Mark Deakin

Job Title	Petrophysics Course Instructor / Advisor / Technical Consultant
Experience	30 Years
Education	PhD "The Integrated Petrophysical Analysis of Brae Conglomerates, North Sea", Imperial College, London. BSc (Honours) Geology, University of Reading, UK
Languages	English
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Availability	Global. SE Asia, Europe, Australia

Mark Deakin is a consultant, author and course instructor in Petrophysical Data Integration. He holds a Ph.D. in 'Integrated Petrophysics' from London's Imperial College, is an ex Amoco petrophysicist and has over 25 years experience, including 18 as a course instructor with PetroSkills and HOTEng. He has **performed over 60 detailed reservoir studies worldwide; primarily in Southeast Asia's Low-contrast pay and Carbonate & Fractured reservoirs.** Deakin's proven approach is to identify and rank reserves uncertainties then guide companies towards defensible booked reserves via the application of new technology, targeted data acquisition and the systematic, logical integration of all related data. After his PhD Deakin authored the first public Integrated Petrophysics course in 1989 which evolved into the industry's benchmark mainstream petrophysics training course. This was followed by courses in Carbonate & Fracture petrophysics and 3 day focused modules on How to use Modern Logs with SCAL, Quick Look Integration Techniques, Low Resisivity Low Contrast Pay, Laminates & Thin Beds, Using PetroDB effectively and Renewable Energy. The uniquely powerful PetroDB-WEB core-log-test linked database is his current project. Deakin is an active member of SPWLA, an occasional lecturer at Curtin University, sailor and runner and his consulting company PETROPHYSICS Pty Ltd has offices in Perth, Australia.

EXPERTISE

- All Things Petrophysical ! (IPRC training course)
- **Asset Evaluation**: hidden value / hidden problems / partial disclosure
- Excellent technical communicator/trainer
- Mentor/Advisor on all petrophysical aspects of Reservoir Management
- Remote step-by-step guidance/mentoring for any complex reservoir evaluation
- Operations: drilling & data acquisition cost-benefits
- How to log and evaluate this field for minimum cost and maximum benefit
- **Link logs to PetroDB's rock-typed core/SCAL 30,000 plug database & eqns** (PetroDB-WEB course)
- How to improve **Quick Look operations** with PetroDB-WEB (IPQL training course)
- Core-log-test integration embracing modern hi-tech logs (Lithosanner, NMR, ADT, SonicScanner, MDT)
- Operations guidance and evaluation of complex **fractured carbonate** reservoirs (IPCFR training course)
- **Low Contrast Pay,** laminated and stacked **shaly sands** evaluation (IPLRLC training course)
- Core and log **Saturation-Height** modelling
- Which Special Logs with which Special Core? (SCAL)
- How to integrate your legacy SCAL with new Special Logs (IPSCAL training course)
- SCAL Program Design for modern hi-tech log integration (NMR, Dielectric, MDT, SScan)
- Common use Equation Sets for (SCAL - Petrophysical - Geomodel)
- Key Well studies and Evaluation Templates and for any Reservoir Type
- Independent Asset Evaluation, **Reserve Audit** & Certification
- Software: PetroDB-WEB, Licensed IP & Geolog
- OnThe-Job- **Parallel Petrophysical Training**

INTERESTS

The evolution, communication and implementation of data acquisition and **petrophysical evaluation workflows** for operational decisions and geo-models **which integrate all modern data for all Reservoir Types.** Keen course instructor/lecturer and advocate of applying the concept of Data Hierarchy during integration

The Development and evolution of PetroDB-WEB.

Traded Options, Sailing, Swimming, Running (fast!)

WORK AREAS

SE Asia, Europe, Australasia, North America, Africa, Middle East. World

AFFILIATIONS

SPWLA

COMPUTER SKILLS

Interactive Petrophysics (IP), Geolog, PetroDB-Vault user app: A-Z evaluation command file

(Petrodb-WEB), Petrel, Excel, Powerpoint, Word, Outlook

EMPLOYMENT HISTORY

1998-present	**PETROPHYSICS Pty Ltd**, Technical Consultant & Course Instructor, Perth
1992-1998	**Consultant Petrophysicist & Course Instructor**, London
1987-1992	**Amoco UK Ltd**, London
1984-1989	**Imperial College (PhD)** & part time Wellsite Geologist, London
1980-1984	**Wellsite Geologist.** UK, Texas/Louisiana, Africa, Mediterranean
1977-1980	**Mudlogger & Wellsite Pressure Engineer** The Analysts, London. Data Log, New Orleans

