PREVIEW

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS

A.C.N. 000 876 040

June 1992, Issue # 38

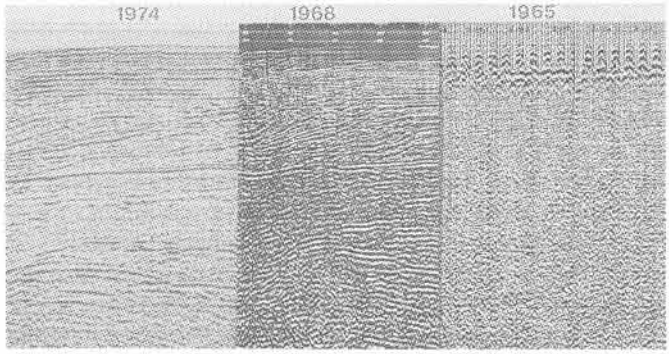
In This Issue

- **Special Features**

- **Regular Features**

HEAD OFFICE: Suite 5, 672B Glenferrie Road Hawthorn Vic 3122
TEL:(03)818 1272 FAX:(03)818 1286
PRESIDENT: Mr Hugh Rutter, Tel:(03) 818 1272 Fax:(03) 818 1286
HON SECRETARY: Mr Brenton Oke, Tel: (03) 652 6625 Fax:(03) 652 6684
EDITOR: Mr Geoff Pettifer, Tel:(03) 412 7840 Fax:(03) 412 7803
NEWSLETTER PRODUCTION: Ms Janine Cross, Tel: (03) 818 1272 Fax: (03) 818 1286
ADVERTISING: Mr Greg Turner, Tel: (03) 881 1279 Fax: (03) 803 2052
PREVIEW ADVERTISING RATES (6 ISSUES): Business Card $75; ¼ Pg $150; ½ Pg $250; Full Pg $400; Back Pg (¾ Pg) $400
Registered by Australia Post, Publication No. WBG 2390, PREVIEW is a publication of the Australian Society of Exploration Geophysicists, circulated to a membership of approximately 940.
Artwork by Geophysical Exploration Consultants Pty Ltd
Printed by Snap Printing

Introduction

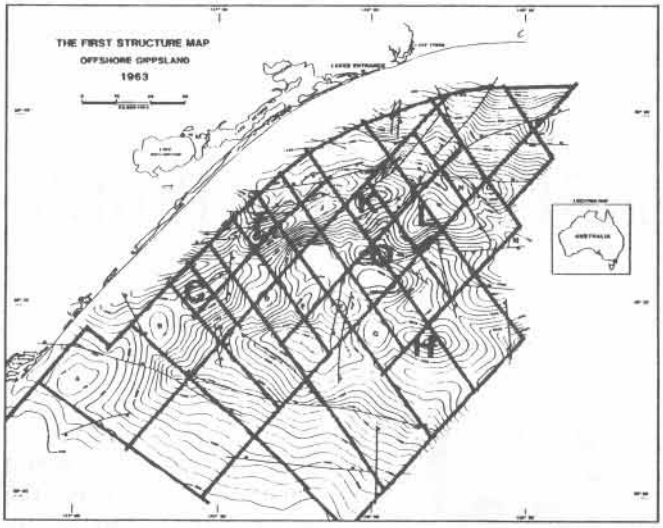


Data of this quality from early seismic surveys helped find some of Australia's significant oil fields. Was the 1963 BHPP Gippsland Basin Survey (see below) the most important seismic survey in Australia? John Denham of BHPP believes it to be arguably so. In our feature article, John gives a personal view of Australian seismic exploration history.

The death of ASEG collegue Prof. Jerry Hohmann saddened many members and a tribute to him appears in this issue.

Conference news items (Pages 7-10) are drawn to the attention of members. Don't forget early registration closes July 31st!

Editor



First offshore Gippsland Structure map for BHPP by Western Geophysical Co., 1963. Note significant structures: C-Dolphin, H-Kingfisher, I-Barracoutra, K-Snapper, L-Marlin, O-Tuna. Courtesy BHPP.

President's Letter

In my other role as Chairman of the Melbourne Branch of the AusIMM I had the opportunity to talk with Robert Champion de Crespigny, Chairman of Normandy Poseidon Limited. Mr Champion de Crespigny was the distinguished guest at The Chairman's Dinner and his after dinner address concerned gold in Victoria along with the state of the mining industry in Victoria. He brought up a number of points which are relevant to all of us throughout Australia particularly at this time of economic recession.

The general public has a rather negative attitude to our industry, but how much of this is due to our lack of attention to public relations, and what are we doing about it? I often hear individuals say that there is nothing they can do personally and that it is the responsibility of the professional societies, A.M.I.C. and the companies themselves, to change the image. But we are "the company"; we are the "professional society"; and as individuals we should be doing something in support of the company or society approach. Talking to schools or service groups (Rotary, Apex etc) is extremely valuable because you are talking to those who are not in the industry and the advantages of mining to Australia and Australians can be put forward in a balanced fashion. Not all of us like to stand up and talk in front of an audience, but there is often the opportunity to present more balanced comments in conversations with friends without being objectionable.

If we can change the attitude of the general public to one of acceptance and tolerance towards the mining industry, the results will flow upwards to the areas of policy making in the political arena, and the future of the industry will be much more secure.

Naive do you think? But definitely worth a try. As Robert Champion de Crespigny said, we are sometimes our own worst enemy. We must do something about it, and now is the time to start. Good Luck.

Hugh Rutter
President

ASEG People Profile

Rob Singh, 2nd Vice President 1992

Rob Singh graduated with a B.Sc (Geology) from the University of Queensland in 1979. With particular interests in palaeontology, stratigraphy and sedimentology, he decided to spend six months travelling in Europe and the U.K. to further contemplate these disciplines.

After returning to Australia he was employed in coal exploration as a geologist with CSR's Energy Division. This work involved the co-ordination of up to four exploration drilling crews in the Theodore region of the Bowen Basin. After a year of logging thousands of exploration holes and keeping drillers from each others throats, he decided that the petroleum industry would potentially more dynamic and interesting and joined Petty-Ray Geophysical as a Junior Processing Geophysicist in 1981.

The first 18 months with Petty-Ray involved training in the latest seismic data processing techniques and processing land seismic data from the Cooper, Surat and Galilee Basins.

In 1982 he was seconded to Petty-Ray's London Processing Centre to assist in processing large marine seismic surveys from the North Sea and offshore Nigeria. After returning to Australia, Rob supervised the processing of seismic surveys from most of the major Australian onshore exploration regions.

In 1985 Rob transferred to Petty-Ray's London Processing Centre where he was involved, among other projects, in processing behind three vibroseis crews operating in Libya. This was an eventful year as he and his wife Deidre were married in England and the U.S. government bombed Tripoli for some reason. This action did not promote U.S./Libyan relations and put an end to any U.S. based operations in Libya for the time being.

After a year in the U.K. and a season of "village green" cricket, Rob and Deidre decided to return to Australia to begin a family.

Upon his return to Australia, Rob was involved in processing Petty-Ray's first Australian offshore data. These data were from particularly difficult data areas of the Vlaming and Carnarvon Basins and Tau-P filtering techniques were tested with some success.

His final two years at Petty-Ray involved the supervision of processing large land surveys from the Carpentaria Basin.

In 1989 Rob joined Tensor Pacific in Melbourne where the chance of working with the latest supercomputers and 3D seismic techniques was offered by a new Australian based processing company. He is currently involved in general management and marketing for Tensor.

Rob is an active member of the A.S.E.G and has served as Secretary of the Queensland Branch (for a brief period) and President of the Victorian Branch (1990 and 1991). Rob is also an active member of PESA.

Rob and Deidre have three young daughters.

Apart from family activities he is interested in all sports, especially cricket, rugby union and golf but is still coming to grips with Australian Rules even after three years in Melbourne.

★★★★★★★

ASEG Branch News

Queensland

The Annual General Meeting of the Qld Branch was held 24 March 1992 in Brisbane. The meeting was addressed by the Hon. Tony McGrady MP, Qld Minister for Resource Industries. Mr McGrady emphasised the importance of the mining and petroleum industries to the economy of Queensland and Australia, and suggested that geophysicists and others directly involved in these areas whilst recognising community concern and adhering to necessary standards, should be less apologetic about the perceived "destructive" image of exploration, extraction and utilisation of resources. Rather, we should be campaigning about the positive effects these industries have on promoting economic growth and the flow-on benefits, including environmental awareness, to the community in general.

The president, Andrew Mutton, presented the Branch Report for 1991, which indicated a growing membership in Queensland, due largely to increased exploration in the mining sector, particularly in the Mt Isa area. A good selection of technical and social gatherings rounded off a positive year for the Branch. Richie Huber, co-Chairman of the ASEG Gold Coast Conference in October, presented an update on the conference preparations to the meeting.

Nominations for office-bearers resulted in the retention of the incumbent Executive, with the exception of Vice-President. Wayne Stasinowsky of Mining Geophysics Pty Ltd fills this position. The out-going Vice-President, Henk Van Paridon, was thanked for his contribution to the Branch over many years, serving in all Executive positions. Henk now takes on the task of Co-Chairman for the ASEG 1992 Conference.

The sponsorship and support of Branch activities by several organisations throughout the year was acknowledged:

AGL	CRA Exploration
Crusader	Velseis
Comalco	Univ. Qld - Geophysics

Branch activities during 1992 are likely to continue at a low level, due to the commitment by many Branch members to the organisation of the Gold Coast Conference. However, guest speakers are always welcome, and meetings can be arranged on short notice. Please advise Voya Kissitch (PH (07) 854 1488 or FAX (07) 257 1561) if you would like to tell your story to the Queensland Branch.

Voya Kissitch
Secretary

Western Australia

An informative evening was enjoyed by all who attended the June technical meeting. The first guest speaker was Mr Greg Street from World Geoscience who talked about airborne geophysical surveys and their applications in land management, especially salinity problems in rural WA. Our second guest speaker was Mr Robert Withers from ARCO Exploration and Production Technology, Dallas, who presented "A Case Study of Integrated Exploration in Volcanic Covered Areas". His casual discussion of drilling through 11,000 ft (at US$1m/1000ft) of basalt to reach buried sedimentary structures was enough to make most people's mouths a little dry. Lucky the bar was open and only 11 feet away!

