PREVIEW

AUSTRALIAN SOCIETY OF EXPLORATION GEOPHYSICISTS

A.C.N. 000 876 040

February 1992, Issue # 36

Contents

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Registered by Australia Post, Publication No. WBG2390, PREVIEW is a publication of the Australian Society of Exploration Geophysicists, circulated to a membership of approximately 900.

Artwork by The Chamber of Mines and Energy of Western Australia Inc.

Printed by Wainwright Art Studio, 107 Cambridge Street, Leederville WA 6007

Introduction

It was with some regret that the Federal Executive received Steve Mudge's resignation from the Conference Advisory Committee (CAC). Since 1988 it has become the most active ASEG standing committee. He is responsible for compiling the Conference Guidelines Manual which has become the bible of ASEG conference organisers.

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The Federal Executive will officially transfer to Melbourne in March 1992. For the April edition of Preview please send your contributions to Mr Hugh Rutter, c/- Geophysical Exploration Consultants, Suite 5, 672 Glenferrie Road, Hawthorn, VIC 3122, Tel: (03) 818 1272.

Those wishing to submit an article or advertisement for Preview (particularly Branch Secretaries) are reminded that the deadline for copy is the 15th of every second month.

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Has anyone heard of the whereabouts of the Geophysics Wine Offer?

The Editor

Branch News

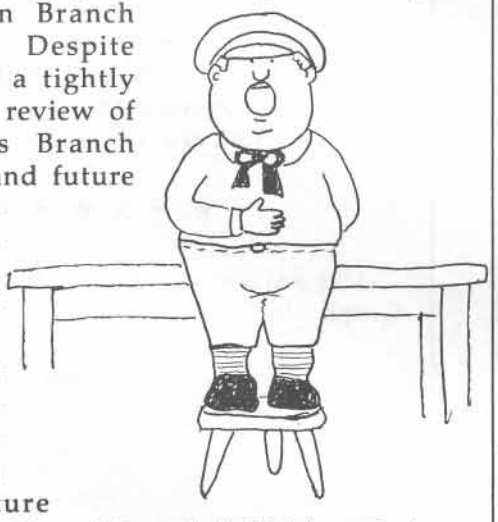
New South Wales

The Christmas Dinner at the Lord Nelson Hotel in late November was well attended, particularly in view of the departure of companies such as Esso and Schlumberger from the Sydney scene.

Lauchlan McIntosh, Executive Director of the Australian Mining Industry Council (AMIC) kindly interrupted his hectic schedule supporting mining industry causes, to give us a talk entitled "A Future Grand or A Future Banned....Examination of Some Recent Enquiries into the Mining Industry". Expressing concern about impediments placed on a major source of Australian revenue, Lauchlan wove Banjo Paterson and Henry Lawson into a provocating discourse, urging all in the industry to SPEAK UP - be it for or against development.

The Branch AGM was held on 30 January 1992 at a new venue: "The Cafe de Pub" at the Edinburgh Castle Hotel. All Executive Officers and Committee members were re-elected, except Don Emerson, Dave Kirkham and Greg Blackburn who have stepped down and receive our thanks for their years of involvement.

A purely social evening was conducted without an invited speaker but with *drinks kindly sponsored by Petroconsultants Digimap and A.S.B.* The President is reported to have given the longest address in Branch history! Despite delivering a tightly structured review of the year's Branch activities and future agenda, he was heckled by a rowdy "minerals" element who will be confined to soft drinks at future meetings! Dave "Karaoke" Kirkham led an enterprising team on to a Chinese restaurant where they evidently "sang for their supper".



Nigel Jones
President

Western Australia

A very enjoyable evening was had by the few of us who turned up to the Trots for the Christmass get-together. A few more would probably have made it a truly great night out.

The local and Federal AGM is scheduled for 4.30 pm start on Wednesday, 4 March, 1992 in the River Room at the Raffles Hotel. As is now traditional, *the beer will be supplied at no charge* to those members who turn up (*thanks to the Federal Committee*).

A short technical presentation will be provided by Dr Chris Juhlin from Curtin University on a topic that always provides stimulating debate: "Seismic over hard rock terrain."

