

AUSTRALIAN PETROLEUM EXPLORATION ASSOCIATION LIMITED



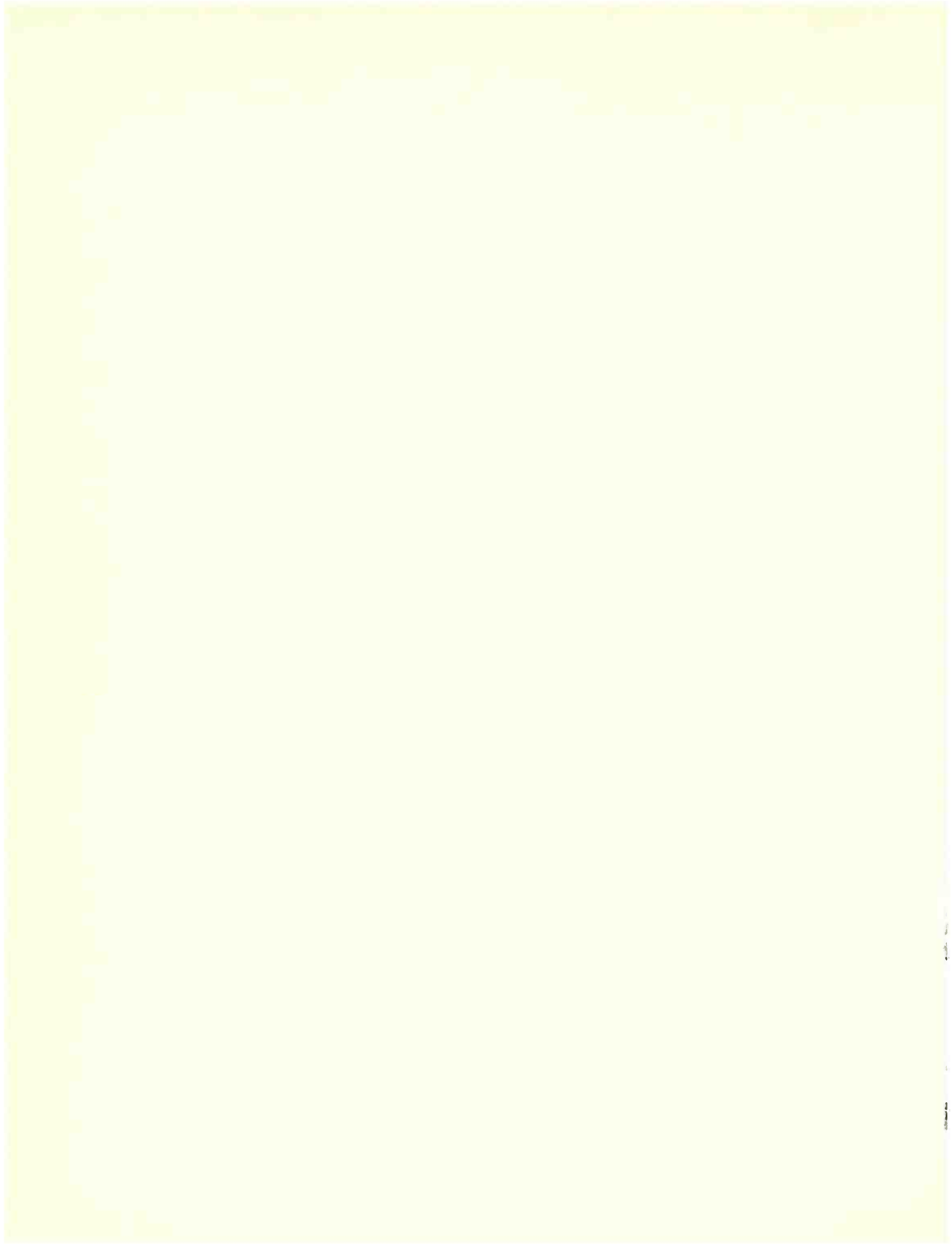
# **APEA Journal**

## **1986**

Volume 26, Part 1

Technical Papers

**1986 APEA CONFERENCE**  
Adelaide, 7-9 April 1986





**AUSTRALIAN PETROLEUM EXPLORATION ASSOCIATION LIMITED**

An Association Not for Gain — Limited by Guarantee  
(Incorporated under the Companies (New South Wales) Code)

**SECRETARY AND REGISTERED OFFICE**

4th Floor, 60 Pitt Street  
Sydney NSW 2000  
(GPO Box 3974, Sydney NSW 2001)  
Telephone: (02) 27 9651  
Telex: AA 23033

**APEA 1986 CONFERENCE CHAIRMAN**

J.W. McArdle

**TECHNICAL PAPERS COMMITTEE**

Chairman: J.D. Armstrong

N.J. Hamilton W.K. Harris R.J.S. Hollingsworth R.W. Hollis E. Moorcroft  
H.T. Pecanek P.R. Robinson (Secretary) T.R. Watts R.J. Webb B.C. Youngs

**PRODUCTION EDITOR**

H. Bagot

The Journal is published under the direction of the Council of APEA, by the Conference Technical Papers Committee of the Australian Petroleum Exploration Association Limited. Reproduction of material in whole or in part requires the customary acknowledgements and prior permission of the Association in writing.