CLIENT LIST (Partial)

Agoco, AkerBP, Aramco, BP, BHP, Boral, BowValley, BritishGas, Caelus, CarigaliTriton, Chevron, Conoco, Cue, DiscoveryGeo, DanaGas, DNO, Equinor, Esso, FletcherChallenge, Hardman, HLHVJOC, HOTEng, HOEC, Hydro, Idemitsu, Interoil, Kosmos, KNOC, MOL, NorskHydro, Perenco, Petroklass, PetroSA, Petronas, PGL, Premier, RDSHelix, ROC, Salamander (all offices), Schlumberger, Sphere, Staroil, Statoil, Tately, Triton(Hess), Tullow, UEPL, Uzma, Woodside.

PETROPHYSICAL FIELD STUDY LIST (Partial)

Amethyst, APN, Andrew, Antelope, Anoa, Armada, Awakino, Baong, Belanak, Belut, Bongkot, Bontang, Brae, Brent, Bualuang, Bumi, BungaMas, Buntal, Cakerawala, CatBa, Ceiba, Cliff-Head, Cooper, Cuu-Long-Basin, Dai-Hung, Drake, El-Giza, Elk, GG, Gulf-Of-Thailand, Gurame, Hamada, HaLong, Jadotway, Jeruk, Thai-Malay-JDA, Kambuna, Kapuni, Kepodang, Khorat, Kro-Kra, Kupe, L-Field, Lhoksemawe, Luconia, Malay-Basin, Mangahewa, Matamata, McKee, Natuna, North Lobe, Nuiqsut, OO, Pelikan, PhuHorm, Pilong, Pluto, Pornsiri, PY1, Rang-Dong, Rong-Doi, Sao-Vang, Sarir, Sembilang, Seruway, SK6, SK309, SK312, Sunrise, Suriya, Tawke, Te-Giac-Trang(TGT), Thebes, Tembang, Tulimaniq, Natuna, Udang,Vincent, Vinh-Chau

PETROPHYSICS TECHNICAL CONSULTANT, December 1989 – Present (Part List)

Dallas & Perth Oct-16 – Current: The detailed asset evaluation and marketing of an unconventional, **fracture stimulation** light, tight oil (LTO) reservoir for Private Equity client. Investigations of improved viability of existing operations by the application of new and emerging technology.

Alaska Jan to Apr-16: Unconventional light tight oil (LTO) reservoirs. Setup operations for integrated formation evaluation embracing drilling, mud, LWD, mudlogging, wellsite geologists, core, wireline and testing programs. Real time close operational team work and guidance on all FE related issues. PetroDB-Vault petrophysical evaluation of tight clastic reservoirs.

South Sudan Dec-15: Review and Recommendations for the improved petrophysical, reservoir engineering management and geo-model setup of a clastic oil development. PetroDB-Vault assisted integrated evaluation.

Dallas Jun-15 Aug-16: **Unconventional**. Review and recommendations of **fracture stimulation** tight oil developments. Improved rigorous, quantitative use of legacy data. Improved formation evaluation of modern fracture stimulation laterals in the absence of appraisal-development link wells – a common problem. Innovative, rigorous technique for the effective use of legacy vertical core data in modern horizontal fracture stimulation wells. This original work put the entire development onto an unprecedented hard data, quantitative footing. Vertical core was transplanted into the exact equivalent sub-layer in the nearest lateral and used for direct LWD lateral data calibration. Robust geo-models, improved recovery factor, lower $/bbl. This innovative process made rigorous use of sedimentologically biased core which had previously been used subjectively and qualitatively.

Vietnam Jan15: Idemitsu. Discovery well A-Z petrophysical integration of logs, NMR, core, SCAL, MDTs & well tests for standard petrophysical output plus oil, gas & water effective permeability curves using PetroDB-Vault methodology in clastic and **carbonate** reservoirs. Report includes the full Geo-Model Equation Set to build the geo-model consistently with future petrophysical evaluations and provides the data acquisition and evaluation template to develop this field.

