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Target Exploration

Energy Geosciences Exploration & Development

Libya

A FOCUS **O**N THE FUTURE

The 6th Middle East & North Africa Oil & Gas Conference



22 & 23 Sept. 2005, The Imperial College. London, SW7, UK.

Libya

A FOCUS **O**N THE FUTURE

MENA 2005 Oil & Gas Conference

(MENA05) The 6th International Middle East and North Africa Oil & Gas Conference

Thursday 22 and Friday 23 September 2005

The Imperial College

Exhibition Road, Kensington, London SW7, England

CONFERENCE PROGRAMME

Day One

Oral Presentations, Thursday 22 September 2005

8.30 Registration

A. MENA PETROLEUM HABITAT (I): PALEOZOIC BASINS OF N. AFRICA

9.00 (A1) Opening Remarks

9.15 (A2) Geologic Evolution of the Palaeozoic Basins of North Africa and the Middle East: Trends, Similarities and Differences.

- ☐ Pan-African basement consolidation
- ☐ Infracambrian Rifting and source rock deposition
- ☐ Ordovician reservoir units
- ☐ Silurian hot shales
- ☐ Silurian-Devonian deltaic progradation (reservoirs)
- ☐ Frasnian hot shale
- ☐ Devonian-Triassic reservoirs
- ☐ Hercynian Uplift
- ☐ Mesozoic Extension
- ☐ Alpine Uplift

S. Luning, Geologist, University of Bremen, Bremen, Germany.

10.00 (A3) Future Exploration Potential of the Libyan Ghadamis Basin: a Comparative Analysis Based Upon Analogue Petroleum Systems in Eastern Algeria and Western Libya.

- ❑ Decreasing effectiveness of the late Triassic-Liassic evaporite seal eastwards from the Berkine area into the Libyan Ghadamis region.
- ❑ Eastwards deterioration quality of the Frasnian source rock, so prolific in the Berkine and Illizi.
- ❑ Greater intensity of basin margin uplift and restructuring of the Ghadamis region during the mid-Cretaceous and mid-late Tertiary.
- ❑ Apparent lack of suitably robust traps capable of retaining entrapped hydrocarbons during post charge tilting and flushing, in comparison with the Murzuq Basin.
- ❑ Intra-Triassic stratigraphic trap concept analogous to the Rhourde er Rouni North (RERN) field in the Berkine Province.
- ❑ Intra-Devonian stratigraphic play extension from the West Alar-(Al Wafa) complex of the Illizi Province.
- ❑ Late Ordovician paleo-topographic ('buried-hill') play continuing north from the Murzuq Basin.

D. Boote, Consultant Petroleum Geologist, London, UK. and **A. Dardour**, PRC, Tripoli, Libya.

10.45 (A4) A New Regional Gravity Map of Libya.

❑

W. Pierce and **E. Rutherford**, Calik Energy Sanayi ve Ticaret A S., Ashgabat, Turkmenistan.

11.00-11.30 Morning Coffee

B. LIBYAN OIL INDUSTRY: STATUS, OPTIONS AND FUTURE PLANS

11.30 (B1) The Battle for Libya's Energy Resources.

- ❑ A new national and international context.
- ❑ The shock of the international bid round for exploration (January 2005).
- ❑ Established European players are feeling the heat.
- ❑ Occidental Petroleum is moving forward.
- ❑ Independents and national oil companies try to get a piece of the cake.
- ❑ The Shell-Libyan National Oil Corporation (NOC) alliance.
- ❑ "We have to submit better bids next time".
- ❑ Towards a more global approach and a new relationship with the NOC.

F. Perrin, Chief Editor, Arab Oil and Gas, Paris, France.

12.15-13.45 Lunch Break and Poster Presentations, Thursday 22 Sept 05

POSTERS

(P1) Thermal Maturity of Potential Palaeozoic Source Rocks, Ghadamis Basin, Libya.

M. Hrouda and S. Rhouma, PRC, Tripoli, Libya.

(P2) Paleozoic Petroleum Systems in the Ghadamis Basin, Libya.