ISSN 0084-7534

## CONTENTS

### Markets, Economics, Finance, Legislation and Taxation

*J. Allen and M. Williamson*

- Legal and taxation implications for the acquisition and disposal of offshore petroleum production and exploration tenements—a practical view and update ..... 7

*S. Breckenridge*

- Capital gains tax in the petroleum industry ..... 23

*J.E. Bushell*

- Economics of contract drilling—a dilemma ..... 31

*G.D. Campbell*

- A case for a national pipeline grid for natural gas ..... 36

*D.J. Gately*

- Queensland Petroleum Act—rusting anachronism or well-oiled discretion? ..... 42

*G.E. Hart*

- Deregulation of the Australian oil market ..... 54

*D.H. Heron and F.A. Jacobs*

- The economics of marginal offshore oilfields in Australia ..... 67

*R.A. Laws*

- Alienation of land from exploration—a South Australian example ..... 73

*J. McKee*

- Foreign funding of the Australian petroleum industry—important aspects of the direct investment decision process ..... 88

*D.P. Maxwell*

- Natural gas—the need to understand the market ..... 96

*P.C. Reid*

- Recent changes to Australia's offshore petroleum regime ..... 102

*I. Story*

- The Australian oil industry—two years of flood before the permanent drought ..... 106

*P.A. Wilson*

- Taxation aspects of sole risk, or, how to make the tax system work for you ..... 123

### Origin and Migration of Oil

*R.E. Chapman*

- Geological reasoning for the petroleum source rocks of known fields ..... 132

*C.B. Foster, G.W. O'Brien, and S.T. Watson*

- Hydrocarbon source potential of the Goldwyer Formation, Barbwire Terrace, Canning Basin, Western Australia ..... 142

*V. Golin and M. Smyth*

- Depositional environments and hydrocarbon potential of the Evergreen Formation, ATP 145P, Surat Basin, Queensland ..... 156

*R.P. Philp and T.D. Gilbert*

- A geochemical investigation of oils and source rocks from the Surat Basin ..... 172

### Exploration

*P.C. Arditty, F. Mathieu, and P. Staron*

- Evaluation of formation properties from processing and interpretation of the EVA tool logs ..... 187

*E. Denelle*

- To tackle the deconvolution problem—a powerful method based on more geological hypotheses ..... 192

*D.I. Gravestock and E.M. Alexander*

- Porosity and permeability of reservoirs and caprocks in the Eromanga Basin, South Australia ..... 202

<i>D.M. Hobson</i> A thin skinned model for the Papuan thrust belt and some implications for hydrocarbon exploration .....	214
<i>R.L. Ireson</i> The use of VSP techniques in field evaluation .....	226
<i>K. Kuttan, J.B. Kulla, and R.G. Neumann</i> Freshwater influx in the Gippsland Basin: impact on formation evaluation, hydrocarbon volumes, and hydrocarbon migration .....	242
<i>I.H. Lavering, V.L. Passmore, and I.M. Paton</i> Discovery and exploitation of new oilfields in the Cooper-Eromanga basins .....	250
<i>P.R. Lehmann</i> The geology and hydrocarbon potential of the EP 104 Permit, northwest Canning Basin, Western Australia .....	261
<i>P.S. Moore, D.K. Hobday, H. Mai, and Z.C. Sun</i> Comparison of selected non-marine petroleum-bearing basins in Australia and China .....	285
<i>H.T. Moors</i> The Yellow Drum Formation—a hydrocarbon reservoir, Canning Basin, Western Australia .....	310
<i>R.G. Nelson, T.N. Crabb, and R.A. Gerdes</i> A review of geophysical exploration in the Poldia Basin, South Australia .....	319
<i>C.B. Newton</i> The Tintaburra oilfield .....	334
<i>J.J. Stienstra, T.J.C. Prudence, and C.J. Haneveld</i> Experience with Thumper, dynamite, and Vibroseis sources in EP 308, the eastern Canning Basin .....	353
<i>M.B. Womer</i> Hydrocarbon occurrence and diagenetic history within Proterozoic sediments, McArthur River area, Northern Territory, Australia .....	363

## Reservoir Engineering

<i>N.B. Beston</i> Reservoir geological modelling of the North Rankin Field, northwest Australia .....	375
<i>D.J. Brown and M.R. Barley</i> Tirrawarra and Moorari Enhanced Oil Recovery projects—'getting more oil out from down under' .....	389
<i>A.B. Kaliszewski</i> Reservoir simulation for reservoir management .....	397
<i>S.G. Kelemen</i> Sales gas and ethane storage projects—Moomba Field, Lower Daralingie Beds .....	405
<i>F.M. Posaner and W.H. Goldthorpe</i> The development and early performance of the North Rankin Field .....	420
<i>B.F. Towler</i> Reservoir simulation in the Mereenie Field .....	428
<i>A.M. Younes, G.O. Morrell, and A.B. Thompson</i> Use of computer graphics: the West Kingfish post development reservoir simulation study .....	447

