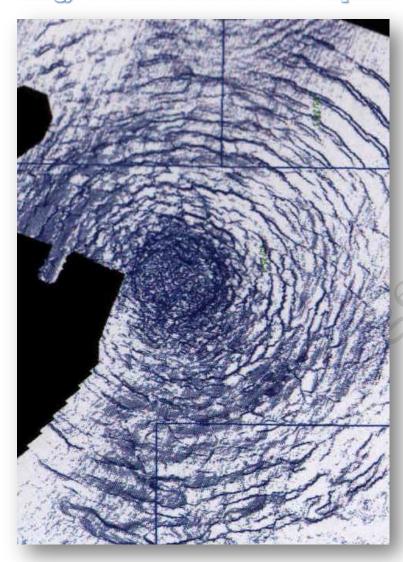
Target Exploration

Energy Geosciences Research & Development





Hydrocarbon Potential

of MENA's Impact and

Circular Structures

MENA2003 Oil and Gas Conference

(MENA03) The 4th International Middle East and North Africa Oil & Gas Conference

16 &17 September 2003 at The Imperial College 180 Queen's Gate, London SW7

Organised by Target Exploration & Sponsored by MEES

MENA 2003 Oil & Gas Conference

Day One Tuesday 16 September 2003

(Hydrocarbon Potential of MENA's Impact and Circular Structures)

8.30-Registration and Coffee

8.55-Chairmen Opening Remarks

- Dr. M. Ala, Director of M.Sc. Courses, Petroleum Geology Section, Geology Department, Royal School of Mines, Imperial College, London, UK.
- Dr. A. Fenghour, Downstream Research Scientist, London, UK.
- Dr. Walter H Pierce, Director, WHPierce Exploration, Houston, Texas, USA.
- Dr. Bindra Thusu, Research Fellow, University College, London, UK.
- Dr. Thamir Uqaili, Managing Director, Petroconsult Canada, Mississauga, Canada

A. NEW REGIONAL HC PROSPECTING IDEAS IN MENA

9.00 (A1) The Role of Spatial Coincidence in the Hydrocarbon Habitat of the Arabian Plate.

- □ Spatial Coincidences in the Arabian Plate, Definition, Recognition
- □ Examples of Spatial Coincidence
- □ Systematic and Unsystematic Spatial Coincidence
- Examples
- Conclusions

Dr. W. Pierce, (WHPierce Explorations, Houston, Texas, USA), and **Everett Rutherford**, (Consultant in Petroleum Exploration and Digital Mapping, Matrix Geoscience, Texas, USA).

The Haima Supergroup The Angudan Unconformity Cycles of Deposition New Exploration Plays Conclusions Dr. Pieter Spaak, Peter Osterloff (Petroleum Development Oman, Oman), Stuart Molyneux (British Geological Survey, UK.) and Randal Penney (Petroleum Development Oman, Oman). 10.00 (A3) A review of the oil and gas reserves and exploration activity in Iran since 1998. Comparison of the published reserves figures from various sources A review of the new plays in the Zagros province

□ A re-evaluation of Iran's oil resources and reserves/production ratios following the Azadegan, Hossaini, Kushk and other recent discoveries

☐ A review of the state of play in the Iranian sector of the Persian Gulf following NIOC's offer of 8 exploration blocks in March 2003

Stratigraphic and Geological Setting

9.30 (A2) Exploration in Block-6 Oman: Sequence Stratigraphy and Play Potential of the Haima Supergroup.

□ A re-evaluation of Iran's gas reserves following the Tabnak, Homa and other recent discoveries

A review of the state of play in the Iranian sector of the Caspian Sea and the adjacent onshore areas

Introduction

Dr. M. Ala, Senior Academic and Director of MSc Programme in Petroleum Geosciences, Imperial College, London. Director of Hydrocarbon Venture Ltd, London.

10.30 (A4) Petroleum Geology and Remaining HC Potential of the UAE.

☐ A review of the pre-Cretaceous potential of the Zagros province

- Introduction.
- Geological and Tectonic setting
- Hydrocarbon Provinces
- Exploration History
- Major Oil Fields
- Discovered Oil per Reservoirs
- Produced Versus remaining Oil
- Present Status
- □ Conclusions, Recommendations and Future E&P Strategies.

K. Muammar (Independent Petroleum Geologist, London), M. Warrak (Imperial College, London), and M. W. Ibrahim (Target Exploration, London).

11.00 Morning Coffee

B. PETROLEUM POTENTIAL OF IRAQ @ 2003: REVIEWS

11.30	(B1) Habitat and Petroleum Geology of Iraq: A 2003 Review.
	atroduction
	lethodology
	asin Modeling
	egional Gradient Mapping
	as Trend
□ Se	ource Rocks
□ O	ils
□ R	eservoirs
□ C	umulative Reserves by Age
□ St	tructural and Stratigraphic Distribution
	lain Fields
	lays
	ummary
□ C	onclusions
	1. Pierce (WHPierce Explorations, Houston, Texas, USA), and Everett Rutherford, (Consultant in Petroleum Exploration and Digital Mapping, Matrix
Geos	cience, Texas, USA).
40.00	(DO) Explanation and Development Drilling in Iran
12.00	(B2) Exploration and Development Drilling in Iraq.
	Background
<u> </u>	
_	
_	
_	Drilling Programmes
_	
_	Case Studies
_	

Dr. Thamir Uqaili, Managing Director, Petroconsult Canada, Mississauga, Canada.

C. IRAQ and MENA: A NEW GLOBAL HYDROCARBONS ORDER?

14.00 (C1) New infrastructural projects to increase MENA-Europe energy trading.

- ☼ Italy, an energy gateway to Europe
- ☼ current cross-Mediterranean oil and gas infrastructures
- new gas pipelines and LNG regassification plants (being built or planned)
- in Italy

13.00 Lunch

- new underground gas storage sites in Italy
- the other significant energy projects in Europe and MENA
- current and future trends in the cross-Mediterranean energy trade

Roberto Bencini, Director, GA.I.A. srl, Rome (Italy)

14.30 (C2) The Opening of Big Middle Eastern Producers.