A. Dardour, PRC, Tripoli, Libya, **D. Boote**, Consultant Petroleum Geologist, London, UK. and **A.W. Baird**

(P3) Reliability Analysis of PVT Correlations for Libyan Oil Reservoirs.

- ☐ Introduction
- ☐ Scope of Work
- ☐ Experimental Data
- ☐ Statistical Analysis
- ☐ Error Analysis
- ☐ Results and Discussion
- ☐ Conclusion and Recommendations

Saber Elmabrouk, A. Eltegaz and N. Eltaeb, Petroleum Engineering Dept, PRC, Tripoli, Libya.

(P4) Samples of Ancient to Contemporary Iraqi Arts (I)

R. Salim, Iraqi Artist Group, London, UK.

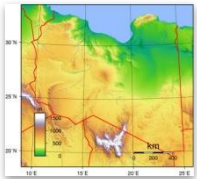
C. RISKS VERSUS REWARDS OF NEW PETROLEUM LAWS

13.45 (C1) Libya - Analysis of the EPSA IV First bid round results, and the shape of future EPSAs.

- ☐ BIDDING PROCESS
 - M-factor (production multiplier to favour NOC)
 - B-factor (signature bonus)
 - (Fixed share to FOC until PO; R=1)

- ❑ EPSA IV
 - A-factor (Based on R; sliding-scale ranging from 0.2-0.85)
 - R (ratio, NOT factor)
 - B-factor (based on production rate, sliding-scale 0.2-1.0)
 - Primary Production Allocation (PPA) (R=1)
 - Secondary Production Allocation (SPA)
 - Excess Cost Oil (or Net Crude Oil (NCO) or Excess Petroleum)
- ❑ DEVELOPMENT / PRODUCTION PHASE
 - Tough, unforgiving
 - Bonuses are NOT RECOVERABLE costs (front-loaded and relatively high)
- ❑ EXPLORATION PHASE
 - Easy and manageable
 - Exploration term: 5 years
 - Seismic acquisition: 500 - 1000 km
 - Exploration wells: 2-3
 - Minimum investment: 20 million, average 9 million
 - Surface area: 8,000 sq km (average per block)
- ❑ CONCLUSIONS

D. Massaras, I.H.S. Energy, Geneva, Switzerland.



14.30 (C2) Past, Present and Future Factors Affecting the Development of Libyan Oil

- ❑ Oil Exploration and Discovery in Libya
- ❑ Development of the Libyan Oil Industry
- ❑ Critical Factors Affecting Development of Libyan Upstream Oil Sector
- ❑ Lifting Sanctions and the Future of the Libyan Oil Industry
- ❑ Conclusions
- ❑ Bibliography

W. Otman, PhD. candidate in Petroleum Economics, Univ. of Aberdeen, Aberdeen, Scotland.

15.00-15.30 Afternoon Tea

D. NEW AND REVIVED UPSTREAM OPPORTUNITIES

15.30 (D1) The Libyan Oil and Gas Fields: An Engineering Review.

- ☐ Background
- ☐ Drilling and Completion
- ☐ Production problems
- ☐ Fields exploration and development
- ☐ Prospects (E&P, Well Service)
- ☐ Production forecast

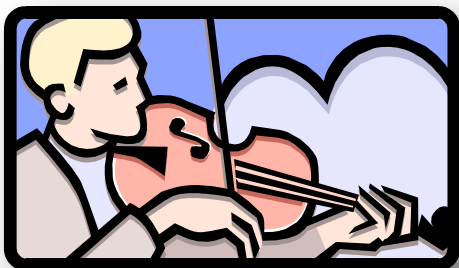
T. Uqaili, Director, Petroconsult Canada. Former Field's Manager NOC, GM CPO, GM Planning of Min of Oil, DG of IDC "Iraq", Area Reservoir Coordinator of Repsol SA in Madrid.

16.00 (D2) Legal and Economic Considerations of USA Oil Companies Re-entry to Libya.

- ☐ The Sanctions and USA-Libyan Relations.
- ☐ The Background of Waha (OASES) Oil Company (WOC).
- ☐ The Standstill Agreements of 30th of June, 1986.
- ☐ The Legality and Conditions of the Re-entry Agreement.
- ☐ Final Remarks.

