistent oil saturations observed in nearby offshore exploration wells. Instead of relinquishing, Operator chose to spend over \$1 billion to develop the two Fields based on my analysis. To date over 50 million barrels have been produced.
- Petrophysical appraisal of gas field under development resulting in 25% increase in reserves (+0.2 Tcf), with full reconciliation between log and core data.
- Recognition and quantification of a significant tight gas resource (>1 Tcf) previously mis-interpreted and overlooked using core and log data.
- Writing and publishing the industry's most comprehensive book on Saturation-Height Modelling in 2016.
- Running training courses covering basic to advanced Petrophysical subjects at locations from New Zealand to Europe.
- Co-authoring the Shell Manual detailing the use of *Capillary Pressure Measurements and Saturation-Height Functions* in formation evaluation. The latter half of the book detailing uses of the data was my contribution. This document was very quickly used in Shell Operating companies to calculate reserves additions and to provide technical arguments in equity negotiations.
- Evaluating a very recently abandoned exploration well to find overlooked oil-bearing sands. The value of the find was highlighted such that embarrassment to the people involved was avoided. A re-drill produced more than 1200 b/d of oil.

## INNOVATIONS

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Some examples of innovative thinking are:

- Developed methodology to use Cement Bond wave-trains to identify quality of casing-cement & cement-formation bonds separately. Technique used to rank likely zonal isolation.

- Development of methodology to characterise permeability in very heterogeneous reservoirs. Good matches to well test properties have resulted, where the reservoir properties were previously underestimated using conventional approaches.
- Development of quantitative methodology to ensure representative sampling in core analyses.
- Development of methodology to estimate imbibition capillary pressure curves based on drainage capillary pressure data. The technique has been calibrated using core data and validated against wireline log evaluations through short and long oil and gas columns that have experienced imbibition.
- Quantified gas saturations using cased hole neutron logs calibrated to unchanged intervals and open-hole log derived gas saturations. The same logs had previously only been used for contact location. The quantitative gas saturations allowed identification of previously unrecognised bypassed intervals and gravity drainage phenomena.
- Development of technique for better estimating hydrocarbon saturations in thin beds using conventional logs. The technique was used in a one-week study of a Brunei Field, yielding hydrocarbon volumes and locations similar to a three-month study carried out by the Operator. The model was also used to understand the previously unexplained production behaviour of a very thinly laminated Miocene field in New Zealand.
- Development of technique to rapidly and cost effectively quantify fracture porosity over un-cored intervals by calibration to core or imaging device. The Operator received estimates of hydrocarbon volumes in the fracture system in time for operational decision-making. Conventional analysis techniques could not have met the tight time frame required.

## SPECIAL SKILLS

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- Have developed particular expertise in core analysis specification, interpretation and reconciliation with wireline log data. Expert in residual hydrocarbon and saturation-height definition.
- Skilled in reservoir and seal characterisation for CO<sub>2</sub> sequestration projects.
- Cased-Hole & Cement bond log interpretation for zonal isolation and abandonment/decommissioning.
- Work occasionally as Operator representative in external Reserves reviews, and, more often, for external Auditors and Reserves Certification companies.
- Expert at real-time, fit-for-purpose Exploration, Appraisal and Development well evaluations (on or off-site).
- Experienced in integrating work with other professionals in team environments.
- Experienced in mentoring and training new recruits and less experienced engineers.
- Experience with NMR logging, interpretation and comparison with conventional log and core data.
- Skilled at quantifying and documenting uncertainty ranges in derived formulae and reservoir properties to facilitate realistic reservoir modelling.
- Work well under stress and to tight deadlines.
- Excellent analysis and problem-solving skills allow me to produce valid interpretations where others have failed.
- Expert with a number of Petrophysical Software Packages including: ALT's WellCAD, Landmark's PETROWORKS and Paradigm's GEOLOG. Experienced with Interactive Petrophysics (IP) & Techlog.
- Excellent conventional and object-orientated computer programming skills in Java, Python, Fortran and Visual Basic.
- Experienced with Machine Learning in neural network and symbolic regression forms.
- Written my own Monte-Carlo modelling software for uncertainty analyses in reservoir properties and HCIIP calculations. Experienced in its use and customisation.