- ☐ The opening process is gathering speed.
- ☐ Iraq: instability, insecurity and the lack of international legitimacy deter investors.

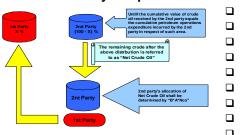
- Saudi Arabia: after the failure of the "Gas Initiative" Riyadh goes back to basics.
- □ Iran: open but endangered.
- ☐ Kuwait: the race is on so we must join them.
- □ UAE: business as usual.
- Qatar is playing with the big boys.

Mr. Francis Perrin, Editorial Manager, Arab Oil and Gas, Arab Petroleum Research Center, Paris, France.

15.00 Tea Break

D. ANALYSIS OF PERFORMANCE OF OLD AND NEW E&P ROUNDS IN MENA

15.30 (D1) Investment in Libyan Upstream Oil and Gas Sector: From the Perspective of New Exploration and Production-Sharing Agreement.



Introduction

Historical background: Critical contributions since 1957 to present time

Review of exploration, reserves and production activities in Libyan upstream oil sector

Exploration activities

Exploration and development wells

Production activities

Reserves

Controlling factors of the Libyan upstream oil and gas sector

Basins Potentials

- Exploration and production-sharing agreements (EPSAs)
- Review of the new Libyan EPSA round
 - Terms
 - Flexibility
 - Conditions
 - New open areas
 - New natural gas clause
 - Rights granted to second party
 - Sharing of petroleum production
 - Allocation of crude oil
 - Area size and discoveries
 - Exploitation of natural gas.
 - Laws and regulations

Summary,	conclusions	and	recommenda	ations

Waniss Otman, PhD, Student, University of Aberdeen, Aberdeen, Scotland.

16.00 (D2) The Use of Consortia in the Exploitation of Hydrocarbon Resources: With Special Emphasis on Undeveloped Discoveries in MENA Countries

- □ Few Large and Almost no Small Independent Oil Companies
- Why Undeveloped Discoveries?
- □ Volume of Undeveloped Discoveries in MENA Countries, with Typical Cases from:
 - Algeria
 - Egypt
 - Iran
 - Iraq
 - Kuwait
 - Libya
 - Morocco
 - Oman
 - Qatar
 - Saudi Arabia
 - Sudan
 - Syria
 - Tunis
 - UAE
 - Yemen
- □ Summary and Conclusions

William Divine, President, Concession International, Inc., California, USA.

16.30 (D3) Common Sense Approach for International New Ventures.

- □ Introduction.
- □ Cyclic Oil Booms
- □ A Common Sense Step-by-step Process
- □ Long Term Planning
- Plan for Implementing and Negotiating a Concession Contract
- Conclusions

William Divine, President, Concession International, Inc., California, USA.

Poster Presentations

P1) Structural Styles and Prospectivity in the Palaeozoic Hydrocarbon Introduction	Systems of North Africa (I).
Pan-African Orogeny and Infracambrian Extension	X
Post-Infracambrian/Pre-Hercynian	
Hercynian Orogeny	
Structural Styles of North Africa	
Alpine Orogeny	
Conclusions	
References	1
	□ Introduction Pan-African Orogeny and Infracambrian Extension Post-Infracambrian/Pre-Hercynian Hercynian Orogeny Structural Styles of North Africa Alpine Orogeny Conclusions

J. Craig (Eni-Lasmo, Milan, Italy), B. Thusu (<u>University College, London, UK</u>), S. Luning (University of Bremen, Germany), E. Zanella (EnCan, London, UK), L. M. Davidson (Eni-Lasmo, London, UK), F. Said (Chairman, Technica, UK and Canada), A. I. Asbali (Advisor, AGOCO, Benghazi, Libya). T. Glover (University of Aberystwyth, Aberystwyth, UK), K. Echikh (Geological Consultant, Algeir, Algeria), H. Siddiq (Exploration Manager, Agip, Tripoli, Libya), W. Zwawi (Geologist, Libyan National Oil Corporation, Tripoli, Libya), and M. Shelmani (Geologist, ALEPCO, Tripoli, Libya).

Standby Presentations

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- □ Introduction
- □ Regional Geology
- Types of Organic Matter
- Thermal Model
- Paleogeothermal Gradients and Maturation
- Conclusions

Drs Maha Saleh, Lecturer, College of Sciences, University of Baghdad, Baghdad, Iraq, and Amjad **A. Mohammed**, Department of Geology, College of Science, University of Baghdad, Baghdad, Iraq.

(SB2) Typical Giant Oil Fields of Southern Iraq.

- Introduction.
- □ Fields and Reservoirs Data
- Typical Traps and Reservoirs of Southern Fields of S. Iraq
- □ Typical Traps and Reservoirs of Western Fields of S. Iraq
- □ Typical Traps and Reservoirs of Eastern Fields of S. Iraq
- Summary and Conclusions
- M. W. Ibrahim, Geologist, Target Exploration, London, UK.

(SB 3) Cancelled- Ranks and E&P Potential of the New Syrian Blocks.

- Introduction
- Remaining Blocks
- Exploration Histories
- □ Source, Reservoir and Seal Rocks of the Syrian Blocks.
- Drilled and Remaining Surface and Subsurface Anomalies
- Ranking Methodology
- Conclusions: Remaining Relative E&P Potential and Ranks

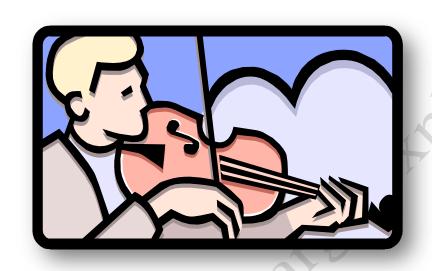
Muhammad W Ibrahim, Geologist, Target Exploration, London, UK.

(SB4) Cancelled- Iraq: Oil Production Potential.