Other News:

Welcome to new members of ASEG (WA); Shane Wilkes, Noelene Dorn, Matthew Fleming, Brett Harris, David Jones, Richard Brescianini, Terry Allen, and Brad George. We look forward to including you in our future branch activities.

Cheerio to Robyn Scott who heads to Spring Hill QLD, and Rob Angus who heads to Brisbane QLD.

For those of you who may have noticed that WA branch activities have been a little quiet recently, you'll be pleased to hear that the committee will meet very shortly in a seedy bar near you in order to liven things up a little.

P.S. Those of you whose names appear on the program for ASEG Gold Coast - we know where you are and will be looking to give you the opportunity of a free critique at the Raffles one evening soon.

Andie Lambourne
Secretary

South Australia

Following the cancellation of our May meeting, the June meeting of the Branch was held as an "Information Evening" with representatives of a number of organisations bringing attendees up to date on their organisation's current activities and proposed future developments. The meeting was a definite success with 67 signing the attendance book and then some who didn't. Organisations represented at the meeting were:

SANTOS:	John Hughes
SAGASCO Resources:	Rob Willink
Dynamic Satellite Survey:	Bill Hedditch
University of Adelaide:	Shanti Rajagopalon & Richard Hillis
NCPGG:	Bill Stuart
Flinders University:	Stuart Greenhalgh
Placer Pacific:	Chris Anderson
Western Mining Corporation:	Peter Fullagar
North Flinders Mining:	Trevor Ireland
CRA Exploration Ltd:	Graham Mackee
Normandy Poseidon:	Graeme Boyd
SADME:	Dave Cockshell
Petrosys:	Wence Sulda
HGS:	Murray Symonds
SSL:	Mark Tyminski

The July meeting is to be a talk by Professor Colin Reeves, Head of the Geophysical Mapping Section of the BMR, on "Geological Inferences from Geophysical Maps: Promises, Pitfalls and Perceptions". This will be followed by a brief status report by Nick Dunston on the NGMA/SADME project to produce a 1:1,000,000 image of the Magnetic Map of South Australia .

Currently our August meeting is scheduled to be an Induced Polarisation Case History by Dave Tucker.

A function of note for all SA members is a testimonial dinner in honour of Professor Dave Boyd, who retired last year after 22 years at the University of Adelaide. The dinner is being held at Fernlea Lodge on 28 July with an invitation extended to spouses/partners.

Ashley Duckett
Secretary

Victoria

May Meeting

John Denham, Division Geophysicist, Australia at BHP Petroleum, gave a talk entitled "A personal history of Seismic Exploration in Australia". He showed many of the early trials, pitfalls, idiosyncrasies and successes of his seismic reflection field work in Australia in his early years as a geophysicist. John's field-work experience in land-seismic surveys was amply shown by the varied and very interesting array of slides he displayed, and the anecdotes he related.

(See article Page 11 - Editor)

April Meeting

Roger Henderson, of Geo Instruments, gave a talk on the latest developments in instrumentation available today and in the near future. His talk was a mixture of mini-case studies tied in with instrument characteristics,showing us that geophysics can be useful not just for exploration, but also for crime investigations, environmental studies (such as soil contamination), and many other uses.

Bob Harms
Secretary

New South Wales

At the April meeting of NSW Branch - Richard Yelf of Georadar Research Ltd gave an absorbing and knowledgeable presentation on "Ground Penetrating Radar", outlining the method, field acquisition and the wide variety of applications. A number of case histories were related: from the Sydney Opera House to the Argyle Diamond Mine. A practical demonstration imaged the beams in the first floor of the Lord Nelson Hotel particularly well, without disturbing the punters at the bar below!

The May monthly meeting - held in June, saw a large gathering of the NSW membership for Chris Jenkins' presentation "The NSW continental slope - its rift and post-rift development from superside scan imagery, seismic and sampling studies". Chris provided a convincing model and some impressive images of an unusually exposed rift system on the Australian Continental Margin, outlining the ongoing and future work of the Sydney University Ocean Sciences Institute where he is a Senior Research Fellow.

Many thanks to Chris Hodge (former president) and active committee member, for his contribution over the years. He will be retiring from the committee, but has promised that "he will be back"!

Juliet Szabados
Secretary

ASEG Continuing Education Workshop

3D SEISMIC EXPLORATION

The ASEG Continuing Education Committee has contracted the SEG Continuing Education Workshop:-

3D Seismic Exploration

R. Malcolm Lansley, Alfonso Gonzalez

The course provides a review of the current techniques in the design, acquisition, processing, and interpretation of land, shallow water, and marine 3-D surveys. Case histories are used throughout the course for illustration and reinforcement; a workshop provides hands-on experience in the design and execution of different types of 3-D surveys.

- **Venues & Dates are:**

Melbourne: October 11-13, 1992
Perth: October 14-16, 1992
Course Cost: $700

- **Course Outline:**

* Comparisons of 2-D to 3-D results
* History and statistics of 3-D activity
* Presurvey considerations
* Survey planning
* Navigation and positioning considerations
* 3-D data acquisition, land and marine
* 3-D data processing, land and marine
* 3-D dip moveout
* 3-D migration - two-pass vs. one-pass, time vs depth
* 3-D interpretation fundamentals
* Case histories - marine, land, and shallow water.

The course is intended for geophysicists and geologists with a working knowledge of 2-D seismic survey acquisition and processing. It is also valuable to managers who must decide where and what type of 3-D surveys would be useful; to acquisition geophysicists needing knowledge about 3-D data processing and conversely to seismic processors wishing to learn more about acquisition techniques; and to all geophysicists involved in the design, acquisition, processing, and quality control of 3-D surveys. Beneficial background knowledge is provided for those primarily concerned with the interpretation of 3-D seismic data. Not limited to a single approach for each topic, the various alternatives are discussed and their individual strengths and weaknesses are related to each specific application.

- **About the Course Leaders**

R Malcolm Lansley *received a B.Sc in physics/mathematics/geophysics from Imperial College of Science and Technology in London. Since 1969 he has been employed by Geophysical Service, Inc in England, Dallas, Denver and Houston. In his current position of chief area geophysicist for North America, he is responsible for overseeing the technical aspects of both seismic data collection and data processing methods and their impact on the interpretability of the resultant data. Mr. Lansley's research interests include 3-D technology, wavelet processing, and vibrator signal theory. He is a member of SEG and AEAG.*

Alfonso Gonzalez *received a B.Sc. in oceanography from the University of Baja California in Mexico, his M.Sc. and Ph.D. in geophysics from Stanford University, and an MBA from the University of Houston. While at Stanford, he was a member of the Stanford Exploration Project where he did research in wave equation velocity estimation. Between 1982 and 1988 he joined the staff of Western Atlas International as senior research geophysicist, where he has been responsible for research in 3-D seismic data processing , in particular 3-D velocity estimation. Dr. Gonzalez is a member of SEG, EAEG, IEEE and the Geophysical Society of Houston.*

- *For Further information contact:*

Melbourne:Rob Kirk, BHP
Tel: (03) 652 6750
Fax: (03) 652 6325

Perth: Mick Micenko, Hadson Energy
Tel: (09) 481 8555
Fax: (09) 481 8881

****

Obituary

Professor Jerry Hohmann 1940-1992

The geophysical community was deeply saddened to receive the news of the death of Jerry Hohmann, Professor of Geophysics at the University of Utah. He was diagnosed a year ago as having multiple myeloma, and died of respiratory complications on May 23, 1992.

Prof. Hohmann was a giant in the field of electromagnetic methods in geophysics in this generation.Georef lists 74 scientific publications by him (including 4 in our own journal). Probably his most enduring work is his chapters on EM theory in the SEG book "Electromagnetic Methods in Applied Geophysics" which is a definitive exposition on the basis of, and insights gained from his work. These chapters will be a much referenced memorial to him for decades to come.

Jerry was well known to many Australian geophysicists with his graduate school being a regular port of call for EM practitioners when travelling in the USA. Two Australian companies (BHP and CRA sponsored his Centre of Electromagnetic Modelling and Inversion and the CSIRO and University of Melbourne collaborated in research. Jerry made many professional visits to Australia which he enjoyed -perhaps because of his interest in participating in sport which gave him a rapport with the Australian way of life. We will miss him in research, teaching and as a friend. He leaves us a fine memorial in his many effective ideas, his students and for many of us our personal memories.

ASEG 9th Geophysical Conference And Exhibition

TECHNICAL PROGRAM

The Conference technical program has been designed to include a balanced mix of case histories and technical developments from all areas of applied geophysics. Geophysicists and other associated earth scientists will also be interested in the two specialist symposia, particularly relevant to the conference's Queensland location.

A strong seismically-oriented stream runs through the program. This encompasses practical issues relating to acquisition, petroleum interpretation case histories and basin development concepts. Topical issues such as dip move out and prestack depth migration will be addressed. Practical examples from Australia and overseas will be presented. Specialist sessions will address seismic tomography, modelling, multicomponent processing techniques and seismic refraction.

The minerals program highlight is the full-day Mt Isa Symposium, providing a unique package of geophysical case histories from deposits in North West Queensland. Traditional mineral geophysics streams including electromagnetics, electrical prospecting and magnetics, are complemented by specialist topics such as mine-site geophysics and gold exploration. A full-day stream has been devoted to airborne geophysics.

A full spectrum of geophysical approaches to coal exploration and mining is covered by the Coal Geophysics Symposium. Papers range from seismic reflection and vertical seismic profiling through to ground penetrating radar and the application of microseismic earthquake activity to mine stability.