Australia, Cooper Basin. Unconventional fracture stimulation wells Feb-May-13 Key Well Study: data acquisition and evaluation templates for old & new hi-tech well integraton including LWD, NMR, MDT and tests. P10, P50, P90 curves for Ø, Sw, kabs, kg, kw, pay and fractional flow using PetroDB-Vault. Key field development recommendations.

New Zealand. Oct-Dec12 Shell Todd Energy. Unconventional Fracture Stimulation wells. Return to Mangahewa Tight Gas (see below). Integrate new SCAL rel.perm and Pc data with NMR, Dielectric & Sonic Scanner to upgrade and extend the existing petrophysical evaluation with updated PetroDB-Vault methods. Derive real-time gas and water relative permeabilities / fractional flow. LWD & WL horizontal & high deviation wells. Improved location of Hydraulic Fracture Stimulation targets, completion swell packers and sliding sleeves. Wellsite fracking monitoring. This tight gas formation has an unusually complex drainage vs. imbibition geological history, creating surprises for the development team – greatly reduced by this technically sophisticated integration of core, log and production data.

Indonesia Mar12: APEC. Ranked Well Testing Scheme and improved logic for extreme Low Contrast Low Resistivity Pay oil sands (LCLRP). Probability of mobile hydrocarbons ranking. Improved drilling & data acquistion recommendations.

Vietnam Dec11: HLJOC. Ongoing implementation of Deakin's 2010 study findings for developement wells in stacked shaly sand oil reservoirs. Production Log update/calibration. New Perforating Guide Log

Thailand Nov11 ongoing: Salamander. Continued Bualuang Development, geo-model checksums, Khorat **tight carbonates**, numerous exploration well operations. Drilling, FMI, Sonic Scanner, NMR, core integration. Straight, high deviation and horizontal wells, LWD & WL.

Indonesia Jul11: Cue Energy. Petrophysial review and Forward Plan for **Fractured Carbonate** oil reservoir appraisal. Existing data and development concepts critically reviewed. Review, Recommendations and Forward Plan report.

Norway Jan11-ongoing: DNO. Follow up to Carbonates & Fracture Petrophysics in-house training. Review & Recommendations of work so far on two complex, **vuggy Fractured Carbonate** oil fields.

Papua New Guinea May09-ongoing: Interoil. Carbonate inhouse lecture course followed by integration, evaluation and way forward for the appraisal of huge, onshore **Fractured Carbonate** gas reservoir. World record DST flow rates, core, logs and drilling data integration and cost-effective appraisal strategies.

Vietnam Oct08-ongoing: HLJOC. Review & Recommendations then SCAL & Full Petrophysical Integration/Evaluation: Mudlogs, SWC, XRD, Core facies, Image log facies, All logs, RCA, SCAL Pc, Rel-perms, NMR logs, MDT excess pressures & samples. New NMR Sw. Swpc-Swrt-Swnmr & Perm reconciliation, Geo-model inputs. Development well minimum-cost logging tied back to study results. PLTs and PPL's Perforating Guidance Log brings all data to bear on this decision point – ongoing.

Indonesia Jan08: Salamander. Technical Consultant/Operations Petrophysics. Stacked shaly sands. Fresh, variable Rw's. [MRIL time domain analysis + standard log + generic PetroDB (RCA,SCAL,Pc) + RDToval] integration for por, Sw, k, kgas, FWL. Results, Recommendations

Thailand Sep07-Ongoing Field Management: Salamander. Heavy oil field appraisal. Investment review & recommendations. Later full petrophysical/geo-modeling integration: LWD, core, wireline, WFT, Tests, Sensitivities, Uncertainties, Petrel geo-modeling. Design detailed SCAL program: wettability, overburden porosity & kbrine, Pc, Kro:Krw, Sorw, Co/Cw, BQv, m*, n*, Interfacial Tension, Contact Angle. Revised simulation input

New Zealand Sep06: Balance. Operations Petrophysics. Technical consultant in tight, stacked shaly sands.

Norway July06: NorskHydro. Clastics and carbonate: 'The Petrophysics of Low Permeability Reservoirs' research project. 500+ recent petrophysical papers & articles read. Critique of methods & new evaluation proposed.

Thailand June06: Salamander, Thailand. Fractured Carbonate petrophysical integration – ongoing.

Indonesia May06: Salamander, Indonesia. Petrophysical evaluation of Carbonate & Clastics variable Rw wells.