- Introduction
- Production Reserves Ratio
- Annual Production Decline
- World Experience
- Proposed Indices
- Production Scenarios
- Conclusions

Dr. Thamir Uqaili, Managing Director, Petroconsult Canada, Mississauga, Canada.

All participants and spouses are cordially invited to *MENA 2003 Oil & Gas Conference* (The 4th MENA O&G Conference) Dinner



Time: (8.00-10.30 PM)

Date: Tuesday 16th Sept 2003

Place: TBD

MENA 2003 Oil & Gas Conference

Day Two Wednesday 17 September 2003

(Hydrocarbon Potential of MENA's Impact and Circular Structures)

(Salt Tectonic Traps in Eritrea, MENA-EU Energy Cooperation, New Plays in North Africa, Libya, and Impact Craters as Potential Exploration Targets?)

8.30 Registration and Coffee

8.55 Chairmen Opening Remarks

- Dr. M. Ala, Director of M.Sc. Courses, Petroleum Geology Section, Geology Department, Royal School of Mines, Imperial College, London, UK.
- Dr. A. Fenghour, Downstream Research Scientist, London, UK.
- Dr. Walter H Pierce, Director, WHPierce Exploration, Houston, Texas, USA.
- Dr. Bindra Thusu, Research Fellow, University College, London, UK.
- Dr. Thamir Uqaili, Managing Director, Petroconsult Canada, Mississauga, Canada

E. HYDROCARBON POTENTIAL OF IMPACT AND CIRCULAR STRUCTURES IN MENA

9.00 (E1) Asteroid Impacts: Astronomical View.

- 1: Asteroid Belt. Orbital data. Absolute Magnitude
- ☐ 2: Asteroid Distribution and Compositional Types
- □ 3: Earth Crossing Asteroids
- □ 4: Statistics of Asteroid Impacts
- □ 5: Historical Impacts
- □ 6: Energy of Impacts
- ☐ 7: Observations of Asteroid
- 8: Impact Craters on Earth and Other Planets

Dr. Abdul Athem Al Sabti, Senior Research Fellow, University of London Observatory, University College, London, UK.

9.30 (E2) Frequency and Types of Marine and Terrestrial Meteoritic Impact Structures

- ☐ Introduction: what we see on Earth? Rates of impact
- Source regions for impactors
- Cometary and asteroidal
- ☐ How we can tell from an impact crater what sort of object made it.
- Conclusions

Dr P. A. Bland, Lecturer, Meteoritic and Planetary Science, Royal School of Mines, Imperial College, University of London, London, UK.

10.00 (E3) Geology of the Silverpit Multi-ringed Crater, Southern North Sea.

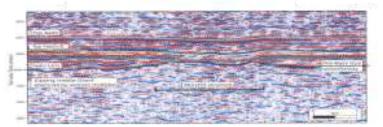


□ Introduction

Simon Stewart, Structural Geologist, BP plc, Sunbury on Thames, Middlesex, UK, and Phil Allen, Consultant Geophysicist, PGL, Banchory, Scotland).

10.30 (E4) A Possible Albian Impact Crater at Murshid, Southern Oman

- Introduction
- Seismic Data
- Murshid Crater Description
- Other Explanations?
- Other Meteorite Sites in Oman and Nearby Areas
- Conclusions
- □ Further Work



Bruce Levell, (Petroleum Development Oman. Present address: Shell International Exploration & Production, The Hague, The Netherlands), **Pascal Richard** and **Folco Hoogendijk,** (Petroleum Development Oman. Present address: Shell Technology Exploration & Production, Rijswijk, The Netherlands).

11.00 Morning Coffee

F. IMPLICATIONS OF NEW BIOSTRATIGRAPHYS AND TECTONIC EVOLUTION OF FRONTIER AND MATURE BASINS OF LIBYA

	A Y
11.30	(F1) Paleozoic, Cretaceous and Other Source Rocks in North Africa: Distribution and Comparison
	Silurian
	Devonian
	Cenomanian-Turonian
	Campanian-Maastrichtian
	Other Source Rocks
S. Lur	ning, University of Bremen, Dept of Geosciences-FB 5, PO Box 330 440, 28334 Bremen, Germany
12.00	(F2)) Recent Advances in the Pre-Upper Cretaceous Stratigraphy of Sirt Basin: It's Implications for Future Hydrocarbon Exploration in Libya.
12.00	Introduction
	Location and Geological setting
_	Methodology
_	Sequences interpreted in
	Southeast Sirt Basin
	■ Eastern flank of Kalash Trough
	Sarir 'C' main Trough
	Western Abu Attiffel Graben
	 West Sirt Basin
	 Waddan Shelf and Tagrifet Trough
	 Central Sirt Basin
	Revised Stratigraphic Position
	Implications to hydrocarbon Exploration
	Summary and conclusions
Dr. Bii	ndra Thusu, Senior Research Fellow, University College, London, UK.
12 30	(F3) Unconformable Stratigraphic Traps Potential of Eastern Sirt Basin, Libya.
12.30	Introduction, Stratigraphic and Tectonic Framework
_	Petroleum Systems of Eastern Sirte Basin, Unconformity Play Components
	Top Precambrian Basement Unconformity, Structure and Bottom-seal
_	Top Ordovician Unconformity, Underlying Reservoir Facies
_	Top Hercynian Unconformity, Underlying Reservoir Facies
_	Pre Upper Cretaceous Unconformity, Structure and Underlying Reservoir Facies
_	Upper Cretaceous Sequence, Structure, Source and Top-seal

- Additional Stratigraphic and Combination Plays
- Summary and Conclusions

Dr. Muhammad W. Ibrahim, Geologist, Target Exploration, London, UK.

13.00 Lunch

G. MENA-EUROPEAN ENERGY COOPERATION AND GEOPOLITICS

14.00 (G1) CO2 geological storage: a new tool to reduce greenhouse gas emissions.