Nominations for all local offices are open - President, Treasurer, Secretary, general committee members etc. These will be taken up to (and after) the AGM.

Local members note: your ASEG wine is on its way, somewhere between Ceduna and Eucla. Contact Kim Frankcombe at World Geoscience to arrange to have it picked up.

Andie Lambourne
Secretary

Queensland

The final meeting of the Queensland Branch for 1991 was the Annual Student's Night, held in the "comfortable" surroundings of the Geophysics Laboratory, University of Queensland. Short papers were presented by Anthony Christensen, John McMonagle and Conrad Schmidt. Awards were presented to Conrad Schmidt (Best Presentation) for his talk on "Synthetically Focussed Resistivity Logging", and to Anthony Christensen (Best Paper) who presented an alternative approach to magnetic field modelling using integral equation solutions. The meeting was well attended by industry and government geophysicists, as well as many other students.

The Annual Dinner at the Korea Restaurant, Fortitude Valley, was a great success, with many geophysicists displaying their culinary skills without managing to set fire to the restaurant! Joe Odin's surprise "guest appearance" and message of goodwill from the NSW Branch was gratefully received by the Branch President.

The Annual General Meeting is planned for late February or early March. Details may be obtained from the Secretary.

Voya Kissitch
Secretary

South Australia

The SA Branch has been fairly quiet since the Christmas BBQ. The BBQ was moderately well attended despite the problem of RBTs. The night was somewhat cool and the gathering ended up inside Terry Crabb's garage. Despite this, most attendees appeared to have a good time.

The next event on the SA Branch calendar is the Annual General Meeting to be held on Tuesday, 3 March, 1992 at the Passa Tempo restaurant. Since the President, Secretary and Treasurer for 1991 are standing down we are hoping for a spirited election campaign from some new hopefuls!

Nick Fitzgerald
Secretary

Archaean Gold Deposits and Proterozoic Dolerite Dykes: A Symbiotic Relationship?

by
D.J. Isles & A.C. Cooke
World Geoscience Corporation Limited

Introduction

The Archaean Yilgarn Block in Western Australia is one of the world's major gold producing provinces having yielded over 2,000 tonnes Au, predominantly from greenstone hosted deposits.

In this study:

- we emphasize gold producing districts which originally contained more than one million ounces of gold; and
- we refer to the very long (tens to hundreds of kilometres) dykes which are sufficiently magnetic to be detected in airborne surveys.

Our objective is to illustrate that the dykes are not pervasive and that their spatial associations with gold deposits are not random. High resolution aeromagnetics from the eastern part of the Yilgarn Block, which includes many of the major gold producing districts, forms the basis of this illustration. *[Figure 1, published previously in Economic Geology and at the Bicentennial Gold 88 Conference, shows some of the dykes; the authors had access to more detailed data which cannot be published for proprietary reasons, ed.].*

Dyke Suites and Regional Associations

The dykes illustrated in Figure 2 have been divided into six suites based on their orientation, continuity and width. The subdivisions are not based on any inferred genetic relationships.

Suite 1 dykes (030 - 050) are intimately associated with the Proterozoic Albany-Fraser Mobile belt.