## PROFESSIONAL EXPERIENCE

September 1994  
onward

THE PETROPHYSICIST LTD.  
*Petrophysical Consultant*

NEW ZEALAND

Set up Petrophysical consulting venture after market research revealed a significant niche. Consulting work has provided full time employment since September 1994. Work has been for hydrocarbon exploration and development companies operating in Africa, Asia, Australia, Europe, New Zealand, South America and the Middle East.

Highlights of this work include:

- Working with Australian State agency on Carbon Capture and sequestration.
- Running Saturation-Height Modelling courses for largest Operator in the World.
- Running combined Training courses with Colin McPhee in Australia & virtually.
- Authoring 2016 Technical Manual: "Saturation-Height Modelling for Reservoir Description". This book is targeted at Petroleum Engineers and University Engineering Departments worldwide.
- Recognised that a number of recent Field discoveries were not in static capillary or formation pressure equilibrium across a number of continents and geographical areas. Working to improve recognition of these "dynamic" scenarios.
- Review of petrophysical evaluation methodology for a SE Asian Operator. Changes recommended allow the previously "unpredictable" well test results to be understood and more optimal testing and production strategies to be adopted.
- Identification of a likely perched water system in a recently discovered Australian oil field with conflicting oil-water contact information.
- Recognition that a large offshore gas Field was initially in imbibition rather than drainage at discovery. This observation greatly aided understanding of the observed short transition zones and likely aquifer support.
- Providing petrophysical support to a highly respected independent consulting group during Reserves Certification work.
- Providing training courses on "Capillary Pressure and Saturation-Height Modelling" and "Advanced Petrophysical Interpretation" for the SPWLA Chapter in Perth and other Australian and South-East Asian Operators.
- Solving a long-standing Petrophysical dilemma for a marginal off-shore oil field. The Operator now has the confidence to proceed with development after an increase in likely reserves of over 30 million barrels.
- Being appointed to the Formation Evaluation Award Committee of the SPE for a 3 year term from 2003. Also appointed to the paper selection committees for the SPE Annual Technical Conference and Exhibition in Denver, October 2003, Houston, September 2004 and Dallas, October 2005.
- Study to better characterise residual gas saturations in a large established gas field, resulting in significant increase (+0.4Tcf) in remaining reserves.
- Petrophysical appraisal of gas field under development resulting in 25% increase in reserves (+0.2 Tcf), with full reconciliation between log and core data.
- Recognition and quantification of a significant tight gas resource (>0.1 Tcf) previously mis-interpreted and overlooked.
- Recognition of water imbibition prior to discovery being important in most Taranaki (New Zealand) hydrocarbon accumulations i.e. very short transitions zones are dominant.
- Development of technique to rapidly and cost effectively quantify fracture porosity over un-cored intervals by calibration to core or imaging device.
- Developed quantitative methodology to ensure representative sampling in core analyses.
- Involved with reservoir monitoring planning and interpretation to aide in optimising mature gas field development.
- Training & mentoring of junior engineers in Petrophysics and log analysis software.

October 1993 to  
September 1994

WOODSIDE PETROLEUM  
*Senior Petrophysical Engineer*

AUSTRALIA

Seconded from the Shell Group to work initially in the business unit developing Woodside's oil fields. A re-assignment into the team developing the Goodwyn gas/condensate reservoir and maintaining production from the North Rankin gas/condensate field followed.

Responsibilities included specification of formation evaluation requirements for appraisal and development wells and advising on appropriate evaluation techniques. Involvement with integrated studies, staff training, support to lateral prediction and operational petrophysical duties were also required.