- ☼ CO2 emission sources
- ☼ the greenhouse gases
- ☼ global climate implications
- available options
- CO2 capture
- CO2 underground storage
- ☼ economics of CO2 geological storage
- Current European and International projects

Roberto Bencini, Director, GA.I.A. srl, Rome (Italy)

14.30(G2) A review of recent activity in the Saharan Africa region: Its contrast with historical trends.

- Production of oil and gas 2002 vs. last ten years
- ☐ Reserves of oil and gas 2002 vs. last ten years
- Exploration activity for oil and gas 2002 vs. last ten years (2D seismic, 3D seismic, exploration wells drilled, drilling success rates)
- Reserves replacement ratios for oil and gas for 2002 and the last 10 years
- Development drilling activity for 2002 and the last 10 years

Dimitri Massaras, IHS Energy, Geneva, Switzerland

15.00 Tea Break

H. REFINING THE HYDROCARBON POTENTIAL OF N. AFRICA

15.30 (H1) Diagenesis, Reservoir Quality and Heterogeneity of the Upper Nubian Sandstone, Bu Attifel Oil Field, Sirt Basin, Libya.

- □ Introduction.
- □Exploration History.
- □The Upper Nubian Reservoir:
 - Lithofacies.
 - Petrographic Characteristics.
 - Diagenetic History.
 - Controlling Factors of Reservoir Quality.

□Summary

Adel Aboktef, Petroleum Research Centre, Tripoli, Libya, Mike Anketell, The University of Manchester, Manchester M13 9PL, United Kingdom and Ibrahim El Kanouni, Petroleum Research Centre, Tripoli, Libya.

16.00 (H2) Static Correction and Reservoir Imaging of Conventional Noisy Seismic Data in the Sirte Basin, Libya.

- Refraction events in conventional Vibroseis seismic data in some parts of the Sirte Basin are noisy and not useful for statics correction.
- Traditional upholes information and noisy refraction events have little success in resolving static problems.
- Drilling closely spaced upholes can inflate acquision cost.
- □ Cost effective and reliable method was used for this type of data to resolve the statics problem.
- Ray tracing forward modelling and inversion yield successful static solution and reservoir imaging.
- H. Al Dabagh, (Staff Geophysicist, Western-Geco, London, UK.) and Khaled Khabbush, (Staff Geophysicist, Sirte Oil Company, Marsa Brega, Libya).

16.30 (H3) Exhumed Petroleum Systems of the Murzuk Basin, Libya.



- Geological Setting:
- Murzuk Basin is a polyphase intra-cratonic depression, with partially truncated Palaeozoic sequence overlain by continental Mesozoic clastics. Its present roughly symmetrical form is the result of repeated basin margin uplift and erosional unroofing during the mid-Devonian, end-Carboniferous (Hercynian), mid-Cretaceous (Austrian) and mid-late Tertiary (Alpine). Three discrete depocentres developed in different parts of the basin (western and northwestern basin margins and central basin axis) through time, followed by uplift and partial to complete exhumation. Significant amounts of hydrocarbons were generated from at least two of the three depocentres and are now associated with two

Ordovician reservoired / Silurian Shale sealed petroleum systems.

- □ Petroleum Systems:
- <u>Petroleum System I</u> (NW Murzuk Licences NC115, NC174 and environs) Memouniat-Melez Chograne (late Ashgillian) glacial and peri-glacial incised valley-fill clastic reservoirs. Basal Tanezzuft (Llandovery) 'hot' shale source facies confined by residual late Ordovician erosional paleo-topography.

Petroleum System II (Licence NC101 area and south central Murzuk) Hawas (Arenig-Llandeilo) marine shelf sandstone forms the primary reservoir in the NC101 area with low matrix and fracture poro-perm. The Memoumiat reservoir is still unproven, but is expected to be more significant further south. Basal Tanezzuft 'hot' shale source facies confined/onlapping erosional paleo-topography to the north and northeast. Expulsion and charge from generative depocentre to south and south west during Cretaceous and early Tertiary, prior to mild mid-late Tertiary uplift. Trap Style: erosional inselbergs/paleo-topographic highs, sealed by Middle Tanezzuft Shales.Post-charge mid-late Tertiary uplift with fresh water aquifer recharge, tilting and partial hydrocarbon spillage.

Summary and Conclusions:

Over 3.0 Bbbls recoverable oil reserves have been discovered so far in the basin mostly associated with Petroleum System I. It is predicted that very significant additional reserves will be discovered within and around the flanks of the south central depocenter (Petroleum System II) as exploration continues.

D.R. D. Boote (Exploration Consultants, London, UK) and Danny Clark-Lowes (Clark-Lowes Consulting, Somerset UK)

17.00-17.30 Panel Discussions Chairmen Closing Remarks

Poster Presentations

(PP2) Evolution of Petroleum Systems in the Ghadamis Basin, NW Libya.

□ Introduction

Modern Structural Architecture

Modern Stratigraphic Architecture

□ Pre Hercynian and Post Hercynian Uplifts

Basin Modelling

□ Petroleum Systems

□ Evolution of the Petroleum Systems

Conclusions Introduction

Abdussalam Dardour, (PhD student, Kingston University, Surrey, UK), **D Boote** (Exploration Consultants, London, UK), **A Baird** (Senior Lecturer in Geology, Kingston University, Surrey, UK) and **P. Wigley,** (Director, Lynx, London).

Standby Presentations

	Um Chaimin Impact Evidence
_	Morphology
_	Paleontology
_	Gravity and Magnetic
ā	Ring Structure X
	Summary and Conclusions
	California Goldania
H. Daba	gh (Staff Geophysicist, Western-Geco, Gatwick, UK) and M Ibrahim (Geologist, Target Exploration, London)
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SB6) Hy	ydrocarbon Potential of Salt-Tectonic Traps in the Eritrean Red Sea Basin.
	Introduction
	Exploration History and Opportunities
	Regional Geological Setting
	Reservoir, Source and Seal Potential of salt-Tectonic Plays
	Post-salt Plays
	Costal Plays
	Intra Salt-wall Plays
	Outer Salt Plays
	Pre-salt Plays
	Early Miocene Plays
	Mesozoic Plays
	Conclusions and Recommendations
_eake W	oldegiorgis, Senior Geologist, Hydrocarbon Exploration and Promotion Division, Ministry of Energy and Mines, Asmara, Eritrea.
SB7) C	ancelled- Impact Structures as Exploration Targets for Hydrocarbons.
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r. Johr	G. Spray, Planetary and Space Science Centre, Department of Geology, University of Brunswick, New Brunswick, Canada.