Malaysia April06: Murphy Sarawak. Operations Petrophysics: LWD/PEX/MDT Dual Packer. Developed a generic system for permeability prediction from standard LWD data, local and PetroDB data. Uses a hierarchical, robust bound fluid prediction with a near universal Coates based Permeability Model. Reduced uncertainty of uncored pay and reserves. Provided clarity in uncored rocktypes. Reduced coring costs.

Perth, WA Apr05: Woodside. Seismic petrophysics. Full petrophysical resistivity/cap.press evaluation followed by seismic integration. Edited rhob, dtc, dts; fluid substitutions (Gassman) virgin and brine; virgin and brine synthetics. Various attributes aimed at wellbore calibration of subtle seismic character with excellent petrophysical and seismic data sets. Integration of resistivity with cap.press and permeability for a base case saturation.

Malaysia/Thailand November04: Carigali-Triton OpCo. Return to update 1997 "Facies Based Petrophysics". The JDA Petrophysical Model derives multiple Sws, continuously selects the least compromised result at each interval and calculates a foot by foot uncertainty curve. The "Sw Decision Tree" calculates, ranks and integrates any and all available sources of Sw: oil mud core, resistivity, cap.press, magnetic resonance, production logs etc within an agreed, transparent and fully flexible framework. A robust permeability output is an integral part of this process, allowing the estimation of undrilled contacts. The upscaled geo.model is checked against well results. See also Malaysia/Thailand Sep95

Malaysia August04: Petronas Agent. Carbonate and typical Stacked shaly sands pre-FDP appraisals.

Perth, WA Apr04 – ongoing: Woodside. Assurance Check3. Detailed review and independent critique of core-log, facies based geo-modeling. Porosity, Permeability, Sw-Height and Upscaling issues. Impact on reserves/plateau. Miscellaneous other tasks. Fluids/SCAL design: Gas:Brine Interfacial Tension

Brazil Feb04: Hardman Resources. Matamata field appraisal.

India NW Oct03 – Mar04: HOEC. **Fractured Basement** Gas Field appraisal (hydrothermally altered gniess) with **carbonate** satellite fields. Complex, staged, innovative integration of core, logs & tests for reserves certification & development scenarios in an extremely problematic reservoir. Staff training.

Indonesia Dec01 – Dec02: BP Indonesia. BP's 'Define' stage for Field Development Plan, complex poregeometry carbonate, detailed core-log integration, capillary pressure Skelt Sw functions, peer reviews. SCAl design. ALSO: Marginal conglomerates feasibility study / Detailed Geolog Multimin studies / Probabilistic vs Deterministic comparisons

Indonesia Apr01 – Dec01: BP Indonesia. Gas field appraisal. Full spec low invasion water mud coring, high porosity soft sands, LRLC pay, NMR, RDT(Halliburton) wellsite supervision. General and specific operational and evaluation recommendations, integration for reserves certification. Staff training.

Indonesia Jan00 – Feb01: Premier: Stacked shaly sands. Petrophysical Health Check. Re-evaluation of typical log analysis using all available data plus analogs towards reduced reserves uncertainty, reserves certification and focused data acquisition. Operational recommendations and evaluation: OBM, CMR, AIT, RCST, MDT for certifiable Netpay. Effective Parallel staff training.

Dallas, Texas Jun99-Jul01 ongoing: Hess (Triton Energy). Research, update and advise on low invasion OBM coring for direct reservoir Sw: mud specs, coring, core analysis, NMR logging and MDTs. Operations: data acquisition of Core, Platform Express, AIT, CMR(NMR), UBI, MDT, CST. Work closely with a first class, experienced team (The A Team), world class specialist consultants and effective management to forge a systematic integration of ALL data for robust, minimum error reserves, testing, prediction of undrilled contacts and seismic integration. This thorough, comprehensive and effective petrophysical data acquisition, and its proper integration, is key to booking maximum early reserves for this project's fast track development. Triton Do Things Properly!

Indonesia Aug99 – Aug00: Premier: reserves upgrade. Review of existing log analysis including recommendations for data acquisition and evaluation. The close implementation of these recommendations contributed to a 70% reserves upgrade.

Indonesia Dec98 – Aug99: Conoco: low resistivity low contrast pay (LRLC pay). Integrated petrophysical evaluation of varied brackish water reservoirs using all available data and disciplines: geophysical, geological, petrophysical and engineering, resulting in a significant reserves increase. Log-independent saturation reference. Data acquisition and evaluation templates. Parallel staff training.