Dr Steve Hearn
Chairman

For further details contact:
Karen Foreman
Conference Secretariat
P.O. Box 1280
MILTON QLD 4064
Tel: (07) 369 0477
Fax: (07) 369 1512

ASEG 9th Geophysical Conference and Exhibition

Keynote Address - Abstracts

FUTURE TRENDS IN EXPLORATION GEOPHYSICS

Dr D O Zimmerman
Executive General Manager-Mineral Resources
MIM Holdings Limited

Modern exploration relies on the integration of geology, geochemistry and geophysics to locate economically viable mineral deposits, water, oil and gas reserves. Exploration geophysics relies on detecting physical property differences within the shallow earth to distinguish rock-type variations, structure and the contrast between that unique rock - the ore body - and the host rock. These physical properties include density, magnetic susceptibility, conductivity, chargeability, velocity and reflectivity. The discovery of additional useful physical properties and thus new geophysical methods, seems unlikely. The future of the continued advancement of geophysics is considered to be in the innovative use of these existing methods. Most of these have been in use since early this century and include the potential field methods of gravity and magnetics, electrical methods (resistivity, induced polarisation, self potential, electromagnetics), seismic and radiometrics.

In the recent past in Australia, geochemistry tended to be the main mineral exploration tool for the 60's through the 80's, except in uranium and more recently in diamond exploration. Geophysics was misused and poorly understood in the 60's and 70's and its proper application improved markedly in the 80's. This was due to the inevitable progression of mineral exploration into areas of thicker cover and physically more inhospitable areas. Improved data quality and the side benefits reaped from private regional airborne surveys for diamonds showed the benefits of such surveys. These extensive reconnaissance-style surveys, particularly using environmentally friendly airborne platforms, will become more widespread as target-generating tools, and ground-based geophysical surveys will become the main targeting method for minerals drilling in these areas of thicker cover.

The increasing sophistication and evolution of both ground and airborne contemporary geophysical techniques will be discussed. Advances foreshadowed will include better computer-based instrumentation that will allow detection of very small, significant signals, increased data-gathering speed and data storage, and easily interpretable output data. Examples will include commercially viable airborne gravity and other airborne and downhole techniques. These improvements are not anticipated to greatly increase survey costs beyond the rate of inflation. If the gradual decrease in the costs of airborne magnetic and airborne electromagnetic surveys are used as a guide, then costs could actually decline in the future.

Management will need to dedicate more powerful personal computers and workstations for the exploration geophysicists to adequately undertake the increasingly more complicated tasks of interpreting larger data sets so as to remain competitive. Data storage hardware and good presentation equipment will also be required. Resources will need to be dedicated to develop fast, user-friendly software for interpretation. A good goal within five to ten years would be to get electromagnetic data and its interpretation to the same level of familiarity amongst mineral explorationists as is airborne magnetic data today. The increasing use of geophysics will require most explorationists to become fluent in geophysics. This will necessitate some changes in earth science curricula within our teaching institutions. A new breed of mineral explorationists will emerge with equal competency in geology and in the practical application of geophysics, as we find now in petroleum.

Geophysics is most effective in petroleum search when results are integrated with high quality geological and geochemical data to produce a robust holistic interpretation of the source-seal-reservoir relationship as determined by sequence stratigraphic techniques.

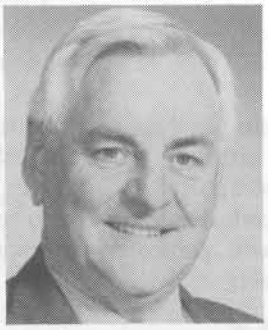
Rapid developments in petroleum geophysics since the mid-1970s have been a response to the increasing importance of cost-effective exploration and development of small, subtle and certainly more complex hydrocarbon traps.

These developments have mainly concentrated on the seismic technique and have relied extensively on constantly improving computer technology. Large volumes of high resolution, accurately positioned seismic data can now be acquired, processed and interpreted relatively quickly and cheaply, enabling the extensive use of 3D seismic as an exploration tool.

The boundaries between the fields of acquisition, processing and interpretation are becoming less distinct, with advances in "real time" processing in the field and interactive processing and interpretation of work stations. Advances in satellite communication have recently enabled the office-based explorationist to interpret on a work station, preliminary processed seismic data, within minutes of the data being acquired in the field, thereby optimising data quality and line locations.

There will also be an increase in the use of well-seismic techniques for the exploration, development and production of existing and future petroleum fields. Techniques such as cross-hole tomography, have recently demonstrated the potential to produce very high resolution and virtually noise-free seismic scans between wells. This could prove particularly useful in development geophysics and in areas where conventional surface seismic techniques are almost useless as in the highlands of Papua New Guinea.

The increasing application of geophysics in mineral exploration will reflect in an acute shortage of geophysicists in middle management where more staff trained in geophysics will control large-scale projects. As in the petroleum industry, we will see geophysicists heading up companies and being appointed to the boards of major mining companies. However, to achieve this broadening of career paths and opportunities, there will need to be a major attitude change in today's senior geophysicists. A purely scientific mentality will not be adequate to achieve the role changes successfully. There will need to be the motivation to drive and lead exploration by efficient management, utilising geophysics as an effective tool within the exploration armoury. Those geophysicists with management ambitions will need to seek out opportunities to get management training, such as the MBA, to broaden their base and increase their employability. To my mind, there should always be room for the technical manager who concentrates on management as well as the very senior and widely experienced technical person who concentrates on advancing the science. We have still to recognise the need to reward these people equally.



***Dr D O Zimmerman** joined MIM Holdings Limited in September 1990 and is currently Executive General Manager-Mineral Resources, responsible for minerals and petroleum exploration.*

Since 1975 he was respectively chief executive of Uranerz Australia, Pelsart Resources and Carr Boyd Minerals exploring in Australia and Indonesia. Prior to that, he was respectively: an exploration consultant for nine years, exploring for phosphate for two years, a university lecturer for one year, after starting as a geologist with the Bureau of Mineral Resources based in Canberra, 1956-64.

He has been active in industry groups and was President of the Australasian Institute of Mining and Metallurgy in 1987.

He first obtained First Class Honours in Geology at University of Queensland in 1956 and a Ph.D. at the Royal School of Mines, London in 1961. He gained his MBA from the University of Western Australia in 1985.

NEW HORIZONS FOR AIRBORNE GEOPHYSICAL MAPPING

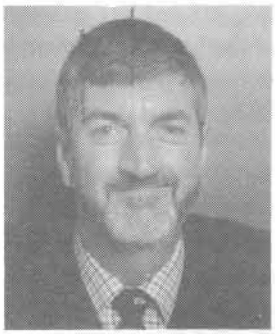
Colin V Reeves
Bureau of Mineral Resources, Geology and Geophysics

Survey technology is entering a new age of maturity which seems destined to make airborne geophysics an even more important solution to many exploration problems. In terms of quantity, more than 40 years of aeromagnetic survey gives an emerging completeness of reconnaissance coverage world-wide. In terms of quality, superlative resolution of geological detail is evident in surveys (magnetic and radiometric) carried out to the latest specifications.

The steady accumulation of aeromagnetic survey data is approaching first-pass completeness, even in areas of the world where this has not been deliberately planned. While the technical quality of older surveys often leaves something to be desired, even the poorest early data can give valuable new structural information when digitised and compiled together into maps covering large areas at small scales. Such a compilation of North America was published in 1987. Compilations of Europe, Africa and Australia will be completed in time to display at the ASEG 9th Conference. Some new technological solutions for digitising map data, linking and

levelling separate surveys and the incorporation of long wavelength (near-DC) information will be described.

The quest for high resolution in magnetic and radiometric surveys is surprisingly new and distinctly Australian. The need for low ground clearance and close line-spacing is predicted by simple theory, and new technology can cope with the consequent demands of accurate position-fixing, more frequent sampling of geophysical parameters with low noise envelopes, high resolution magnetic recording and adequate crystal volumes for spectrometry. Current techniques of imaging the resulting data - both magnetic and spectrometric - test the data quality to its limits and suggest new areas where improved data acquisition and processing technology could stretch the exploration power of airborne surveys even further in the immediate future. Meanwhile, the full digital integration of geophysical information with geological and other geo-data is still in its infancy.



***Colin Reeves** is presently Head of Geophysical Mapping at the Bureau of Mineral Resources, Geology and Geophysics (BMR) in Canberra. He holds academic qualifications from Cambridge, Birmingham and Leeds Universities in England. From 1970 to 1974 he pioneered regional geophysical mapping for the Government of Botswana in central southern Africa. After two years with Geoterrex in Ottawa, Canada (1976-8), he joined Paterson, Grant and Watson in Toronto where he continued his interest in the interpretation of airborne geophysics for mineral and oil exploration. In 1983 he was appointed Professor in Exploration Geophysics at the International Institute for Aerospace Survey and Earth Sciences (ITC) in Delft, The Netherlands, where he has led post-graduate teaching, research and consulting directed towards the developing countries and initiated the recently completed magnetic anomaly map of Africa.*

ASEG Conference Short Course

SEISMIC REFRACTION INTERPRETATION WITH THE GRM

Since it was first published in 1980, the GRM has become widely accepted within the Geotechnical and petroleum exploration sciences in North America and in Europe as the new standard for the analysis of seismic refraction data. The three level approach based on the GRM (described in Palmer D., 1990, "The generalised reciprocal method - an integrated approach to shallow refraction seismology". Exploration Geophysics (Bull. Austral. Soc. Explor. Geophys.) 21, 33-44), is currently being adopted by the ASTM.

- The GRM is a generalisation which includes most of the commonly used methods for the inversion of refraction data, and which incorporates the strength of most other methods.
- The GRM has the flexibility to suit most survey objectives. It can be used for either reconnaissance or for detailing.
- The GRM provides convenient solutions to standard problems, such as the resolution of structure on, and seismic velocity within, a refractor, as well as the only solutions to problems such as undetected layers, velocity inversions, and seismic anisotropy.
- The GRM is computationally simple and convenient to use.
- The GRM is well suited to good quality control practices.
- The GRM achieves the maximum resolution possible with first arrival refraction data. Furthermore, it does not suffer from the instability common to inversion employing the verisimilitude criterion in conjunction with forward modelling using ray tracing.