Highlights of this work include:

- Finding major flaw in subsea perforating strategy for oil field about to be developed. Continuing with the plan would have resulted in US\$30 million worth of wells being junked as well as 60,000 b/d of oil deferment.
- Using resistivity modelling runs to populate a spreadsheet allowing Woodside's first use of a multiple depth MWD resistivity tool to monitor the distance of a horizontal well from the overlying shale in real-time.
- Organising the transfer of all original log data from 1500 tapes in a variety of reel formats to six checked tape cartridges. Petrophysical data handling costs were reduced, while data accessibility was increased.

October 1991 to  
September 1993

SHELL INTERNATIONAL PETROLEUM  
*Petrophysical Engineer*

NETHERLANDS

Employed in the Technology Development section at Shell's Hague offices. Responsibilities were diverse and included focal point and advisor for petrophysical technology. A broad knowledge of formation evaluation techniques was vital to provide timely responses facilitating the business of operating companies. To monitor technology developments in the oil and gas sector, liaison with third party contractors involved in formation evaluation activities was critical. The applications of new technologies to a variety of petrophysical problems were investigated.

Research planning and the evolution of Shell's technology development strategy were key roles. Related activities included the review and dissemination of ongoing research. Production of comprehensive manuals was used to disseminate research and to provide detailed guidelines for business processes.

Highlights of this work include:

- Co-authoring a Shell Manual on *Capillary Pressure measurements and Saturation-Height Functions* in formation evaluation. The latter half of the book detailing how to use the data was my contribution. This document was quickly used in Shell companies for reserves additions and technical arguments in equity negotiations.
- Other planned documents to which significant contributions were made include: *Cased-Hole and Production Logging Guidelines*, *Core Analysis Manual*, *Making the Most from Well-Site Data*, *Gas-Oil Differentiation Techniques* and *Residual Oil Saturation Determination*.
- Helping determine Shell Technology Development strategy for Petrophysics.
- Assisted in training of inexperienced engineers and lectured on technical courses.

May 1988 to  
September 1991

PETROLEUM DEVELOPMENT OMAN LLC  
*Petrophysical Engineer*

OMAN

Seconded from the Shell Group, initially assigned as Petrophysicist for two of the largest oil fields in Oman. Evaluations of development wells were undertaken. Experience with both new and vintage data was acquired. Where limited data was available, some novel techniques had to be employed. Improved oil-in-place estimates were made through petrophysical reviews, rock property mapping and saturation-

height function derivation. Reservoir monitoring programmes were integral parts of field management.

In November 1989, was re-deployed to Exploration Support. Work involved the planning of Exploration wireline log acquisition programmes and their consequent interpretation. The re-evaluation of old log data was also undertaken to assist in maximising the chances of drilling on a successful prospect. A large number of wells were drilled (>100) and a number of hydrocarbon accumulations identified.

Highlights of this work include:

- Taking a leading role in the first Borehole Gravimeter surveys ever conducted to estimate secondary gas saturations in an oil field. As a consequence, full-scale gas-oil gravity drainage was implemented in a large fractured carbonate oil field.
- Evaluating a very recently abandoned exploration well to find overlooked oil-bearing sands. The value of the find was highlighted in such a way that embarrassment to the people involved was avoided. A re-drill produced in excess of 1200 b/d of oil.
- Extensive use of Pulsed Neutron logs for reservoir sweep monitoring.
- Extensive visits were made to well sites, witnessing and supervising a number of logging and associated activities.
- Assistance in the training of inexperienced engineers was undertaken.

September 1987 to  
May 1988

SHELL INTERNATIONAL PETROLEUM  
*Trainee Petrophysical Engineer*

NETHERLANDS

On initial employment, seven months of training was undertaken at Shell's Noordwijkerhout Training Centre in the Netherlands. Thereafter an assignment to Petroleum Development Oman was forthcoming.