Egypt Jan99. Tullow: Operations, 15000ft **Fractured Carbonates**. Operations, log integration, testing recommendations.

Thailand Nov97: Thaipo. Petrophysical Health Check: Critique and recommendations for cost-effective petrophysical data acquisition and evaluation. Data acquisition and evaluation templates.

New Zealand Dec97 – ongoing: Fletcher Challenge: Tight, high-pressure fresh water gas field appraisal. High Pc transition zones, complex pore geometries, fractures, nmr, mwd, innovative data acquistion, prediction of undrilled contacts via Reservoir Master Equation (see course summary).

New Zealand Mar-May98: Fletcher Challenge: Reserves, simulation model. Wet-gas development feasibility study, complex diagenesis. The study replaced and clarified numerous previous studies its thorough and systematic data integration. Pc rocktype calibrations etc, ko, predicted FWLs

China Jan-Aug97: Schlumberger Wireline & Testing. Technical author and editor, China WEC.

New Zealand Apr-Aug97: Fletcher Challenge: Mature field, reserves & simulation input, mixed-oil wettability, complex paleo and production related fluid zones.

Malaysia/Thailand Sep95 – ongoing. Petronas: Carigali-Triton Operating Company (CTOC). WaxmanSmits Sw. Low contrast pay (LRLC pay), freshwater stacked shaly sands, variable Rw. Design & implement complex SCAL program for "Facies Based Petrophysics" integration of core-FMI facies, core capillary pressures, MDT pressures, pump-out samples and hi-tech logs (NMR, FMI, ARI, IPLT, MWD), per facies for Reserves Booking (technical paper SPE 39761). The resulting 23% reserves upgrade was vigorously challenged by a rival operator, BP, who dispatched log analysis "experts" from Europe to challenge the study. However, arbitrated by Petronas, the challenge was sucessfully defeated due to the core based, technically sound nature of the evaluation. **The asset value was increased by $100 million,** dramatically increasing project profits and Triton's book value. (BP subsequently requested that I work with them in Jakarta to develop and implement this and similar ideas, see above)

"Whilst the changes in reserves implied by this study are large an alternative technique equally founded on direct core observations is difficult to envisage" (May-97 FBP report cover)

Malaysia/Thailand May95-Sep95. Petronas: Carigali-Triton Operating Company (CTOC). Operations. Gas-condensate freshwater stacked shaly sands. Optimised mud systems, innovative MDT programs, hi-tech logs, MWD, uncored Waxman Smits BQv, k and testing programs for shaly sand, very low contrast pay (LRLC pay). Data acquisition planned for Facies Based Petrophysics study (above). Petrophysical-seismic attribute integration for interwell HC column. Staff training.

Vietnam Exploration. Jan-Feb95. PEDCO. Typical S.E.Asia freshwater, stacked shaly sands. Sw, Netpay, testing-perforating recs. RCI, CBIL Image Log, WS Sw

Vietnam Dai Hung Formation Evaluation: Field Study. July94-Nov94 BHP Petroleum. Integrated Petrophysical Field Study: Complex mixed lithology **carbonate**s and dislocated stacked shaly sands. (WS Sw) What is Netpay? The criteria and delineation of Netpay and Netrock in cored, complex lithology, complex fluid zone, multiple oil reservoirs.

Vietnam Dai Hung Formation Evaluation: Operations. July93-May94. BHPPetroleum (Dual Water Sw). Sw, Netpay, testing recs. Integration of conventional & hi-tech logs with core & RFTs in dislocated, stacked, shaly, sideritic sands. Provided earliest recognition, later proved correct, of the truely problematic nature of this development.

North Sea LWD – Horizontal Wells – Unconsolidated Sands. Oct-Nov93. Bow Valley (UK) Ltd. Integration of MWD, conventional logs and core, from horizontal + vertical wells to plan for an Extended Well Test.

North Sea Development feasibility study. N.Lobe Brae conglomerates. Dec92-May93. Bow Valley (UK) Ltd. What is Netpay? A quantitative synthesis of all relevant data including water encroachment, depletion and core relative permeabilities to define Netpay, and the impact of conglomerate clasts on volumetrics and simulation. This bottom up, core-log detailed geological integration enabled the first successful history match, radically revised HCPV distribution and a 25% reserves upgrade for client's asset.