As part of the 9th Geophysical Conference and Exhibition at the Conrad Hotel and Jupiters Casino on the Gold Coast, the Australian Society of Exploration Geophysicists will hold a two day workshop on the GRM on 4th and 5th October. Features of the course include:

- A 200 page camera-ready course manual, containing introductory theory and 20 exercises, using model studies and case histories. This manual is convenient for course revision at a later date.
- Emphasis on the development of interpretation skills with the full presentation of data and processed data.
- Exercises are graduated from the elementary to the advanced.
- Exercises have detailed instructions and answers.
- The course will address important issues such as quality control, and it is especially suited to managers and project supervisors, as well as students and practising geoscientists.

The course will be held on Sunday 4 and Monday 5 October at a cost of $A275 per participant. Please contact the conference organiser or the course leader for further information.

Karen Foreman
Conference Organiser
P.O. Box 1280
MILTON QLD 4064
Tel: (07) 369 0477
Fax: (07) 369 1512

Derecke Palmer
Department of Mineral Resources
P.O. Box 536
ST LEONARDS NSW 2065
Tel: (02) 901 8355
Fax: (02) 901 8777

Depth OF Investigation Of The TEM Method

Roger Henderson

I'm often asked when I travel to other countries promoting SIROTEM, a perennial question; "how deep does it penetrate?". Of course I answer that it depends on many factors including the variation in the geo-electric section itself.

However, on reading in the newly available text on Electromagnetic Methods in Applied Geophysics, Volume 2, published by the SEG, the chapter by Spies and Frischknecht on Electromagnetic Sounding, I was re-introduced to the exposition of TEM depth of investigation by Spies, reprinted from Geophysics vol. 54, 872-888. It has some interesting conclusions.

Assuming a reasonable threshold for a minimum voltage measurement after 15 minutes of stacking, Spies derives a relationship for depth versus the transmitter moment and the average conductivity of the strata overlying a basement. (Multiple layers can be combined into one by determining their average conductivity). His Figure 8 which graphs this relationship is reproduced here.

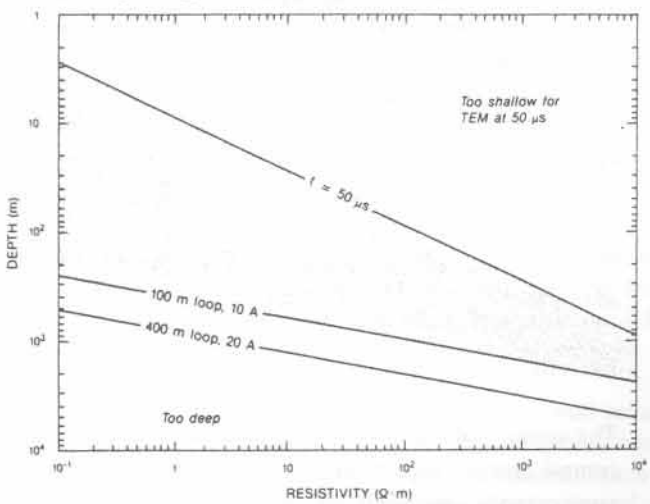


FIG. 8. Depth of investigation (shown shaded) attainable with a TEM system measuring voltage, assuming a noise level of 0.5 nV/m^2. The maximum depth [given by equation (16)] is proportional to the average resistivity of the overlying section, raised to the 1/5 power. The minimum depth is given by equation (8).

The interesting thing about this is that if one looks at some of the actual values you get, for example, for a 100m loop, 10 amps of current and an average resistivity of 100 ohm-m, a depth of investigation of 1,000m (10 x the side length). This may seem surprising to some who have used an old rule of thumb that the depth of penetration is of the order of the loop side length. It is certainly true in practice that depths can be interpreted at three and four times the loop side length.

Spies gives another expression for the time at which this depth is measured and in the case of an average resistivity of 100 ohm-m it is 6 milliseconds. It may also then seem surprising that a depth of 1,000m can be reached so quickly. However, if one remembers that the velocity of diffusion of the induction current of "smoke ring" is for this resistivity of the order of 200m per millisecond, this again is not unusual. It is also interesting to realise that millisecond which is just two orders of magnitude less than that of the velocity of light.

History Of Seismic Exploration In Australia

John Denham
Divsion Geophysicist ,Australia, BHPP

(This article is the text of a presentation given to the ASEG Victorian Branch May Meeting - Editor)

The following is a brief history of seismic exploration for oil and gas in Australia, as seen from my viewpoint. I will concentrate on the earlier period, rather than repeat what most of you know from your own experience.

Introduction

Australia was a latecomer in seismic exploration for Petroleum. Although seismic exploration was started overseas in the 1920s, and reflection seismic in 1931, there does not appear to have been any seismic exploration in Australia until well after World War II.

While there were a few early attempts to drill for oil in Australia, the first boom in exploration started from the accidental discovery of gas in a bore being drilled for water at Roma in the Surat Basin in 1899. The boom was relatively shortlived and produced only some minor gas discoveries, but lead to a series of further mini booms in the area up to the start of the Second World War. These made further gas discoveries and a few very minor oil shows, but all drilling was at best on surface mapping, with many wells drilled in locations chosen for no good geological reason.

After World War II there was renewed interest in oil exploration, and as well as the continued work around the Surat Basin, exploration was under way in Western Australia with the Wapet Consortium, and a drilling campaign by Shell intended to drill all known surface closures. In 1953 Wapet found a significant show at Rough Range in WA, which although it never produced from any stepout wells, sparked the biggest oil boom in Australian history, one which furthermore, eventually resulted in a continuing oil exploration and production industry which we have today.

One result of the boom in exploration was the discovery of oil at Moonie in the Surat Basin in 1959, which became the first commercial oil field in Australia. By 1962 gas was being produced in Roma, admittedly on a small scale, and the pipeline from Moonie to Brisbane was completed in 1964. Perhaps the most important result of the boom was that it pressured BHP into entering the oil industry, initially in the Sydney Basin, but then on the advice of their consultant Lewis Weeks, in the offshore Gippsland Basin. This resulted in the discovery of gas there in 1965 and oil in 1967 , and the discovery and development of major fields since then.

At the same time, a series of gas discoveries in the Cooper/Eromanga lead to the development of this area as the third major area for exploration in Australia after the Surat and Gippsland Basins. The Northwest Shelf followed with the discovery of the Rankin Trend gasfields.

A major effect on the use of seismic for oil exploration was the Petroleum Search Subsidy Act of 1960 which provided a 50% subsidy for drilling and later for seismic operations. This enabled the Federal Government to dictate standards, and, as the subsidised data was required to be published in report form, resulted in a much higher standard of report writing than would otherwise have been the case.

Early Seismic Efforts

After Rough Range, in its efforts to improve the quality of the oil exploration effort the BMR equipped its first seismic crew and carried out demonstration surveys in most of the prospective onshore basins. It must be remembered that at this time very few even of the major oil companies employed geophysicists, or if they did, they were only a few and were carefully segregated from the real exploration effort.

The first commercial seismic operation in Australia seems to have been a survey for WAPET by GSI in about 1955. This led to the virtually continuous presence of the company in Australia as a land acquisition company and then as a data processor and a marine acquisition contractor. In 1958 the second crew arrived in Australia: a Geo Prospectors Crew to work for Amerada in Queensland's Adavale Basin. This company remained as a land acquisition company, eventually combining with United, which was taken over by Seiscom Delta, which was taken over by Norpac, which became Grant-Norpac, and now Grant-Tensor. In 1960 there were three seismic crews in onshore Australia, by early 1962 twelve, and a year later 48, a figure that has never since been equalled.

In the 1960s the major players onshore were Geo Prospectors, United, GSI, Petty, and Ray. None of these now exist as such, and the only more or less direct descendant is HGS, descended from GSI, Petty and Ray.

From the first crews in the second half of the fifties, there was a major effort over the next ten to fifteen years which resulted in regional coverage of almost all the sedimentary basins in Australia, and in fact defined these basins in many cases. The first lines generally followed roads and other existing

Moving to the field, safety rules were not always strictly followed.

access such as fencelines, with cleared lines only becoming common late in the sixties. In the early sixties I drove from Longreach to Sydney, and there were shotpoints flagged along the road for almost the entire distance.

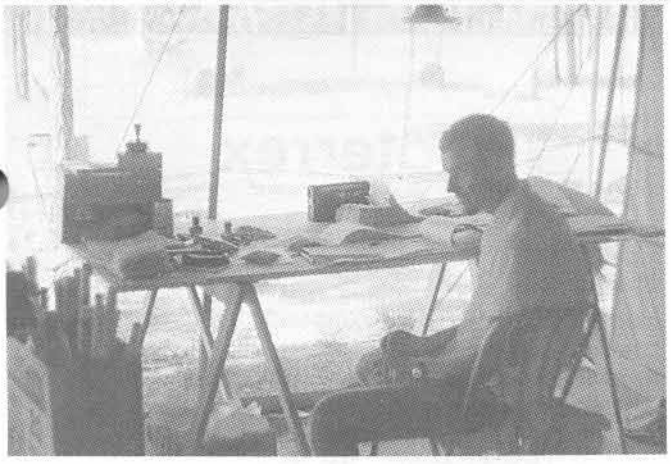
At sea, the first survey in Australia was one done by Teledyne for Woodside offshore Gippsland in 1962. A few months later the first survey for BHP was shot in the summer of 1962-3. This being a new type of operation for BHP, the company used Western as the contractor, with United being hired to interpret the data and bird dog the operation. Maps from this first survey show clearly most of the current producing fields. (See figure bottom of front page).

Regional surveys were carried out over much of the Australian shelf over the next ten years. A major effort was the BMR Continental Margins survey which covered the entire Continental slope with a grid of single trace lines over the period 1969-71. As this constituted the data from which the treaty between Indonesia and Australia was concluded in about 1973, this survey must be considered one of the most important ever undertaken in this country.

Operations

I joined AGP at the beginning of 1962, and my initial job was as a computer. This was a field job, and included interpretation of seismic data.

The crews invariably operated out of camps, and through the years these varied markedly. The movement to and from the field and in the field was usually by motor vehicle, but occasionally by air.