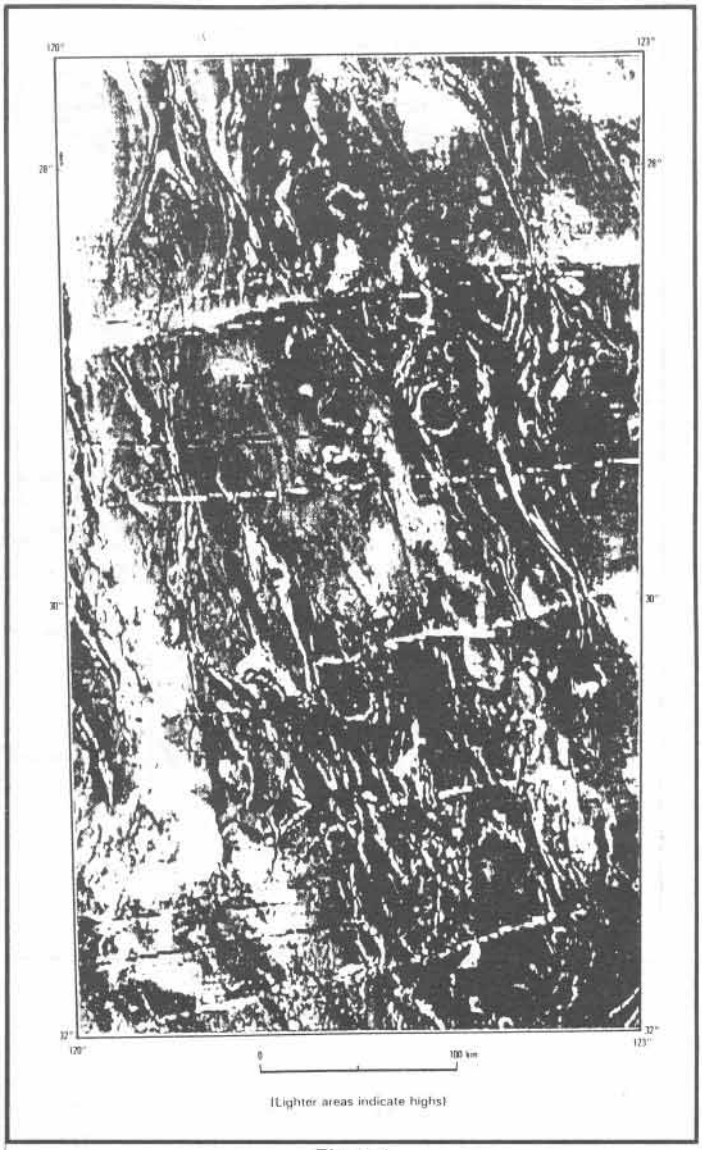


Figure 1

Grey Scale BMR Total Magnetic Field Image - Eastern Yilgarn Block

They parallel the belt and are confined to a 75 km wide zone adjacent to it. The major structural trends in the older greenstone belts in the northwest of the Yilgarn block also have this orientation. A "suite 1" dyke is observed in the Victory-Defiance gold mine.

Four narrow swarms of Suite 2 (065 - 070) dykes occur at intervals of 80 to 100 km throughout the study area. These dykes are conspicuous in the Leonora and Menzies gold districts.

The suite 3 "swarms" (070 - 080) include dykes which are thicker and longer than all other suites and in places show cumulate layering (Campbell et al, 1970). These dykes exhibit a "semi-regular" spacing (50 km, 65 km, 80 km, 170 km) and are observed in the Norseman, Celebration and Bardoc gold districts.