Malaysia Fresh water shaly sands Nov91. British Gas. Independent evaluations of problem wells including recommendations for improved drilling and targeted data acquisition.

North Africa Fresh water shaly sands and **carbonate**, mature reservoir. May92-Jan93 HOT Eng. (Dual Water Sw) HCFT (EHC), permeability and facies evaluated from open and cased hole logs, core, test and production data. Rationale for data extraction and reserves in capillary transition zone through careful, multidiscipline, concept and data integration.

North Africa Giant, mature oil field. Jan90 with ongoing updates. HOT Eng. (Dual Water Sw). A two year, integrated, full scale geological-reservoir engineering study of a mature, braided fluvial reservoir with secondary recovery problems. The study involved 300 wells, 10,000 feet of core, open hole & production logs. Ø, Sw, k, initial and residual oil saturation, heavy oil zones and logfacies were quantified and mapped. The petrophysical evaluation resulted from the systematic, detailed integration of core, production logs, RFTs, well tests and 25 years of production history and formed the cornerstone of the geological model. Following initial conditions mapping, utilising pre and post production wells, and predicting residual oil saturation the model was used as 'hard' input for simulation. Effective presentations were a key component of this study.

Russia Fresh water stacked reservoirs. Oct-Nov91. Quad Eng. A log analysis study of key wells with limited data utilising classic pre-porosity log analysis techniques.

North Africa Capillary Transition Zone **Carbonate**s July92 May93. Evaluation of HCIIP and producibility in variable transition zone producing carbonates: pore-typing, fracture ID for What is Netpay? Capillary pressure and relative perm. modelling in transition zone. Innovative transition zone klog from Sw and J Functions.

North Sea Netpay criteria re dynamic data. Oct-Nov90. Ireland Dept. of Energy. What is Netpay? Establishing key log parameters including permeability for Netpay by reference to production data and tests. Full re-calculation sensitivity studies to determine impact on GIIP.

North Sea Permeability prediction. Jan90-Jun92. Esso. Predicting permeability from logs in facies with dissimilar pore geometries but apparently identical bulk volumes.

North Sea Brae conglomerates Mar'88 Occidental Petroleum. Integration of all geological and engineering data from three N.Sea appraisal wells. Core-log-test integration, and a hierarchical (ranked) flow of conclusions solved a four year interpretation problem and provided the only credible explanation of extremely confusing data. This rigorous approach provided a general evaluation template which set the style of my career direction for thoroughness, attention to detail, and the careful, logical, piecing together of information.

PETROPHYSICS COURSE INSTRUCTOR, Jan 1990 – ongoing

Repeat in-house lecturer for numerous major operators including Statoil, Woodside, Chevron, Repsol, Aramco

1. IPRC: Integrated Petrophysics for Reservoir Characterisation

2. IPCFR: Integrated Petrophysics for Carbonate and Fracture Reservoirs, A Roadmap

3. IPSCAL: Integrated Petrophysics - How to Use Modern Logs with Special Core Analysis (SCAL)

4. IPQL: Integrated Petrophysics – Quick Look Techniques

5. IPLAM: Integrated Petrophysics for Laminated Reservoirs

6. IPPetroDB: Integrated Petrophysics for PetroDB-WEB

7. IPUR: Integrated Petrophysics for Unconventional Reservoirs

8. REP: Renewable Energy Primer

9. Actual Well/Field Evaluations

10. Parallel Petrophysical Training

These industry benchmark courses cover the full spectrum of mainstream petrophysical training needs and are delivered by a reputable, PhD qualified consultant.

PETROPHYSICIST, AMOCO London, 1988 – 1990

Worked as an already qualified petrophysicist in the Exploitation Dept in field development teams consisting of managers, geophysicists, geologists and reservoir engineers. Amethyst, Drake, Brent. Work embraced reservoir engineering and the field development economics. Projects included a Department of Energy gas/condensate Annex B, equity re-determinations and in-house sensitivity studies. Represented Amoco at equity meetings and worked on equity 9agreements. Role required knowledge of evolving petrophysical techniques and spanned exploration, reservoir geology, and reservoir engineering. Resigned (not laid-off !) following repeated offers for over 12 months consulting projects and a contract with TerraSciences software to build and supply a (then) powerful PC with TerraStation licensed log evaluation software in exchange for developing "Integrated Petrophysics" Ph.D (see below)

Often neglected, inter-departmental skills reduce risk and enhance oil company profits. Since my PhD in 1985 my career has focused on filling this then neglected, but now established approach to reservoir problem solving.