Field office,Galilee Basin, 1962 the lone seismic computer - field statics under canvas

Technology

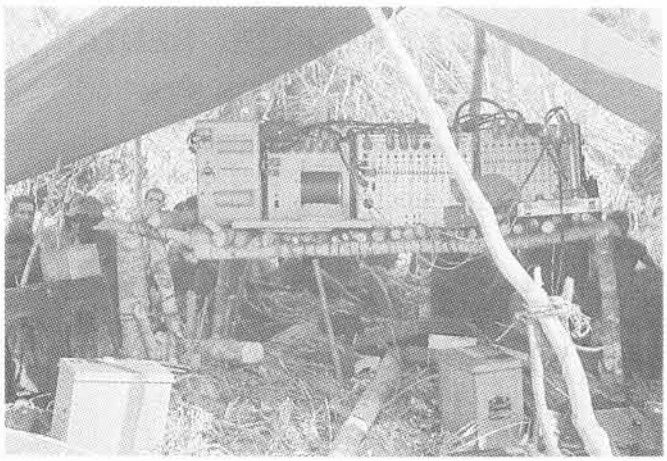
At the time that seismic surveys started in Australia, the technology, developed in the U.S.A. during the boom of the early fifties, was fairly standard. The energy source was dynamite, usually about 30 pounds, in a deep shothole. The geophones were single, moving coil devices with a resonant frequency around 4Hz. Recording systems had 24 channels, and recorded as wiggly traces on photographic paper. Timing lines were controlled by a tuning fork, and there were no magnetic recordings. As the CDP technique had yet to be invented, all data was single fold. Most recording was continuous single fold, but some data was recorded using the correlation technique where each line was shot for a mile and then a mile was skipped. Spread length was almost universally either a quarter mile or a third mile, invariably split spreads, and with shotpoints either 1320 (1/4 mile) or 1760 (1/3 mile) feet apart. The recording systems had AGC, and used valves, as transistors had yet to get out of the laboratory. Instruments provided for a fixed amount of trace mix, which could be turned on or off, and it was a common practice to take two shots in each hole, one straight, and the other mixed.

In the first offshore surveys, the spread was usually 2400m, with 100m groups, and the charge size was 50 or 100 pounds, shot from a separate shooting boat positioned about 100m off the centre of the spread.

The first advance was the use of so called miniature phones in strings of phones, typically 4 or 8, per group, occasionally more. There was a dramatic increase in the resonant frequency to a fairly uniform 30Hz. At about the same time, magnetic recording made its first appearance. The earliest magnetic recording system used in Australia was the Magnedisc, a GSI system which used discs of magnetic tape the size and shape of a LP record.

These were soon superseded by drum recorders, which used a sheet of magnetic tape wrapped round a drum. There were two common systems, the Techno and SIE formats, but others such as United were used. Techno and some variants of SIE were direct recording, in other words, they worked exactly the same as audio recording, with a separate head for each trace, usually 25, one for each trace plus one auxiliary, usually used for a timing check. The time break and uphole were superimposed on two of the outer traces.

The most common SIE system was the FM variety, where the signal actually recorded was an audio signal centred on 4khz which was varied in frequency as the amplitude of the seismic trace varied. Again, one head was used for each channel. In 1963 the BMR put an end to the use of crews without magnetic recording by requiring it as a condition for subsidy.



Air conditioned United crew dog box. Recording setup is Geospace III, SIE and Techno equipment - Kapuri area TPNG, 1969.

By 1962 transistor amplifiers were replacing valve amplifiers, with integrated circuit systems not coming until digital recording was introduced.

In 1965 the first digital recording was introduced, a GSI boat operating for Esso in a BHP farm-in. This survey actually used a dual recording system, with the data being recorded on analogue tapes as well as the digital tapes, since the data would have to be processed at great length. In fact, the digital systems offered little advantage over the FM recording systems. The earliest digital systems used ganged AGC which offered no advantage in recovering true amplitude over the FM systems' programmed gain or AGC, and in any case the true amplitude was never used. At this time the digital system was ten times the size and weight, ten times the power consumption, cost ten times as much, and was far less reliable. There was indeed a good case for doing the digitising in the processing centre. However, the industry did not adopt this view, and by the early seventies all recording in Australia was digital. At the same time as digital recording was being introduced, the subminiature geophones, similar to those in use today were introduced, with the number of phones per group increasing to twelve or more and the resonant frequency decreasing to 10 or 12 Hz.

1965 also saw the first use of the CDP stack, initially offshore, in the same survey, but gradually spreading through the industry, although it did not become standard practice until about 1970. The introduction of the CDP stack was seen as an expensive way of acquiring data, a problem which was eventually overcome by the introduction of more recording channels and cheaper energy sources. Compensating for this did, however, result in a period of shooting with long groups and group intervals, with resulting low frequency data which in any case stacked better with the poor velocity control and statics of the time.

By the early seventies the DFS III or the equivalent from Geosource had become the standard recording system, featuring binary gain and usually with 48 channels.

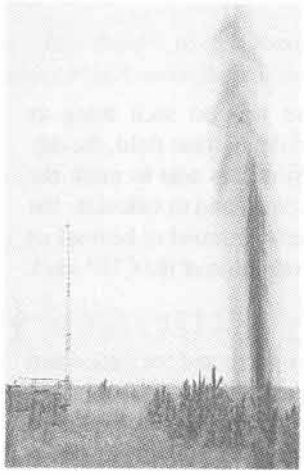
The number of channels for marine recording increased to 96 in the mid seventies, and onshore the first 96 channel crew was introduced by BHPP in 1979. By this time IFP systems, either DFS V or SN338 were replacing the binary gain systems. One inch, 21track tapes were also gradually replaced by half inch tape.

In the early eighties telemetry systems including the 1024 channel sign bit system started to be used, and the number of channels in regular use increased on land to 192 or 240 channels and at sea to 192, then 240, and now 300.

Group spacing decreased on land as the number of channels grew, from 60-100m to 50m, to 40m, to 25m. At sea, the group spacing decreased from a norm of 100m to 66m, to 50m, to 25m, to 15m to 12.5m.

Energy Sources

Early seismic operations used dynamite in shotholes exclusively for land, and dynamite floated just below the surface for marine work. To avoid a bubble, the first expansion had to break the surface, which meant very inefficient use of energy, and hence large charges.



1000lb shot. Note the height of the collapsible radio mast on recording van in distance. AGP refraction survey - Bribie Island, Queensland 1964.

In 1963 the BMR brought the first vibroseis crew to Australia, and ran a series of demonstration projects in various basins. This crew was an SSL crew and was fairly successful, although lacking CDP stacking, results with the very low power vibrators then available were not as good as might have been expected. The correlation was carried out, on the crew, using an analogue correlator. The data were recorded on conventional (for the time) drum recorders, and then played back onto a second drum on the same shaft, using a playback head which was a printed circuit representation of the designed sweep, wrapped round the drum.

It was to be the end of the seventies before vibroseis became the most popular onshore energy source. In the meantime, only one other source approached the popularity of dynamite as a source, and that was ploughed in detonating cord. Land airguns were tried briefly in the late eighties, and weight drop crews were occasionally used from the mid sixties to the late eighties but were never popular. The reason for leaving dynamite was almost purely the cost, although the explosives laws in some states helped.

An early Vibroseis truck (circa 1963)

At sea, the first airgun survey, for Esso/BHP, was in 1966. The reason for moving away from explosives was for cost and operational reasons, including safety. During the last dynamite survey carried out by Esso/BHPP the shooting boat spent about half the survey time returning to port to resupply, not surprising with the survey shooting six fold, shots every 200m, and a shot size of 100pounds. At 100km per day this represents a usage of 50 **tonnes** of dynamite per day! Although the first airgun was only about 600 c.i. it was able to shoot 24fold using a single boat, and to shoot for several weeks without resupplying.

The airgun was replaced, for Esso/BHP, by the Esso designed sleeve exploder from 1967-70, a period which was ended with the loss of the Western Spruce in a liquid oxygen accident at Barry Beach. Airguns returned and have been used ever since with steadily increasing sizes of arrays. Popular in WA was Maxipulse, which used a small explosive charge with special processing to eliminate the bubble.

Processing

Before magnetic recording, there was no such thing as processing, and the interpretation was done in the field, the day after the data was shot. The first step of this was to mark the timing lines up with the tenths of seconds, and to calculate the static corrections. Field interpretations continued to be used as a first pass interpretation until the introduction of the CDP stack in the late seventies.

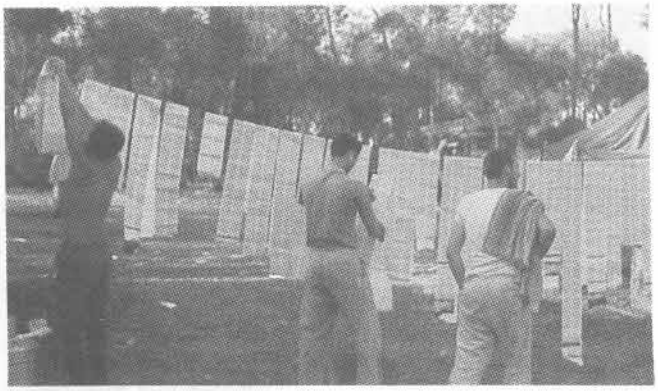
Initially, analogue data was simply corrected for statics and moveout and then displayed, initially as individual records, but later as a record section. At first this was done in the recording truck at night, using the magnetic recorder which had moveable heads. The moveout correction was applied by a cam which had to be cut for each velocity function. Statics were applied by the screw adjustment of the heads. This was never a very popular system, as the moveable heads on the recorder lead to the possibility of recording a shot with the heads misaligned.

By the early sixties there were analogue processing systems such as the one set up by Pacific Magnetic Reduction in Brisbane or GSI in Perth. These centres used analogue processing similar to that described in the field except that they used delay lines for the corrections, and usually plotted on film wrapped on a drum next to the tape. This, incidentally, explains the two popular time scales of 3.75 and 2.5 inches per second, as these were the tape speeds for the two most common formats of tape. The multiplicity of tape formats led to the development of a machine called an Omnitape, which was capable of transcribing data from one format to another, one trace at a time. Analogue processing systems were even capable of performing deconvolution, the GSI MAE process being one which applied a sort of deconvolution, by having a number of separate heads round the drum with their spacing and weights comprising a deconvolution operator calculated from the water depth.