## Operations

<i>R. Frith</i> Performance of the Wallumbilla LPG plant .....	458
<i>B. Lake and N. Muecke</i> Drilling mud evaluation of southwest Queensland wells .....	465
<i>R.J. Scanlan and C.J. White</i> Surface facilities for oilfields in the South Australian sector of the Cooper Basin .....	470

## AUTHORS

Alexander, E.M. (with Gravestock, D.I.)	202	Mai, H. (with Moore, P.S., Hobday, D.K., and Sun, Z.C.)	285
Allen, J. (with Williamson, M.)	7	Mathieu, F. (with Arditty, P.C., and Staron, P.)	187
Arditty, P.C. (with Mathieu, F., and Staron, P.)	187	Maxwell, D.P.	96
Barley, M.R. (with Brown, D.J.)	389	Moore, P.S. (with Hobday, D.K., Mai, H., and Sun, Z.C.)	285
Beston, N.B.	375	Moors, H.T.	310
Breckenridge, S.	23	Morrell, G.O. (with Younes, A.M., and Thompson, A.B.)	447
Brown, D.J. (with Barley, M.R.)	389	Muecke, N. (with Lake, B.)	465
Bushell, J.E.	31	Nelson, R.G. (with Crabb, T.N., and Gerdes, R.A.)	319
Campbell, G.D.	36	Neumann, R.G. (with Kuttan, K., and Kulla, J.B.)	242
Chapman, R.E.	132	Newton, C.B.	334
Crabb, T.N. (with Nelson, R.G., and Gerdes, R.A.)	319	O'Brien, G.W. (with Foster, C.B., and Watson, S.T.)	142
Denelle, E.	192	Passmore, V.L. (with Lavering, I.H., and Paton, I.M.)	250
Foster, C.B. (with O'Brien, G.W., and Watson, S.T.)	142	Paton, I.M. (with Lavering, I.H., and Passmore, V.L.)	250
Frith, R.	458	Philp, R.P. (with Gilbert, T.D.)	172
Gately, D.J.	42	Posaner, F.M. (with Goldthorpe, W.H.)	420
Gerdes, R.A. (with Crabb, T.N., and Nelson, R.G.)	319	Prudence, T.J.C. (with Haneveld, C.J., and Stienstra, J.J.)	353
Gilbert, T.D. (with Philp, R.P.)	172	Reid, P.C.	102
Goldthorpe, W.H. (with Posaner, F.M.)	420	Scanlan, R.J. (with White, C.J.)	470
Golin, V. (with Smyth, M.)	156	Smyth, M. (with Golin, V.)	156
Gravestock, D.I. (with Alexander, E.M.)	202	Staron, P. (with Arditty, P.C., and Mathieu, F.)	187
Haneveld, C.J. (with Stienstra, J.J., and Prudence, T.J.C.)	353	Stienstra, J.J. (with Prudence, T.J.C., and Haneveld, C.J.)	353
Hart, G.E.	54	Story, I.	106
Heron, D.H. (with Jacobs, F.A.)	67	Sun, Z.C. (with Hobday, D.K., Moore, P.S., and Mai, H.)	285
Hobday, D.K. (with Moore, P.S., Mai, H., and Sun, Z.C.)	285	Thompson, A.B. (with Younes, A.M., and Morrell, G.O.)	447
Hobson, D.M.	214	Towler, B.F.	428
Ireson, R.L.	226	Watson, S.T. (with Foster, C.B., and O'Brien, G.W.)	142
Jacobs, F.A. (with Heron, D.H.)	67	White, C.J. (with Scanlan, R.J.)	470
Kaliszewski, A.B.	397	Williamson, M. (with Allen, J.)	7
Kelemen, S.G.	405	Wilson, P.A.	123
Kulla, J.B. (with Kuttan, K., and Neumann, R.G.)	242	Womer, M.B.	363
Kuttan, K. (with Kulla, J.B., and Neumann, R.G.)	242	Younes, A.M. (with Morrell, G.O., and Thompson, A.B.)	447
Lake, B. (with Muecke, N.)	465		
Lavering, I.H. (with Passmore, V.L., and Paton, I.M.)	250		
Laws, R.A.	73		
Lehmann, P.R.	261		
McKee, J.	88		

## ADVERTISERS

R.W. Fisher and Associates	22	Santos Ltd	131
Hosking Geophysical Corporation (Australia)	159	Schlumberger	399
Oil Drilling & Exploration Ltd	302	Switzerland General Insurance Co. Ltd.	225
Petroleum Management Associates	66	Skywest Charter	225
Richter Drilling Pty Ltd	105	Williams Brothers — CMPS	260
Robertson Research (Australia) Pty Ltd	370	Woodside Offshore Petroleum	431