EDUCATION and RESEARCH

University of Reading: B.Sc. Honours Degree in Geology. Mudlogger, Wellsite Geologist and Amoco after BSc during PhD 1989. Imperial College, London. Ph.D. thesis. Sponsor: Occidental Petroleum.

The Ph.D. research program outlined below was the response to a survey sent to 15 operating oil companies. The survey enquired of major shortcomings in formation evaluation.

Ph.D: Integration of Core, Log and Drill Stem Test Data for the Petrophysical Analysis of Brae Conglomerates, North Sea

The thesis provides a generalised method for the quantitative integration of cores, logs, RFTs, DSTs, SCAL, petrography, X-Ray diffraction, and SEM's. The method creates Non-log-inputs from these data to integrate with the continuous log data. The resulting hybrid parameters enable high confidence lithology and fluids analysis from their rich information content, and a prediction of kcore and DST kh values. The need to reconcile apparently contradictory data provided the impetus for this research. The integration is based upon sound petrophysical theory, and provided a prototype template for solving a wide variety of problems, from the identification of Netpay in exploration wells, to the optimum exploitation of reservoirs with complex lithologies, pore geometry's or other unusual features. All MSc Petroleum Engineering and Petroleum Geology courses were completed during Ph.D. studies.

The approach developed by this PhD formed the cornerstone of Deakin's long career in integrating petrophysical data and began the movement away from 80's stand-alone log analysis to quantitative petrophysical integration of diverse data. It has since been adopted by countless other companies, large and small, and has evolved into the industries standard for petrophysics, in part due to the 18 years and 1,000+ students of the IPRC training course

Professional Courses and Affiliations Numerous SPWLA & SPE Annual Conventions / seminars. Numerous Amoco in-house lecture courses on Formation Evaluation and Development Geology. Schlumberger Basic and Advanced Log Interpretation. Member SPE, SPWLA. Bali SPE Forum 1998. Technical articles and lectures are occasionally given, time permitting.

PUBLICATIONS

'How to do Quick-Look Shaly Sand Log Analysis with Confidence' SPWLA Bangkok Regional Conference 2019
'IPQL Integrated Petrophysics – Quick Look Techniques' Training Manual 2019
'IPRC Integrated Petrophysics for Reservoir Characterisation' Training Manual 2019
'IPCFR Integrated Petrophysics for Carbonate & Fractured Reservoirs – A Roadmap' Training Manual 2019
'IPSCAL Integrated Petrophysics – How to use Special Core Analysis with Modern Logs' Training Manual 2019
'IPLAM Integrated Petrophysics for Laminated and Thin Bed Reservoirs' Training Manual 2019
'IPLRLC Integrated Petrophysics for Low Resistivity Low Contrast Pay' Training Manual 2019
'IPPetroDB Integrated Petrophysics with PetroDB' Training Manual 2019
'REP Renewable Energy Primer' Training Manual 2019
'The Petrophysical Integration of Four Volumetric End Points Applied to an Indonesian **Carbonate'** Deakin, M.J.W and Smith, D.R. Indonesian Petroleum Association (IPA) paper G-151, Jakarta October 2003
'Low Invasion Core and Integration with the Rock Type Master Equation for the Prediction of Undrilled Contacts' June 1999 Draft
'Petrophysical Data Integration Increases Reserves In S.E. Asia's Stacked Shaly Sands' IPA Conference, Jakarta, May 1998
'The Integration of Petrophysical Data for the Evaluation of Low Contrast Pay' SPE 39761, Asia-Pac.Conf., Kuala Lumpur, March 1998
'Earthtides: Their Power during Petrophysical Integration' presented at SPE Forum, Bali May 1998
'Wettability, Formation Resistivity Index and Excess Conductivity' SPE 16518, 1987. Draft

REFEREES

1) Paul Bransden, Technical Director, Salamander Energy, 80 Raffles Place, #34-02 UOB Plaza1, Singapore 048624. Ph +65 6536 5290 www.salamander-energy.com
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