W. Otman, PhD. candidate in Petroleum Economics, Univ. of Aberdeen, Aberdeen, Scotland.

16.30 –17.00 END OF FIRST DAY DISCUSSIONS AND CHAIRMEN CLOSING REMARKS.



All participants and their spouses are invited to the MENA05 conference dinner

- ***The Time: (8.00-10.30 PM)***
- ***The Date: Thursday 22 of September 2005***
- ***The Place: TBA***

Day Two

Oral Presentations, Friday 23 September 2005

8.30 Registration

E. MENA PETROLEUM HABITAT (II): SIRTE BASIN, LIBYA

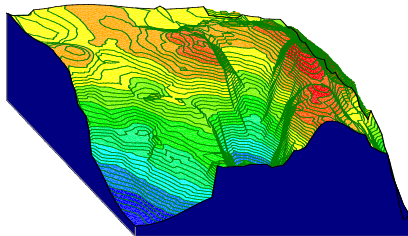
9.00 (E1) Opening Remarks

9.15 (E2) Petroleum Systems of the Sirte Basin, Libya.

□

D. Hallett, Consultant Petroleum Geologist, London, UK.

10.00 (E3) Undeveloped Oil Fields and Remaining Potential: A Case Study of a Typical Sirte Basin Graben, Libya.



- 3600 KM2 onshore area covering a prolific sub-basin of Sirte Basin, which hitherto was covered by very few publications.
- More than 25 areas-of-interest were identified including 15 discoveries made during the turbulent sixties to eighties; few were produced, and others remained mainly undeveloped.
- A number of undeveloped small size fields opportunities was expected, but the existence of a large (70-100 MMSTBO) of recoverable reserves in dormant and un-produced oilfield was an unexpected surprise. Impressive opportunities have been identified.

M. Ibrahim, Geologist, Target Exploration, London, UK.

10.30 (E4) Advances in geophysical technology improve subsurface images in challenging terrains.

□

Paul Brettwood, Regional Manager, Input/Output UK.

11.00-11.30 Morning Coffee

F. MENA PETROLEUM HABITAT (III) PALEOZOIC BASINS OF IRAQ

11.30 (F1) Geology and HC Potential of Western Desert: Iraq.

- Silurian Play/Source
- Hot Shale
- Hot shale Distribution
- Thermal Gradient
- TOC
- Ordovician Play
- Akkas Gas Field: Case Study
- Prospects of Western Desert of Iraq
- Gas versus Oil
- Conclusions

A. Samarraie, Consultant Petroleum Geologist (Former Deputy Head of Geology Department Iraqi North Oil Co. and later Oil Exploration Company)

12.15-13.45 Lunch Break and Poster Presentations, Friday 23 September 05

POSTERS:

(P5) Gravity and Magnetic Investigation of Sabratah Basin, Offshore Libya.

G. Reeh, Geophysics Dept, PRC, Tripoli, Libya

(P6) Mapping Basement Relief and Modelling Paleo-Structures Using Gravity Data, Sarir Trough Province, SE Sirte Basin, Libya.

- ☐ Location
- ☐ Introduction
- ☐ Geological Setting
- ☐ Results and Products
- ☐ Discussion
- ☐ Conclusions

H. Ghanoush and M. Saleem, PRC, Tripoli, Libya

(P7) Hydrocarbon System and Basin Evolution of the Hagfa Trough, Sirte Basin, Libya.

- ☐ The study confirmed the validity of three groups of exploration plays.
- ☐ The pre-Upper Cretaceous Sirte group (Hofra-Nubian-Bahi) sands are proven oil and gas reservoirs in structural traps at Al-Hagfa trough and it's flanking highs.
- ☐ The Waha-Faiz members of the Maastrichtian Kalash Formation, the "M-59", and the Ora-F members of the Lower Palaeocene Beda Formation.
- ☐ The Eocene Gialo Formation is a proven reservoir in structural traps at the flanking highs to the Hagfa trough.