The major advance of digital processing was deconvolution, but digital processing came more or less at the same time as the introduction of the CDP stack. The velocity analysis appeared at the end of the sixties, and migration not long after. Velocity filtering was introduced in the late sixties under the name of pie slice (GSI), but was less than successful, probably because the then common trace spacing allowed spatial aliasing and this was not well understood. It was reintroduced in the late seventies as FK filtering, and has become routine.

A bastard offshoot of processing from the mid sixties was the laserscan or optical processing which was espoused by Milton Dobrin of United. This transformed the data from a variable density display to a hologram, or fourier transform, using a lens. The hologram could be masked and then reconstructed using another lens, the mask acting as a dip or frequency filter. This technique suffered from the same sort of aliasing problems as the pie slice technique, but with the added problem of reduced dynamic range. It was hardly used in Australia.

The first record sections were wiggle trace, as had been most shot records, but these were soon replaced by variable area and later VA/Wiggle trace sections. In the 1960's variable density sections were popular, sometimes combined with wiggle trace, but by the early seventies these ceased to be used to any extent. The reason for their passing was less that they are not a better



Daily ritual of drying photographic records - GSI camp, Bowen Basin, 1962

display, but rather that they need to use grey scales in their reproduction, and there is no cheap way of copying them, and even when copied photographically, the process is critical to getting good results. Another problem is that since the photographic paper is wet processed, there is a greater tendency for the paper to shrink or stretch than with dry copying techniques which can be used for VA/wiggle as it only requires black and white.

Colour displays were introduced in the late seventies, but despite their obvious advantages were not used much used because of the cost of reproduction. They were first used to any extent when inversion of data started becoming available in the early eighties.

Interpretation

Before the introduction of the record section, reflections were identified on the shot records, correlated from record to record, and then plotted on cross sections, with the time and quality written at each shotpoint. The geological interpretation was done on the section, and the identified horizon times then posted on the base map. The map was contoured in pencil, so that it could be updated with the next day's shooting. Very occasionally the sections were manually migrated or depth converted. When record sections were introduced they replaced the plotted section. Depth conversion was rarely attempted.

The first major change in the interpretation process was the introduction of digitising the horizons, with the ability then to computer post the maps and to compute depth or corrections between surveys much more easily. It also introduced the possibility of computer contouring, although this was rarely used as results were unsatisfactory. In BHPP this change happened in 1973.

The next major change was the introduction of interactive interpretation workstations. At first used only for 3D surveys, the first of these came on the market in 1983, and as a launch customer for Landmark BHPP got their first one in 1984.

3D

The first 3D surveys in Australia were carried out for Esso/BHP at the end of the 1970s, and the technique has gradually spread. Initially interpretation used a back projection table for displaying horizontal sections, but this was superseded in 1984 by interpretation workstations.

Publications Committee Report

Members of the Publication Committee for this year included:

Terry Crabb	Chairman
Don Emerson	Editor
Ted Tyne	Conference Guest Editor
Mike Sayers	First Vice President
Mick Micenko	Business Manager
Anita Heath	Preview Editor

Graphic Services Pty Ltd printed the three issues, as highlighted below, during 1991.

VOL	ISSUE	DATE	DATE OF RELEASE	NUMBER OF PAGES	COST $	COST/ PAGE
	1-2	Mar-Jun 89	Sep 89	346	45,109	114
20	3	Sep 89	Mar 90	80	8,285	104
20	4	Dec 89	May 90	104	10,399	100
21	1-2	Mar-Jun 90	Nov 90	160	15,853	99
21	3-4	Sep-Dec 90	Aug 91	158	16,261	104
22	1-2	Mar-Jun 91	May 91	483	65,658	136
22	3	Sep 91	Feb 92	70		

Volume 21 Issue 3 & 4 was a 21 year celebrator publication, with review papers, membership listing and an index to Volumes 19, 20 and 21.

Volume 22, Issues 1 & 2 contained 92 refered papers from the Sydney Conference, held during the period February 17-20 1991. The extraordinary efforts of Ted Tyne as Guest Editor, in maximising the papers included in this issue resulted in the Publications Standing Committee strongly recommending to the Federal Executive that paid Special Conference Editors be appointed for this onerous and intensive task.

After much discussion, at the last meeting of the Perth Federal Executive, this recommendations was adopted. Jim Dooley has advised that he would be willing to become the first SCE - Special Conference Editor, and his appointment is expected to be confirmed within the week.

Don Emerson continued as Editor of Exploration Geophysics for his eighth consecutive year (13 years total) and was ably assisted this year by Ted Tyne, who guest edited the Sydney Conference Issues. The need for Associate Editors to assist Don catching up with the backlog of papers for the non-conference issues was again raised with Federal Executive, who agreed to the payment of expenses for those performing such duties. A number of members have been approached by Don to perform associate editor duties, and it is expected up to 5 will be appointed within the next month.

Brackett Secretariat continued to provide publishing facilities to the Society by liaising with the printer, editor, handling back issues, non-member subscribers and advertising.

Non-members subscribers for 1991 (114) show a slight increase over the 1990 figure of 95.

My thanks to the members of this committee for their support and assistance during 1991.

T Crabb
Chairman

Honours & Awards Committee Report

Committee members are: **Lindsay Ingall**
Barry Long
Bill Peters

During 1991 ASEG Honours and Awards were presented at the 8th ASEG Conference held in conjunction with the GSA in February at Darling Harbour in Sydney. Details are:-

Honorary Membership

For distinguished contributions to the professions of exploration geophysics:

John Wardell

The Graham Sands Award

For innovation in applied geoscience:

Terrence John Lee

For his theoretical contribution to transient electromagnetics applied to geophysical exploration.

Lindsay Ingall - Chairman

Best Paper Presentation

R Hills
"Australia - Banda Arc Collision and In Situ Stress in the Vulcan Sub Basin (Timor Sea) as revealed by Borehole Breakout Data".

Best Poster

C Walker, R J Whitely, T M Leung, M A Win
"Engineering Seismic Refraction: An Improved Field Practice and a New Interpretation Program, REFRACT".

Best Exhibit

Encom Technology Pty Limited

Lindsay N Ingall
Chairman

ASEG Conference Advisory Committee Report

The role of the Conference Advisory Committee (CAC) are:

a. To advise the Federal Executive on all conference matters;

b. To monitor the Conference Organising Committee (COC) of each conference (usually a sub-committee of the State branch of the ASEG) and give advice if required/where appropriate;

c. To plan future Conference strategies; and

d. To keep reports, records and statistics of ASEG Conferences.

The ASEG Conference Advisory Committee (CAC) comprised the following;

Timothy Pippett - Chairman
Greg Street
Robert Singh (2nd V.P. Federal Executive)
Dick Irvine

Sydney 1991

The ASEG's 8th Conference and Exhibition was held in February 1991 and was a joint meeting with the Geological Society of Australia (GSA). The conference was successful in all areas including technical presentations, the exhibitions and the finances.

The conference catered for over 900 delegates who were able to attend 300 oral, poster and video presentations put on during the four days of the conference. The 90+ exhibitors took up 140 booths and this was one of the highlights of the conference.

Gold Coast 1992 (October 5-8, 1992)

Richie Huber has continued on as Co-Chairman of this conference with the resignation of Barry Long who has moved to Thailand. Barry's position has been taken by Henk van Paridon. Richie and Henk head a very committed committee organising this event.

The conference will be held at the Conrad Hotel (Jupiter's Casino) on the Gold Coast with the theme "Improved Technologies - Revised Solutions".

Perth 1994 (Feburary)

The West Australian branch of the ASEG has been accepted as the host for the ASEG 10th Conference and Exhibition under the Co-Chairmanship of Kim Frankcombe and Norm Uren. This will be held at the Burswood Convention Centre.

CAC Matters

During 1991 the CAC undertook a further update of the "ASEG Conference and Exhibition Requirements and Guidelines Manual" with a revised manual coming out in mid 1991.

The CAC undertook an evaluation of the conference publications and made recommendations to the federal executive which were adopted. The main points of this decision were that the Conference Edition of Exploration Geophysics, be compiled by the ASEG Publications Committee (with editorial assistance from the Conference Committee) and the Conference Committee will produce an abstracts volume for the conference. It is anticipated that the former will be available f... delegates at the conference and will comprise short papers fro... as many presenters at the conference as possible.

Later this year the CAC will be calling for ASEG State Branches, to submit proposals for the 1995 conference.

After the 1992 conference, the CAC will also review the conference and Exhibition Requirements and Guidelines Manual to make sure it's relevant for future conferences.

Tim Pippett
Chairman

ASEG Corporate Affairs Committee

Committee Members

Lindsay Ingall - Chairman

Activity in 1991

On 1 January the Australian Securities Commission (ASC) replaced the State Corporate Affairs Commissions and the National Companies and Securities Commission and became the sole national authority responsible for the administration of companies and securities law throughout Australia.

It will provide a nationwide system for the registration and regulation of companies and securities and future markets.

Uniform legislation together with increased resources will enable the ASC to focus on strong enforcement of the corporations law.

An Australian Company Number (ACN) was assigned to the ASEG. It is 000 876 040 and it was required on the Common Seal as of 1 January and was required on every public document with the company name that is signed, issued or published after 1 July. Such a document includes:

* Business Letter
* Statement of account
* Invoice, receipt, order form
* Official notice
* Every eligible negotiable instrument such as cheques, bill of exchange, promissory notes letters of credit.

The ACN should be shown adjacent to the company name.

Another item of interest was that effective 1 July we had to record our Tax File Number 81 028 457 with investment bodies paying interest to us so that tax is not deducted from interest paid to us by these bodies.