(SB5) A Review of Um Chaimin Crater, Circular Features and Ring Structures of Iraq Yields Hydrocarbon Exploration Targets.

<u>MENA 2003 Oil & Gas Conference</u> will be held on the 16 & 17 September 2003, at and around the Clore Theatre, (<u>Building No 8, click for location map of the Imperial College</u>),



Imperial College, Queen's Gate, London SW7. The Building is within 10-15 minutes walking distance from South Kensington or High Street Kensington Underground Stations, and 5 minutes from stops of Bus routes 9, 10, 49 and 52.



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CHAIRMEN AND AUTHORS

CHAIRMEN

Dr. Mike Ala

Director of M.Sc. Courses, Petroleum Geology Section, Geology Department, Royal School of Mines, Imperial College, London, UK.

Mike has BSc, MSc & PhD in Petroleum Geology, Imperial College, and University of London. Authored more than 50 research and review articles. Member of the editorial board of international technical journals, and chief editor of one book. Acknowledged expert on the petroleum geology of Iran. Worked in the oil industry for 8 years in global petroleum exploration - identification and evaluation of oil and gas prospects. Currently Senior Academic and Director of the internationally recognised MSc programme in Petroleum Geosciences at the Imperial College, responsible for up to 45 postgraduate students per year. Involved since 1982 in consulting, organising and presenting industry training courses for the private and state sectors in many oil and gas producing countries. Author of numerous proprietary and non-proprietary reports on petroliferous regions in northern Europe, eastern Mediterranean countries, Africa, eastern South America and the Middle East. Co-founder in 1988 and Director of Hydrocarbons Venture Limited, an organisation involved in providing consulting services and running industry training programmes.

Dr. A. Fenghour

Consultant Downstream Research Engineer, London.

Dr Fenghour has a B.Sc., M.Sc. and Ph.D. In Chemical Engineering, and CASLAT in advanced education. He is a Chartered Chemical Engineer, a member of the Inst. of Chemical Engineers, and the Editor of the Journal of Chemical Thermodynamics. Worked as Process Engineer, Plants Manager, Senior Project Engineer for the National

Petrochemical Company of Algeria, and as Research Associate in the National Engineering Laboratories, East Kilbride, Glasgow, Scotland, and as a Research Associate in the IUPAC Centre, Department of Chemical Engineering, Imperial College. Dr Fenghour authored more than 30 publications in refereed journals, books and conference proceedings.

Dr. Walter Pierce

Director, WHPierce Exploration, Cypress, Texas, USA.

Walter has a Ph.D. and MSc degrees in Geology from The Colorado School of Mines and an A. B. from DePauw University. Explored the Africa and Middle East as an Amoco geologist for seventeen years. Taught Geology for eight years at Ball State University, University of Georgia, and The Colorado School of Mines. Worked for the USGS in the Petroleum Group and in the Heavy Metals group. His recent work has included New Ventures, hydrocarbon system analysis of the Arabian plate, undiscovered reserve assessment, multi-basin assessment of Central Asia and the Middle East.

Dr. Bindra Thusu

Senior Research Fellow of University College London. Bindra has a PhD from Bristol University, MSc. from Alberta, Canada and BSC from Kashmir, India. He has worked for the Arabian Oil Company in Benghazi, Libya as geological research and training advisor, and as a senior scientist in the Petroleum Research Institute (IKU) in Norway. Published more than thirty papers mainly on the biostratigraphy of Cyrenaica and southeast Sirt Basin, Libya. Accredited with the re-assignment of the Amal reservoir in east Sirte Basin to Triassic (formerly Cambro-Ordovician), and organising and editing the First International workshop on North African Micropalaeontology for Petroleum Exploration (conducted in cooperation with the Petroleum Research Centre in Tripoli and the Arabian Oil Company) in Benghazi, Libya.

Dr. Thamir Uqaili

Managing Director, Petroconsult Canada, Mississauga, Canada.

Reservoir Engineer (BPC), Field Manager (NOC), General Manager (CPO) General Manager Planning Department (MOO), Iraq; Area Reservoir Co-ordinator (North Africa) Repsol, Spain.

AUTHORS

Mr. Adel Abuktef

Petroleum Geologist, Petroleum Research Centre, Tripoli, Libya.

Adel has a B.Sc. in Geology, Al-Fateh University, Tripoli, M.Sc. in "Earth and Environmental Sciences, Application & Management", The University of Manchester. Current research projects include studying the burial history, diagenesis, reservoir quality and heterogeneity of the Nubian Sandstone in Abutifel Oil Field, Sirt Basin, Libya.

Dr. Mike Ala

Director of M.Sc. Courses, Petroleum Geology Section, Geology Department, Royal School of Mines, Imperial College, London, UK.

Mike has BSc, MSc & PhD in Petroleum Geology, Imperial College, and University of London. Authored more than 50 research and review articles. Member of the editorial board of international technical journals, and chief editor of one book. Acknowledged expert on the petroleum geology of Iran. Worked in the oil industry for 8 years in global petroleum exploration - identification and evaluation of oil and gas prospects. Currently Senior Academic and Director of the internationally recognised MSc programme in Petroleum Geosciences at the Imperial College, responsible for up to 45 postgraduate students per year. Involved since 1982 in consulting, organising and presenting industry training courses for the private and state sectors in many oil and gas producing countries. Author of numerous proprietary and non-proprietary reports on petroliferous regions in northern Europe, eastern Mediterranean countries, Africa, eastern South America and the Middle East. Co-founder in 1988 and Director of Hydrocarbons Venture Limited, an organisation involved in providing consulting services and running industry training programmes.