M. Ibrahim, Target Exploration, London, **and S. Mahrouqi**, PDO, Muscat, Oman.

(P8) Samples of Ancient to Contemporary Iraqi Arts (II)

- ☐

R. Salim, Iraqi Artist Group, London, UK.

G. E&P POTENTIAL OF NEW MENA BID ROUNDS

13.45 (G1) The Strategic Role of Libya as a North African Suppliers to the Growing European Gas Markets.

- ☐ Background
- ☐ Libyan Liquefied Natural Gas
- ☐ Western Libya Gas Project (WLGP)
- ☐ Libyan Gas Sector: Current Situation
- ☐ Recent Gas Fiscal Policy
- ☐ Payment of Bonuses
- ☐ Income Taxes
- ☐ Sharing of costs and Expenses
- ☐ Price and Marketing

- ❑ Transportation and Processing
- ❑ Conclusions

W. Otman, PhD. candidate in Petroleum Economics, Univ. of Aberdeen, Aberdeen, Scotland.

14.30 (G2) Algeria - Evolution of Petroleum Law.

- ❑ Ministry Of Energy will be in charge of hydrocarbons
- ❑ The Ministry will create two independent agencies:
 - ❑ ALNAFT or National Agency for Contracts
 - ❑ ARH or Regulatory Agency for Hydrocarbons (Regulation Authority)
- ❑ New situation for investors in the hydrocarbon sector
- ❑ Main provisions concerning upstream activities
 - ❑ Upstream tax aspects
 - ❑ Upstream fiscal package
- ❑ The new status of Sonatrach - The state oil company of Algeria
- ❑ Legal protection of investors rights in signed contracts
- ❑ Midstream: transportation by pipeline
- ❑ Downstream Fiscal Package

D. Massaras, I.H.S. Energy, Geneva, Switzerland.

15.00-15.30 Afternoon Tea

H. LESSONS FROM PAST MENA UPSTREAM VENTURES

15.30 (H1) Factors Controlling Hydrocarbon Accumulation in the Pre Upper Cretaceous Clastics of Sirte Basin.

- ❑ Introduction.
 - ❑ Structural Setting
 - ❑ Stratigraphic Divisions.
 - ❑ Petroleum System(s).
 - ❑ New Exploration Concepts and Key Discoveries.
- Conclusions Major New Discoveries and Remaining Prospects.

T. Barsoum, Consultant Geologist, London UK

16.00 (H2) An Estimation of the Remaining Reserves of Libyan Basins: Progress Report.

- ☐ Remaining oil reserves, this talk will not deal with gas.
- ☐ Reserves in the eleven billion-barrel oil fields of the Sirt Basin may still be paramount (despite historical production).
- ☐ Significance of Libya's remaining reserves is discussed in a worldwide context.
- ☐ Future production estimates more useful than reserve estimates.
- ☐ Yet to find oil reserves.

D. Clark Lowes, Clark-Lowes Consulting, London, UK.

16.30-17.00 FINAL PANEL DISCUSSIONS AND CONFERENCE CLOSING REMARKS

STANDBY PAPERS

(S1) New Blocks of the Libyan Bid Rounds: Ranks, Potentials, Undeveloped Fields, Discoveries and Dry Holes.



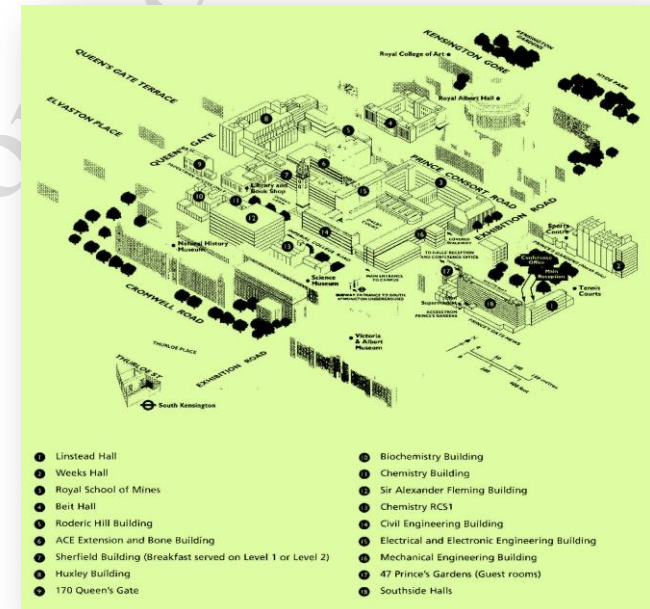
- ☐ Introduction
- ☐ The Databases
- ☐ The Ranking Programme
- ☐ Ranking the Concessions
- ☐ Applications
- ☐ Conclusions