Also in 1991 we changed our Registered Office From:

Simon & Baffsky
Solicitors
10th Floor, 60 Martin Place
SYDNEY NSW 2000

To:

Webeck Farland Pender
incorporating Simons & Baffsky
Solicitors
Level 18, State Bank Centre
52 Martin Place
SYDNEY NSW 2000

Activity in 1992

Commencing with the year ended 31 December 1991 we are now required by the Australian Securities Commission (ASC) to lodge an Annual Return within one month of our Annual General Meeting. Financial Statements are required and information on each director secretary and principal executive officer. This information is:

* Surname and given names
* Complete residential address
* Date and place of birth
* Office held and date of appointment

Lindsay Ingall
Chairman

****

The Geophysical Activity Committee

JANUARY 1992

The main purpose of the committee is to gather statistics on the geophysical activity in Australia in order to observe trends and have some appreciation of the fluctuations from time to time to assist in other decision making in the society. The SEG Activity Report for example is used by investment analysts, etc.

The committee has only ever consisted of myself as chairman and the appointed representative of the executive committee. This has been sufficient to carry out the tasks.

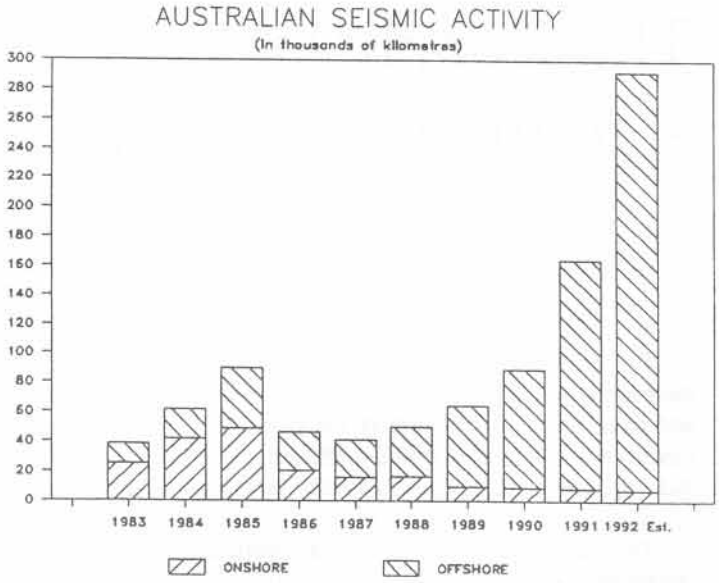
The tasks generally consist of obtaining the seismic activity statistics from APEA and the BMR and where possible, the airborne activity. Otherwise, ground contracting activity has shown itself to be almost impossible to gauge due to the nearly 100% lack of response to questionnaires. An incidental task for the committee has been to try and ensure that the statistics published by the SEG in their Activity Report are accurate for Australia. For this purpose I established myself as a member of the SEG Geophysical Activity Committee in 1990.

I now have to report that I have since resigned from that committee as I have found it to be a frustrating task to attempt to encourage and assist the SEG in getting replies to the questionnaires that they send out to Australian companies. In fact I have encountered strong opposition from the airborne contractors to the supply of any information on their activities. As a result, the figure published in the SEG report for 1990 for airborne activity for Australia/New Zealand is grossly incorrect.

OFFSHORE ACTIVITY THROUGH THE ROOF

Offshore seismic activity is forecast this year to be double last year's total, which itself was nearly double the previous year of56,000 line kilometres. The number of kilometres shot offshore has been increasing exponentially since 1987 (see graph page 22). However, APEA reports that much of this is associated with appraisal and development of current discoveries rather than with new exploration. Nevertheless there has been a revival of interest in offshore Victorian and Tasmanian waters.

Meanwhile, onshore activity remains low at only 8,619 km in 1991 and is forecast to be about this level or slightly lower in 1992. The trend for onshore seismic has been steadily decreasing every year since 1985. Mr Dick Wells, executive director of APEA, attributes this to the high cost of exploring in Australia and points to the fact that 19 companies reported plans to spend $350 million on overseas exploration. Total oil exploration expenditure in Australia has been declining since a peak in 1990.



Airborne geophysical activity has continued to be healthy in 1991.

Roger Henderson
Chairman
Geophysical Activity Committee

****

ASEG Research Foundation

ASEG Research Foundation Grants for 1993

The ASEG Research Foundation formally commenced its function in September, 1989.

The aim of the ASEG Research Foundation is to support research into exploration geophysics via approved research projects at B.Sc.Hons. and M.Sc. level in Australia Tertiary Institutions.

Since its inception the ASEG Research Foundation has sought donations from companies and individuals to establish an adequate base from which to fund projects. During the first two years of operations the foundation has provided grants for nine projects.

Institutions are now being requested to nominate appropriate projects for consideration by the ASEG Research Foundation. These projects may cover any aspect of exploration geophysics, and should have an applied objective.

The Research Foundation has established subcommittees for mining geophysics and petroleum geophysics. Each subcommittee will review projects in their relevant field and make recommendations to the ASEG Research Foundation committee.

The guidelines for the research grants are attached. Please note it is not essential that a student be identified when the application is made. However this will be necessary later if the project is to proceed.

Nominations, to be submitted by 30 September, 1992, should provide a brief outline of the project, the purpose for which funds are required and details of other funding available to the project. Your early nominations will assist us in selecting suitable projects for support in 1993.

Please ensure that colleagues in your department are made aware of this notice.

Please forward nominations to:

Joe Cucuzza
Secretary
ASEG Research Foundation
C/- AMIRA
9th Floor
128 Exhibition Street
MELBOURNE VIC 3000

Joe Cucuzza
Secretary

Guidelines for Research Grants

1. Funds will be granted in support of research projects, primarily at B.Sc.Hons. and M.Sc. level.

2. Grants will be made to projects rather than people ie. they will not be "scholarships".

Annual grants of up to $5,000.00 will be made to the Tertiary body responsible for the project - usually a University. Additional funds beyond $5,000.00 could be provided in exceptional cases, at the discretion of the Research Foundation.

3. The funds are to be used in support of the project, e.g. for travel costs, rental of equipment, etc. Funds must not be accounted for and, if not used, should be returned to the ASEG Research Foundation.

4. The project supervisor will be responsible for drawing the funds as required and for managing the expenditure. He/She should ensure that a research report and financial reconciliation is provided to the ASEG Research Foundation on completion (or cessation) of the project. Confidential research is therefore inappropriate for the ASEG Research Foundation.

5. Projects will be selected by the Research Foundation Committee. They will select projects in exploration geophysics with an emphasis on practical or applied research. Expenditure will be spread approximately equally between petroleum and minerals exploration research - unless there is a strong bias in contributions.

6. On completion of the project, abstracts will be published in Preview and publication as a paper in "Exploration Geophysics" will be encouraged. The supervisor would normally be expected to be a co-author and will be responsible for submission of a publication.

7. Interim (e.g. six monthly) progress reports will be required and should be forwarded to the Chairman/ Secretary of the ASEG Research Foundation. For each project, the ASEG Research Foundation will appoint a liaison officer, who should be a member of ASEG (but not necessarily of the Research Foundation Committee), and who will keep in touch with the project and report to the committee on progress. This would involve at least one and preferably more visits to the Institution where the project is being carried out.

8. Three members of the ASEG Research Foundation Committee will be responsible for checking the final report from each project. Copies of the report (e.g. thesis) will be available to any interested members, on request.

9. Project supervisors should submit a short list of suggested projects by 30 September of the proceeding year. These lists should include a project description, name of the supervisor and the purpose of the funds requested. *(Continued Page 24)*

ASEG RESEARCH FOUNDATION

Post to: Treasurer, ASEG Research Foundation
Peter Priest, 39 Ningana Ave, KINGS PARK, SA 5034

NAME: .....

.....

COMPANY: .....

.....

ADDRESS: (for receipt purposes)

.....

.....

.....

AMOUNT OF DONATION: $ .....

Do not detach - To be completed by ASEG Research Foundation

ASEG RESEARCH FOUNDATION

Receipt of donation

Received from .....

.....

The Sum of .....

.....

dollars being a donation to the ASEG RESEARCH FOUNDATION

$ .....

In accordance with Income Tax Assessment Act S73A, this donation to the ASEG Research Foundation is tax deductible.

Signed: .....

(This form should be retained for tax purposes)

Since the last issue of Preview the following have contributed to the ASEG Research Foundation:

BILLITON AUSTRALIA	**$1,000**
ABERFOYLE RESOURCES	**$2,000**
CRA EXPLORATION PTY LTD	**$5,000**
BHP MINERALS	**$1,000**
ESSO AUSTRALIA	**$5,000**
KEVRON GEOPHYSICS	**$1,000**
AERODATA HOLDINGS LTD	**$1,000**
B.E. MILTON	**$50**
PASMINCO	**$2,000**

☆☆☆☆☆☆☆☆☆

Magnetic Mappers of Africa Meet in Tanzania

A landmark meeting in the magnetic anomaly mapping of Africa took place at Arusha, Tanzania, during the week of April 6-10 this year. About one hundred delegates assembled to see and discuss the initial results of the African Magnetic Mapping Project (AMMP) which has been working for three years to compile all available magnetic surveys into a consistent m and digital data-set for Africa. AMMP has been promoted and executed by University of Leeds in England, Paterson, Grant and Watson Limited, consulting geophysicists of Toronto, Canada and the Department of Earth Resources Surveys of ITC in Delft, The Netherlands. The meeting was seen not only as the conclusion of a $4 million project, but also as a springboard from which new exploration undertakings in Africa may grow.

Delegates represented the sponsors of the project (nine international oil companies - Agip, Amoco, BHP, BP, Conoco, JNOC, Mobil, Texaco and Unocal - and the Canadian International Developments Agency, CIDA) and national agencies in African countries which have actively participated by contributing data. African delegates were supported by the United Nations, the European Community, the World Bank, CIDA and UNESCO. These and other aid agencies were represented since future programmes may, in some cases, be linked to international assistance programmes in Africa. A number of airborne survey contractors offering the necessary technical survey expertise were also present.