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Mr Phil Allen

Consultant Geophysicist, PGL, Banchory, Scotland,

Dr Abdul Athem Al Sabti

Senior Research Fellow, University of London Observatory, University College, London, UK.

Dr Mike Anketell

Emeritus Professor, Department of Geology, University of Manchester, Manchester, UK.

Mr Ahmed I. Asbali

Exploration Division, AGOCO, Benghazi, Libya.

Dr. Roberto Bencini

Director, GA.I.A. srl, Rome, Italy.

Dr Bencini (honours MSc in Geological Sciences, Pisa -Italy, 1978) started as exploration geologist with Gulf Oil co. in Houston and London in 1981, working on the North Sea including the Alba field. In 1985 he joined Lasmo plc in London where he later contributed to their success in Algeria. He moved to Rome with growing technical and operating responsibilities, including Chief Geologist for the Tempa Rossa field and Business Development Adviser. In 1999 Dr Bencini founded GA.I.A. srl, an Italian independent E&P company, where he is now Director. Dr Bencini is oil industry Expert for the European Commission and for INTAS, lecturer and writer. He co-operates with INGV of Rome on the Weyburn CO₂ sequestration international research project. Dr. Bencini is AAPG Italy Team Leader for 2002-2005. He is Chartered Geologist of the London Geological Society, and member of SPE, SGI (Italian Geological Society) and AIEE (Italian Association of Energy Economists). He has been in the Editorial Board of the National Geological Survey of Italy.

Dr. Alastair Baird

Senior Lecturer in Geology, Kingston University, Surrey, UK.

BSc., MSc., D.I.C., PhD., F.G.S., and C.Geol. 1980-3 Research Assistant, Bedford College London, 1983-5 Senoir Research Assistant, Univ of Durham. Research Interests: Structural evolution, hydrocarbon potential, fluid flow and Pb-Zn mineralisation in the Tunisian Atlas thrust and foreland basin system. Sequence stratigraphy, tectonic evolution and petroleum systems in the Ghadamis Basin, western Libya. Geotectonic evolution of the Western and Central Mediterranean area. The relationship between extensional fault geometry, basin inversion and uplift history in southern England. Post rift sedimentation and differential compaction across basin bounding faults and fault reactivation.

Dr. P. A. Bland

Lecturer, Meteoritic and Planetary Science, Royal School of Mines, Imperial College, University of London, London, UK.

David R. D. Boote.

Independent Consultant Geologist, London, England, UK.

Twenty-five years international new venture exploration with Occidental Oil and Gas Company, variously as Chief Geologist, Worldwide Exploration, Regional Manager and Senior Geological Advisor, responsible for basin evaluations, play analysis, prospect generation and appraisals in many parts of the world, including Oman, Yemen, Australia, Philippines, Algeria, Libya, UK and California. Since leaving Occidental, he has been active as an independent consultant in regional stratigraphic and hydrocarbon petroleum system syntheses.

Dr Daniel D Clark-Lowes, MA, PhD

Dr. Daniel Clark-Lowes has over 25 years experience working in the oil and gas industry for companies including Shell International company in 1993. Previously, he was a director of Scott Pickford plc, the British-based petroleum

consultancy, for eight years, in charge of international prospectivity reports. He spent 10 years with Anglo Siberian, and Charterhouse Petroleum plc, where he was Chief Geologist.

His first degree was in Natural Sciences (Geology) at Cambridge University. He was later awarded a PhD from Imperial College, London University, for work on the Palaeozoic clastics of Libya and Saudi Arabia. He has pursued his interest in Libyan geology ever since, with numerous publications. He has held a Research Fellowship at Imperial College and has been Course Director of the MSc class on Stratigraphy at Birkbeck College.

Dr Jonathan Craig

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Mr Hazim Dabagh

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Mr. Abdussalam Dardour

PhD, Student, Kingston University, Surrey, UK.

Worker as Associate Researcher in Geological Interpretation, Exploration Department, Petroleum Research Centre, Tripoli, Abdussalam has BSc. in Geology, Al-Fateh University, Tripoli, Libya.

L.M. Davidson

Explorationistst, ENI-Lasmo, London, UK

William Divine

President, Concession International, Inc., California, USA.

William Divine has 20 years of experience at all levels of the oil and gas industry. He has expertise in the divestiture of major oil and gas companies and owns and operates his own domestic and international properties. He has compiled an extensive database of undeveloped oil and gas fields worldwide. Mr. Divine focuses on international

consulting that identifies concessions opportunities for individual companies. Mr. Divine maintains close contact with a number of government ministries regarding international oil and gas opportunities. He presently serves as a Managing Director of Concessions International Ltd.

Dr Khalid Echikh

Consultant Geologist, Tripoli, Libya

Mr. Ibrahim El Kanouni

Associate Researcher in Sedimentology, Exploration Department, Petroleum Research Centre, Tripoli, Libya. Ibrahim has BSc. in Geology, Al-Fateh University, Tripoli, and MSc. in Petroleum Geosciences, University of Manchester, UK.

T. Glover

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Folco Hoogendijk

Folco Hoogendijk is a Senior Geologist at the Shell Technology Centre in Rijswijk, The Netherlands, focusing on exploration opportunity evaluations in the North Africa and Middle East regions. He holds an MSc in Geology/Geophysics from the University of Utrecht. From 1996 to 2001 he worked for Petroleum Development Oman (PDO) where he was involved in prospect evaluation/maturation and prospect portfolio management of the infra-Cambrian Area Salt plays. Prior to joining PDO, he worked for Shell Exploration and Production in London as regional geologist, operations geologist and seismic interpreter in Central and Northern North Sea exploration teams.

Muhammad W. Ibrahim

Geologist, Target Exploration, London, UK.