M. Ibrahim, Geologist, Target Exploration, London, UK

Location, Travel and Accommodation

The 6th Middle East and North Africa Oil and Gas Conference will be held at the Main Concourse Mechanical Engineering and Lecture Theatre 342, Imperial College, at the Main College Entrance at the Exhibition Road, London, SW7 (building 16 in location map) in the scientific and cultural quarter of London. The Royal School of Mines, the Geological Museum, the Royal Geographical Society, the Natural History Museum, the Science Museum, the Royal Albert-Victoria Museum, the Royal School of Art, the Royal School of Music and the Royal Albert Hall are all within 10 minutes walking distance from the Conference Hall.

- Nearest Bus stops are outside the Royal Albert Hall at Kensington High Street, and nearest Tube is South Kensington Underground Station at the southern end of the Exhibition Road.
- To book your accommodation within or outside the Imperial College campus, please visit the Imperial College accommodation Department website or contact the I.C. Accommodation Staff at: Tel: +44 (207) 594 9507/11, Fax: +44 (207) 594 9504/5 Or Visit: www.imperialcollege-conferencelink.com
- For other information, exhibition spaces, topics, formats and instructions, please call: Tel: +44 (207) 371 2240, Fax: +44 (207) 371 4120 or E mail: m.ibrahim@TargetExploration.com



CHAIRMEN AND AUTHORS

CHAIRMEN

Dr Abdussalam Sghair

Regional Studies Coordinator, PRC, Tripoli, Libya.

Dr. Thamir Uqaili

BDM, Baker Hughes, Baghdad, Iraq. 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.

Dr. M. Warrak

Consultant Geologist, 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.

AUTHORS

Mr. Adnan Al Samarraie

Petroleum Industry Consultant, Baghdad, Iraq. Has 36 year experience in oil and gas exploration, development and production of giant Iraq oil fields. Has a B.Sc. in Geology from Baghdad University, joined IPC as field geologist of Kirkuk Irrigation Project, and became Deputy Head of Geology Department of Iraqi North Oil Co., then Deputy Head of Geology Department of Iraq's Oil Exploration Co. Mr. Samarraie shared a degree of responsibility in formulating, supervising and implementing the exploration strategy of the Iraqi Oil Exploration Company.

T. Barsoum

Consultant Petroleum Geologist, London, UK.

D. Boote

Consultant Petroleum Geologist, London UK.

Paul Brettwood

Regional Manager, Input/Output, UK.

Dr D. Clark-Lowes

Consultant Geologist, Clark-Lowes Consulting, London, UK.

Dr A. Dardour

Associated Researcher with the regional basin studies, Petroleum Research Centre, Tripoli, Libya. Has a BSc in Geology from Al Fateh University and a PhD. in Geology in 2004 from Kingston University, London, UK. Dr Dardour published several papers on Ghadames Basin and authored a PhD thesis entitled “Tectono-Stratigraphic Evolution of the Palaeozoic rocks and the Petroleum Systems of the Ghadamis Basin, Libya”.

Saber Elmabrouk

Researcher, Reservoir Engineering Group, PRC, Tripoli, Libya

Hussein Bashier Ghanoush

Researcher in geophysics and geology, Exploration Department, Petroleum Research Center, Tripoli, Libya. Hussein has MSc in Petroleum Geosciences and Management from the University of Manchester, UK, and BSc in Geophysical Engineering from Al-Fateh University, Tripoli, Libya. He worked as a Geological Engineer for the Baroid mud logging services and subsurface geological studies for hydrocarbon and water investigations then joined the Petroleum Research Center as assistant researcher. He was involved in planning, supervision and acquisition, processing, enhancement and interpretation of gravity and airborne magnetic surveys and seismic interpretations using Geosoft and Geoframe Carisma software's.