Highlights of this work include:

- Successful completion of the Campbell Gas course.
- Approximately 1 month spent working with the drilling crew and well-site engineers on drilling and work-over rigs around the Netherlands.

August 1986 to  
August 1987

BHP MINERALS INTERNATIONAL  
*Technical Systems Analyst*

AUSTRALIA

This Melbourne based position involved both the development and maintenance of technical software packages used by BHP mining operations throughout Australia.

Extensive liaison with both users and vendors was necessary to meet the business requirements. Programming work was predominantly in FORTRAN-77. The fourth generation language SQL was used in conjunction with the ORACLE relational database management system. SAS was used for most statistical applications.

Highlights of this work include:

- Using an innovative approach to provide a program enhancement after 1 day of programming, when it had been expected to take at least 3 weeks.
- Porting a technical application from Data General to VAX/VMS environments.
- Travel to locations around Australia that would not normally be accessible.

## COURSES UNDERTAKEN

2024	Pulsed-Neutron & Production Log Workshop	Dale Fitz (TPL)
2017	Certificate in Company Direction	Institute of Directors (NZ)
2016	Shale Gas Petrophysics	SPWLA/ University of Leicester
1999	Java Programming – SL275A & B	Sun
1993	Using the Exploration & Production Business Model	Shell
	Theoretical Aspects of Well Synthetic Generation	Shell
1992	Reservoir Engineering for Other Disciplines	Shell
	Cased Hole Evaluation	Shell
	Petroleum Economics Seminar	Shell
1991	Core Data in Reservoir Description & Evaluation	Corelab
	Cement Log Evaluation	Schlum.
1990	Advanced Petrophysics	Shell
	Production Geology	Shell
1987	Introductory Petroleum Engineering, Drilling, Operations & Economics	Shell

1981 – 1986	UNIVERSITY OF AUCKLAND	NEW ZEALAND
	<i>M.Sc. (First Class Honours) Physics,</i>	
	■ Thesis: “Size-Fractionated Raindrop Chemistry Studies” looked at efficiency of atmospheric pollutant scavenging by raindrops.	
	<i>B.Sc. Physics and Chemistry</i>	
	■ Completed sufficient papers for individual majors in both chemistry and physics.	
1976 - 1980	GLENDOWIE COLLEGE (Secondary School)	AUCKLAND, NEW ZEALAND
	<i>Dux (Top Academic Student)</i>	
	■ University Junior Scholarship awarded (only 200 per year given country-wide).	

## INTERESTS AND ACTIVITIES

Ideas/Inventing/Innovating, SUP, Windsurfing, Reading, Renewable Energy, Sailing, Skiing, Swimming, Writing.