Muhammad has a B.Sc. Geology, University of Baghdad, MSc and Ph.D. in Petroleum Geology, Imperial College, University of London. Worked as Geophysicist, Iraq Mineral Exploration Company, Field Geologist, Iraqi Geological Survey, Assistant Professor and Head of Department of Petroleum Geology, Faculty of Earth Sciences, King Abdul Aziz University, Jeddah, Saudi Arabia, Consultant Geologist, Kuwaiti Institute for Scientific Research (KISR), Staff Geologist, Mobil Oil Libya, Veba Oil Operations, Lasmo Grand Maghrib PLC, Lasmo International PLC, and lately as MENA Geologist conducting and directing E&P services and studies for several oil companies. Muhammad Wijdan Contributed to the discovery of few oil accumulations, and the recognition of additional oil reserves in Libya and Iraq. Authored, and co-authored several technical reports, papers, fieldtrip guidebooks, abstracts, discussions, technical articles, and conference volumes mainly on the petroleum geology of the Middle East, and North Africa.

Khaled Khabbush

Staff Geophysicist, Sirte Oil Company, Marsa Brega, Libya.

Mr Hama-Jaza Saleh Kader

Independent Petroleum Engineering Consultant and since Jan.2002 the owner of GOGTEC Ing. Büro in Hannover-Germany. Since 14-6-03, He has been in Baghdad working as a member of IRDC-Iraqi reconstruction and Development Council.

Hama has BSc.in Petroleum Engineering from University of Baghdad, College of Engineering. Worked as a drilling engineer at INMCO Mishraq Sulphur mine in northern Iraq. He then moved to INOC (Iraq National Oil Company) and worked as drilling operations engineer EXPL/PROD, well testing supervisor in drilling and production of INOC General Directorate, INOC/ NPO authorized representative for drilling and production of development wells in many oilfield (in NPO - Northern Petroleum Organisation). \, INOC/CPO Drilling and Petroleum Engineering operations supervisor (in CPO- Central Petroleum Organisation), INOC/CPO head of cementing & drilling fluids department, INOC/CPO drilling manager (directing 11 drilling + 3 work-over rigs + 2 rigs directional drilling from clusters), Chief Executive Consultant and Project Manager, developing Taqtaq oilfield in North-Iraq and fabricating domestically a Drilling/WO rig and a 10 000 BOPD oil refinery. Hama's work covered Oil/gas fields: 1. Kirkuk, 2. Jumbur, 3. Bihassan, 4. Egeel

(Sadam), 5. Kormor, 6. Hamreen, 7. Balad, 8. Qayarah, 9. Qasab, 10. Taqtaq, 11. Naft-Khana, 12. Badra, 13. Naudoman, 14. Ain-Zalah, 15. Butmah, 16. Sufaia, 17. Sasan, 18. Abtakh, 18. East Bagdad, 19. Nahrawan, 20. Ahdab, 21. Kifi,l 22. Marjan, 23. Ekhedhir, 24. Tal-Gazal, and many other drilling locations; as well as follow-up all operations in SPO/Basrah under the INOC umbrella.

Bruce Level

Bruce Levell is currently Head of the New Exploration Business in Shell's Global Exploration unit. By background a sedimentologist / basin analyst he has worked for Shell since 1978. He is first and foremost a geologist, who still (!) gets a kick of seeing new geology, new areas and learning more about the earth. He has had assignments with Shell in Sarawak and Sabah, Continental USA, the UK North Sea and NE Atlantic Margin, and Oman, as well as two spells in research developing tools for seismic stratigraphy and basin modelling. He gained his current position in May 2003.

Dr. Sebastian Lüning

Dr Sebastian Obtained his geology/palaeontology diploma from the University of Göttingen (Germany) in 1994 working on stratigraphy and terrain movements in NW Thailand. His interest in North Africa/Arabia began in 1994 when he commenced a study about late Cretaceous-lower Tertiary strata of the Sinai Peninsula. Received his Ph.D. in geology in 1997 from the University of Bremen (Germany). Between 1997–2000 he was a postdoctoral fellow at the University of Wales, Aberystwyth, and the Royal Holloway University of London, sponsored and based at the oil company LASMO plc, London; there, he carried out and co-ordinated a variety of projects, including a re-evaluation of the petroleum potential of the Kufra Basin SE Libya and North Africa-wide studies about structural styles and Silurian and Frasnian 'hot shales'. Since 2000 he is continuing his black shale studies as a postdoctoral fellow at the University of Bremen, sponsored by the German Science Foundation (DFG) and the petroleum-industry supported North Africa Research Group (NARG).

Amjad A. Mohammed

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Mr. Dimitri Massaras

Dimitri Massaras is a Regional Manager for the Saharan Africa Region since1998 at HIS Energy based in Geneva, Switzerland. He received his Bachelor of Science Degree in Geology in 1978 from the University of Massachusetts at Amherst, in the USA. He worked as Project Geologist and Petrophysicist for Pennzoil Exploration & Production Company in exploration, project management and property acquisitions, as Senior Geologist for Petrofina S.A. in project management and property acquisitions, and as a Geologist for Gulf Oil Exploration & Production Co. in exploration, production and well-site operations.

Dr. Stuart Molyneux

British Geological Survey, UK.

Mr. Kamal Muammar

Consultant Geologist, London, UK and Amman, Jordan.

A wide MENA exploration experience with Sonatrach, KOC, Exploration Manager of ADNOC and Advisor to NPC.

Peter Osterloff

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Born in Libya, Waniss received a B.Sc. degree in Petroleum Engineering from Bright Star University of Technology, Libya, and a BA in Law from the Open University, MSc in Gas Engineering from Salford University, Manchester and Master degree LLM in International Law and Diplomacy from Derby University, UK.

His current research interests are economics, risk and uncertainty analysis, and technical evaluation of investment in the Libyan upstream oil and gas sector.

Randal Penney

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Dr. Francis Perrin

Editorial Manager, Arab Oil and Gas, Arab Petroleum Research Center, Paris, France.