Approximately 800 surveys - mostly airborne - carried out since 1949 at a total cost of about $500 million at today's prices,

have been catalogued for the first time by AMMP and offer coverage of some 80% of Africa. Many of these surveys have, of necessity, been ditigized from contour maps, though more recent digital data have been incorporated where possible. Participating countries will each receive a digital version of their national data sets linked, levelled and gridded at 1km intervals. An initial summary of the results was available at the meeting in the form of a 1:15 million scale colour image of the magnetic anomalies arising from the African crust. New insights into the tectonic framework of Africa will be afforded by the compilation of this wealth of data which has only been available in fragmentary form until now.

Oral papers, posters, commercial booths and demonstrations addressed present day airborne survey capabilities and their application to petroleum, mineral and groundwater exploration and environmental management problems in Africa against the background of this new data set.

At the invitation of the Government of Tanzania, the five-day meeting was held at the Arusha International Conference Centre and invited delegates were welcomed by Lt Col Kikwete, Minister of Energy, Water and Minerals of Tanzania, who formally opened the proceedings.

Further information may be obtained from:
Professor Colin Reeves (Meeting Chairman)
Bureau of Mineral Resources, Geology & Geophysics
GPO Box 378
Canberra ACT 2601 Australia
Tel: (06) 249 9226

AMMP

Calendar Of Events

AUGUST 2-5, 1992

AAPG INTERNATIONAL CONFERENCE AND EXHIBITION
Exploration Frontiers in Asia and the Western
Pacific, (PESA)
Darling Harbour, Sydney
For further details:
Murray H Johnstone, General Chairman
1992 AAPG-PESA Conference
4 Edinburgh Ave, Carlingford NSW 2118
Tel: (02) 683 4102 Fax: (02) 630 8717

AUGUST 2-14, 1992

ISPRS - INTERNATIONAL SOCIETY FOR
PHOTOGRAMMETRY AND REMOTE SENSING
CONGRESS XVII
Washington D.C.
For further information:
XVII ISPRS Congress Secretariat
PO Box 7147
Reston, VA 22091
Tel: 703 648 5110 Fax: 703 648 5585

AUGUST 16-20, 1992

VENEZUELAN GEOPHYSICAL CONGRESS
"Surpassing Barriers"
Caracas, Venezuela.
For further details:
Mr L Melendez
Technical Program Chairman
C\- Geocron Consultore C.A.
Apartado 66507, Caracas 1961A
Venezuela

OCTOBER 5-8, 1992

ASEG 9TH NATIONAL CONFERENCE AND EXHIBITION
Improved Technologies, Revised Solutions.
Gold Coast, QLD
For further details:
Ms Vivienne Mackenzie
Intermedia Convention & Event Management
PO Box 1280
Milton QLD 4064
Tel: (07) 369 0477 Fax: (07) 369 1512

OCTOBER 25-29, 1992

SEG: 62ND ANNUAL INTERNATIONAL
MEETING AND EXHIBITION
New Orleans, Louisiana, USA

NOVEMBER 2-6, 1992

6TH AUSTRALASIAN REMOTE SENSING
CONFERENCE
Wellington, New Zealand

FEBRUARY 8-11, 1993

NINTH THEMATIC CONFERENCE ON GEOLOGIC REMOTE SENSING: EXPLORATION, ENVIRONMENT AND ENGINEERING
Pasadena, California
For further details:
Nancy J Wallman
ERIM
PO Box 134001
Ann Arbor MI 48113-4001
Tel: 313 994 1200 Ext: 3234 Fax: 313 994 5123

APRIL 17-20, 1993

SEG CONFERENCE 93
Integrated Methods In Exploration & Discovery
Red Lion Inn, Denver Colorado
For further details:
SEG Conference 93
PO Box 571
Golden, Colorado 80402
USA

Membership

NEW MEMBERS

We welcome the following new members to the Society. Their details need to be added to the relevant State Branch database:

Victoria

Joseph CHIUPKA
40 Somerset Drive
ViewBank Vic 3084
Ph: (03) 344 7222 (w)

Niels STIENSTRA
4/607 Park Street
Brunswick Vic 3056
Ph: (03) 387 0636

Michael NOBLE
6 Tyndall Street
Surrey Hills Vic 3127
Ph: (03) 836 3907

Simon COX
Monash University
Dept of Earth Sciences
Clayton vic 3168
Ph: (03) 565 5762

Hector GALAM
13 Edgecombe Street
Kew Vic 3101
Ph: (03) 853 3461

New South Wales

Mark RUSSELL
P.O. Box 746
Strathfield NSW 2135
Ph: (02) 529 2355

Ms Amanda TULLY
31/1740 Pacific Hwy
Wahroonga NSW 2076
Ph: (02) 487 1149

John YONG
5 Short Street
South Hurstville NSW 2221
Ph: (02) 546 6432

Peter WOLFGRAM
Geoterrex Pty Ltd
7-9 George Place
Artarmon NSW 2064
Ph: (02) 418 8077

Queensland

Mr Dale SIMS
13 22nd Street
Mt Isa Qld 4825
Ph: (077) 443 412 (w)

Peter SPRAGGON
C/- Crusader Ltd
GPO Box 703
Brisbane QLD 4001
Ph: (07) 221 6516

Bernard STOCKILL
Geological Mapping
6th Floor, QMEC
GPO Box 194
Brisbane Qld 4001
Ph: (07) 237 1510

Paul HYDE
10 Pumile Street
Eight Mile Plains QLD 4113
Ph: (07) 341 5536

Justyn HEDGES
24 Hamson Terrace
Nundah Brisbane QLD 4012
Ph: (07) 266 4653

South Australia

Angus McCOY
27 Beeston Way
West Lakes SA 5021
Ph: (08) 356 9426

Ric HORN
P.O. Box 85
Woodside SA 5244
Ph: (08) 274 7574 (w)

Dr Kevin WILLS
C/- Dominion Mining Ltd
P.O. Box 255
Eastwood SA 5063
Ph: (08) 373 3633 (w)

Western Australia

Richard WILLIAMS
8 Emile Court
North Lake WA 6163
Ph: (09) 331 2546

Richard BUNT
13 Houtmans Street
Shelley WA 6155
Ph: (09) 354 3441

David DE PLEDGE
"Rivelin"
Kendenup WA 6323
Ph: (098) 514 057

Tasmania

Fernando DELLA-PASQUA
University of Tasmania
Dept of Geology
GPO Box 252C
Hobart TAS 7001
Ph: (002) 202 457 (w)

Overseas

Michael SANDERS
P.O. Box 4858/JKT
Tebet
Jakarta 10002
Indonesia
Ph: 829 7508

Hugh MACLEAN
202 North Avenue, Suite 289
Grand Junction, Co., 81501
USA
Ph: (303) 242 1649

Neil HUGHES
3607 Wolfedale Road
Mississauga
Ontario L5C 1V8, Canada
Ph: (416) 270 0096

WHERE ARE THEY?

Does anyone know the new address for the following member:

Mr S CAO
formerly of the BMR Canberra ACT 2601

CHANGE OF ADDRESS

The following changes need to be made to the relevant State Branch Databases:

Victoria

Pradeep JEGANATHAN
To: BHP Petroleum
13th Floor
120 Collins Street
Melbourne Vic 3000

Chris LUXTON
From: Mitcham Vic
To:36 William Street
Ringwood Vic 3134

New South Wales

Don EMERSON
From: Sydney NSW
To: Box 6001
Dural Delivery Centre
NSW 2158

Dr Kenneth McCRACKEN
From: Canberra ACT
To: Jellore Technologies
Spring Hill Road
Via Mittagong NSW 2575

Queensland

Phillip ANDREWS
From: Townsville Qld
To: C/- MIM Exploration
Star Gully
Mt Isa QLD 4825

South Australia

Chris ANDERSON
To: Placer Exploration Ltd
63 King William Street
Kent Town SA 5067

Grant ARCHER
From: Westbourne Park SA
To: Box 23
Bridgewater Post Office
Bridgewater SA 5155

Western Australia

The Manager
PNC Exploratin Aust Pty Ltd
From: Perth WA
To: 26 Lyall Street
South Perth WA 6151

Marianne WINDHOFER
From: Curtin University
To: Simon-Geolithic
69 Outram Street
West Perth 6005

Teck Chuan GOH
To: Simon-Geolithic Aust
69 Outram Street
West Perth WA 6005

Tom KERR
To: 5/43 First Avenue
Mt. Lawley 6050

Bernie FRENCH
To: 16 Burlimba Road
Nedlands WA 6009

Milovan UROSEVIC
From: Jolimont WA
To: 21 Cuthbert Street
Shenton Park 6008

Tracy KERR
From: Springhill Qld
To: BHP Minerals
P.O. Box 6062
East Perth WA 6892

Corporate

WAVEFORM PTY LTD
TO: GPO Box 297
West Perth 6005

Overseas

James GALBRAITH
From: Alberta Canada
To: 1100, 444 5th Avenue SW
Calgary
Alberta T2P 2T8
Canada

Chris JUHLIN
From: Curtin University
To: Uppsala University
Box 556
751 22 Uppsala
Sweden

Prof Anton M ZIOLKOWSKI
From: University Of Delft
The Netherlands
To: Dept of Geology & Geophsyics
The University OF Edinburgh
Grant Institute
West Mains Road
Edinburgh EH9 3JW

Miss S C BOWEN
From: Melbourne
To: Shell Int Petroleum Co
HRDH/53
Postbus 162
Den Haag 2501AN
The Netherlands

RESIGNATIONS

Prof C.N.G. DAMPNEY
From: Macquarie University
North Ryde NSW 2113

A.M. HESPE
From: Aberfoyle Resources
Townsville Qld 4814

Martin BAWDEN
From: Waveform Pty Ltd
West Perth WA 6005

DEATHS

Mr L.G.G. (Tim) Pearce, 59 of Pembroke Ave South Turramurra NSW 2000
28/12/32 - 12/5/92
He was an active member of the ASEG since 1991. He was also an active member of AAPG, PESA and a associate member of AIMM.

Mr Jerry Hohmann, 52 of Salt Lake City Utah, USA
1940 - 1992
He was an Active member of ASEG since 1981. He was also an active member of SEG.