## EXTERNAL PUBLICATIONS

1. Montague, E., Frears, B., Browne, M., Strauss, P., Adams, S.J. & Prosser, J.: "Rediscovering the Gummy Gas Field – Gippsland Basin," The APPEA Journal 63 190-206 <https://doi.org/10.1071/AJ22246>.
2. Adams, S.J.: "Which Saturation-Height Function?", paper OOO, SPWLA 57<sup>th</sup> Annual Logging Symposium, Reykjavik, Iceland, 25-29 June 2016.
3. Adams, S.J.: "Log vs. Core Sw - How to Compare? And How Do They Compare?", Formation Evaluation Society of Malaysia Master Seminar on Saturation, Kuala Lumpur, 3 October 2013.
4. Adams, S.J.: "Insights from Sw - What Else Can I Get from the Data?", Formation Evaluation Society of Malaysia Master Seminar on Saturation, Kuala Lumpur, 3 October 2013.
5. Adams, S.J.: "Case Studies: How Well Does It Work? Thin Bedded Models and Tools in Action", Formation Evaluation Society of Malaysia Seminar on Thin-Bed Evaluation; Petrophysical Challenges and Solutions; Methods, Tools And Case Studies, Kuala Lumpur, 29 November 2012.
6. Adams, S.J.: "Core-To-Log Comparison – What's a Good Match," SPE 97013, ATCE Dallas, 9-12 October 2005.
7. Adams, S.J.: "Quantifying Petrophysical Uncertainties," SPE 93125, APOGCE Jakarta, 5-7 April 2005.
8. Adams, S.J.: "Modelling Imbibition Capillary Pressure Curves," SPE 84298, ATCE Denver, 5-8 October 2003.
9. Adams, S.J.: "New Insight into Eromanga Basin Oil Saturations," SPE 77886, APOGCE Melbourne, 8-10 October 2002.
10. Verbruggen, M.H.W. and Adams, S.J.: "Residual Hydrocarbon Saturations In the Maui Field," SPE 68741, APOGCE Jakarta, 17-19 April 2001.
11. Adams, S.J.: "Fracture Porosity from Conventional Logs with Image Tool Calibration," SPE 64408, APOGCE Brisbane, 16-18 October 2000.
12. Engbers, P., Adams, S., Farmer, R., Mathers, R. and Soek, H.: "Whaarangi: Prospect Potential Resolved," SPE 64440, APOGCE Brisbane, 16-18 October 2000.
13. Adams, S.J., Farmer, R.G., Hawton, D. and Seybold, O.: "Laboratory and In-Situ Determination of Residual Gas Saturations in Maui," proceedings of N.Z. Petroleum Conference, Christchurch, 19-23 March 2000.
14. Farmer, R.G., Adams, S.J., and Verbruggen, R.: "State-of-the-Art SCAL Experiments and Interpretation," proceedings of N.Z. Petroleum Conference, Christchurch, 19-23 March 2000.
15. B.A. Rogers, Adams, S.J., Holstege, G.C.J., Nazzari, C.A., Viets, T.P. and Young, I.M.: "Maari-1/1A - Results and Implications for Development," proceedings of N.Z. Petroleum Conference, Christchurch, 19-23 March 2000.
16. Adams, S.J., Farmer, R.G. and Heuvel, E. van den: "Modelling Maui with Imbibition Capillary Pressure Curves," proceedings of N.Z. Petroleum Conference, Queenstown, 30 March to 1 April, 1998.
17. Farmer, R.G. and Adams, S.J.: "Facies Recognition Using Neural Networks," proceedings of N.Z. Petroleum Conference, Queenstown, 30 March to 1 April, 1998.
18. Adams, S.J. & Popta, J. van: "Gravity Gains Momentum," Middle East Well Evaluation Review, pp.6-11, N0. 12, 1992.
19. Adams, S.J.: "Gas Saturation Monitoring in North Oman Reservoirs Using a Borehole Gravimeter," SPE 21414, Middle East Oil Show, Bahrain 16-19 Nov. 1991.
20. Popta, J. van, Heywood, J.M.T., Adams, S.J. and Bostock, D.R.: "Use of Borehole Gravimetry for Reservoir Characterisation and Fluid Saturation Monitoring," SPE 20896, Oct. 1990.
21. Bostock, D.R., Adams, S., Mercadier, C., Milatz, H., Weerd, H. van der and Walker, T.: "Generation of a Field Development Plan, Natih Field, North Oman," The Archie Conference, Houston, Texas, 22-25 Oct. 1990.
22. Bradley, S.G., Stow, C.D., Adams, S.J. & de Mora, S.J.: "Preliminary Measurements of Raindrop Chemistry Using an Improved Raindrop Chemistry Spectrometer," New Zealand Journal of Geology and Geophysics, Vol. 34, pp:555-558, 1991.
23. Adams, S.J., Bradley, S.G., Stow, C.D. and Mora, S.J. de: "Measurements of pH versus Drop Size in Natural Rain," Nature 322, pp.842-844, 1986.