Studied economics (PhD) and political science at the University of Grenoble (France). Presently editorial manager of the Paris-based Arab Petroleum Research Center, which publishes Arab Oil & Gas and the Arab Oil & Gas Directory. Contributing editor for some other publications including Petrostrategies and Africa Energy Intelligence. Special emphasis on the Middle East, Africa, the Caspian Sea region, sanctions and the strategies of the international oil industry.

Dr. Walter H. Pierce

Director, WHPierce Exploration, Cypress, Texas, USA.

Walter has a Ph.D. and MSc degrees in Geology from The Colorado School of Mines and an A. B. from DePauw University. Explored the Africa and Middle East as an Amoco geologist for seventeen years. Taught Geology for eight years at Ball State University, University of Georgia, and The Colorado School of Mines. Worked for the USGS in the Petroleum Group and in the Heavy Metals group. His recent work has included New Ventures, hydrocarbon system analysis of the Arabian plate, undiscovered reserve assessment, multi-basin assessment of Central Asia and the Middle East.

Pascal Richard

Pascal Richard is a global expert for Shell in structural geology. He holds a PhD in Structural Geology on strike-slip tectonics from the University of Rennes, France. He joined Shell in 1991 and spent five years in the Structural Geology Department on sandbox modeling of structural styles, fault growth and hydrocarbon systems. In 1996 he transferred to Petroleum Development Oman (PDO) as the Structural Geology Focal Point and Seismic Interpreter

with PDO's Exploration Department. In 1999, he moved to Shell's Carbonate Development Team where he was focusing on the analysis and modeling of fractured reservoirs. He recently returned for a second posting to PDO.

Dr. Everett Rutherford, Jr.

Consultant in Petroleum Exploration and Digital Mapping, Matrix Geoscience, Texas, USA.

Everett has a BS and MS from the University of Tennessee. Ph.D. at the University of Houston, 1992 .His research interests centred on structural geologic, plate tectonic and basin evolutionary problems in the Middle East, Central Asia, the Caribbean and Indonesia. His career in petroleum exploration began in 1981 with Sequoyah Petroleum Corporation and later with Paragon Exploration Company. From 1992 until 1999, he was a Senior Geologist with Amoco Corporation, working with regional exploration problems in North Africa, the Middle East and Central Asia.

Drs Maha Saleh

Lecturer, College of Sciences, University of Baghdad, Baghdad, Iraq.

Mr M Shelmani

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Dr Hussein Siddiq

Exploration Manager, Agip Oil Company, Tripoli, Libya

Dr Pieter Spaak

Exploration Geologist/Stratigrapher, Petroleum Development Oman, Muscat, Oman.

Dr John G. Spray

Planetary and Space Science Centre, Department of Geology, University of Brunswick, New Brunswick, Canada.

Simon Stewart

Simon Stewart completed a Ph.D. at Imperial College, London, on the structural geology and paleomagnetism of the Carboniferous thrust belt in north Spain. He joined Amerada Hess in 1992, working mainly on three-dimensional (3-D) seismic interpretation in the North Sea. In 2000, he joined BP as a structural geologist, working on the application of integrated drilling, geomechanical, and seismic data. His special interests include the relationship between mechanostratigraphy and structural style and development of 3-D seismic interpretation workflows for fast, accurate mapping.

Dr. Bindra Thusu

Senior Research Fellow of University College London. Bindra has a PhD from Bristol University, MSc. from Alberta, Canada and BSC from Kashmir, India. He has worked for the Arabian Oil Company in Benghazi, Libya as geological research and training advisor, and as a senior scientist in the Petroleum Research Institute (IKU) in Norway. Published more than thirty papers mainly on the biostratigraphy of Cyrenaica and southeast Sirt Basin, Libya. Accredited with the re-assignment of the Amal reservoir in east Sirte Basin to Triassic (formerly Cambro-Ordovician), and organising and editing the First International workshop on North African Micropalaeontology for Petroleum Exploration (conducted in cooperation with the Petroleum Research Centre in Tripoli and the Arabian Oil Company) in Benghazi, Libya.

Dr. Thamir Uqaili

Director, Petrocosult Canada.

Reservoir Engineer (BPC), Field Manager (NOC), General Manager (CPO) General Manager Planning Department (MOO), Iraq; Area Reservoir Co-ordinator (North Africa) Repsol, Spain.

Dr. Mohammed Warrak

Research Associate in Structural Geology, Imperial College, London, and Associate Lecturer, the Open University, UK.

Mohammed has a B.Sc. Honours in Geology, University of Liverpool, M.Sc. and D.I.C. in Petroleum Geology, Imperial College, University of London, Ph.D. in Structural Geology, Imperial College studying an area of great structural complexity in the Western Alps of France. Well-established researcher and teacher of Earth Sciences with detailed knowledge of the Geology of the Northern Oman Mountains. The results of his research include scientific papers and six geological map sheets of some of the most important and geologically critical regions of the Northern Oman Mountains. He also carried out consultations to the Government of the U.A.E. and many contracting companies including Abu Dhabi National Oil Company (ADNOC) / OMV Aktiengesellschaft (Austria) and Calvalley Petroleum (International) Inc., Canada.

Dr Peter Wigley

Director of Lynx Information Systems and sister company Lynx Geographics Information Systems, London, UK. Dr Wigley has BSc in Geology and PhD in Carbonate Sedimentology from University College London 1966-1972, Joind ERICO Research Labs Ltd 1973-1984 Research Geologist, 1984-1991 Managing Director and Chief Operating Officer of Erico (Petroleum Information) Ltd. He is currently working on GIS and digital geologic applications for the oil industry.

Leake Woldegiorgis

Senior Geologist, Ministry of Energy and Mines of Eritrea.

Has a BSc in geology from Addis Ababa University and MSc in structural geology and Petrography from the Technical University, Ankara, Turkey. Involved in supervision and follow-up of HC and geothermal exploration, project formulation, HC promotion, economic and technical evaluation of production sharing contract proposals, negotiation, and part time lecturer at the Department of Earth Sciences University of Asmara etc.

E. Zanella

Geologist, EnCan, London, UK.

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Geologist, Libyan National Oil Corporation, Tripoli, Libya.



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