Dr D. Hallett

Consultant Petroleum Geologist, London, UK.

M. Hrouda

Researches, Basin Analysis Group, Petroleum Research Centre P.O. Box 6431, Tripoli, Libya

Dr. 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. He contributed to the discovery of few oil accumulations, and the recognition of additional oil reserves in Libya and Iraq. Authored, co-authored and edited several papers, technical reports, fieldtrip guidebooks, abstracts, technical discussions, technical articles, and conference volumes mainly on the petroleum geology of the Middle East, and North Africa.

S. Luning

Geologist, University of Bremen, Bremen, Germany.

Dimitri Massaras

Regional Manager, Saharan Africa Region, IHS Energy, Geneva, Switzerland. Dimitri 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, production, 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.

Waniss Otman

PhD. candidate in Petroleum Economics, Univ. of Aberdeen, Aberdeen, Scotland.

Dr. Francis Perrin

Editorial Manager, Arab Oil and Gas, Arab Petroleum Research Center, Paris, France. Studies in economics and political science at the University of Grenoble (France); PhD in energy economics and graduate of the Institute of Political Studies. Consultant and freelance journalist in energy economics. Editorial manager of Arab Oil & Gas published by the Paris-based Arab Petroleum Research Center. Contributing editor to Petrostrategies (Paris) and Africa Energy Intelligence. Contributing

editor to CycloPe 2005, a yearbook published in Paris (May 2005) and covering world commodities markets (an English translation will be published by the United Nations with the title "World Commodity Survey"). Special emphasis on the Middle East, Africa, the Caspian Sea region, sanctions and the strategies of the international oil industry.

Dr. Walter Pierce

Calik Energy Sanayi ve Ticaret A S., Ashgabat/Turkmenistan. 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.

G. Reeh

Researcher, PRC, Tripoli, Libya.

S. Rhouma

Researches, Basin Analysis Group, Petroleum Research Centre P.O. Box 6431, Tripoli, Libya

Dr. Everett Rutherford, Jr.

Calik Energy Sanayi ve Ticaret A S., Ashgabat/Turkmenistan. Everett has a BS and MS from the University of Tennessee, and Ph.D. from the University of Houston. 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.

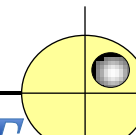
Mohamed Saleem

Assistance researcher in the Exploration dept. I involved in the Libyan gravity project. He Has M.Sc. In Petroleum geosciences and management, University of Manchester, faculty of engineering, department of earth sciences, and B.Sc. in Geophysical engineering, University of EL Fateh, faculty of petroleum & Mining Engineering, Tripoli Libya (1984). He worked for Libyan Baroid as geological engineer for 7 years during which had got a very wide experience in Hamada, Abu Eltefel, Alwadi, Alwaha, and Altahadi oil fields.

Rashad Salim

Iraqi artist with extensive exhibitions, a researcher of history, culture and technology.

Born 1957, Khartoum, European national/German of Iraqi origin- Institute of fine Arts, Baghdad, Graphic arts 1980, St. Martins School of Art, London 1983; Rashad is a practising artist with extensive exhibitions and a researcher of history, culture and technology. Crewmember Thor Hayerdahl "Tigris" Reed Boat 1977 retracing seafaring routes of the ancient Sumerians. Much inspired by travels and residence in Iraq, England, Morocco and Yemen. Has taught and held workshops at schools, universities and cultural centres. His creative output includes publications, film and photography, printmaking, sculpture illustration, and stage design. Has worked as Art consultant with UN agencies and for non-governmental organisations and is a cultural activist, grass root development. Founder member of The Friends of the Children's Hospital, Rabat Morocco; the International Cultural "Halaqa", Sana'a Yemen; Ashford Visual Artists, Kent, England; senior advisor with iNCiA - the International Network of Contemporary Iraqi Artists and associate of the Iraqi Artists Society. His works are in major public and private collections. The cultural and historical resonance between tradition and modernity, the dialectics between nature and the synthetic are subjects of his art and research.



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