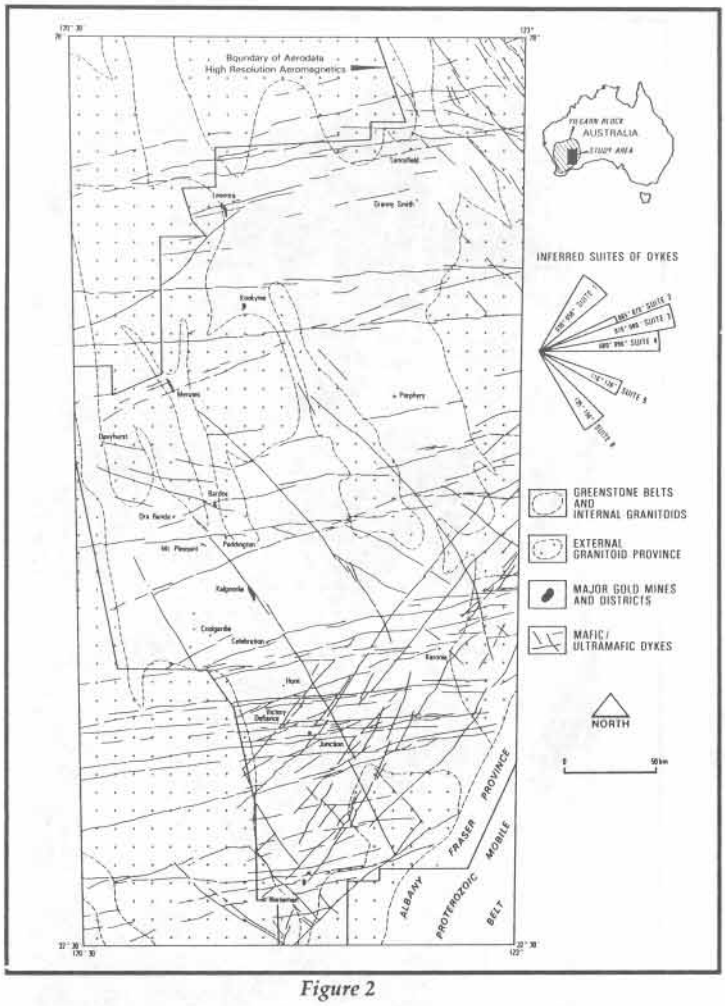


Figure 2

Post Cratonization Dykes of the Eastern Yilgarn Block

The suite 4 dykes (080 - 090) are much narrower and, although very long, frequently exhibit a stepped character comprising overlapping segments. Such dykes are found in the Junction and Paddington gold districts.

Suite 5 (110 - 120) is quite weakly developed, but is notable because one such dyke is observed cutting the mineralization at Bardoc and is also present at the Sand King mining centre.

Suite 6 (135 - 150) includes the enigmatic "Parkeston Dyke" which passes approximately 2 km from the main lodes at Kalgoorlie and has been proposed as part of a wrench tectonic system which controlled the mineralization (Mueller and Harris, 1987). The suite comprises four separate narrow curvilinear dykes spaced about 50 km apart.

Suites 1, 2, 3 and 5 show positive magnetic responses while suites 4 and 6 are predominantly negative features. Studies of the remanent magnetization of the dykes have been very limited and are considered to be far less important than the study of the geometry of the dykes.

Although all field evidence shows that the dykes postdate gold mineralization, figure 2 indicates that the great majority of the significant gold producing districts occur in close proximity to dykes. Given the extensive areas in the greenstone belts where dykes are absent and the likelihood that much of the gold arguably lies undiscovered beneath the sand and salt lake cover, the proposition that the dykes and gold mines share common tectonic controls deserves closer scrutiny.

Victory-Defiance District

We focus on Victory - Defiance which is in the Kambalda region, 65 km SSE of Kalgoorlie.

High resolution aeromagnetic data for the area are in figure 3 [*a PREVIEW exclusive, courtesy of AERODATA, ed.*]. Our interpreted dykes and known gold mining areas are in figure 4. Roberts et al (1989) present a comprehensive summary of the geology and mineralization of the region.

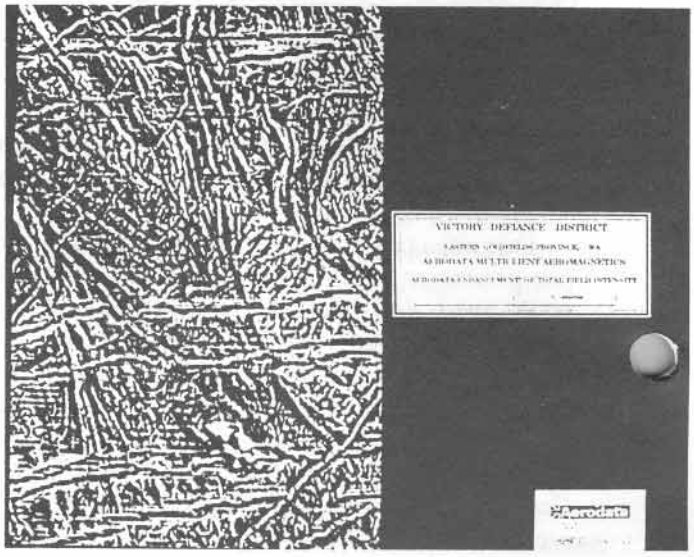


Figure 3

Aerodata Enhancement of Total Field Intensity - Victory-Defiance District

Primary lithological and structural controls on gold trend NNW but clearly the mines cluster near the dykes. The Victory - Defiance and Junction areas each contain over 1 million ounces of gold and post-cratonization dykes are a prominent feature of the open pits at both mines. Several of the lodes in the Defiance pit parallel the Suite 1 dyke.

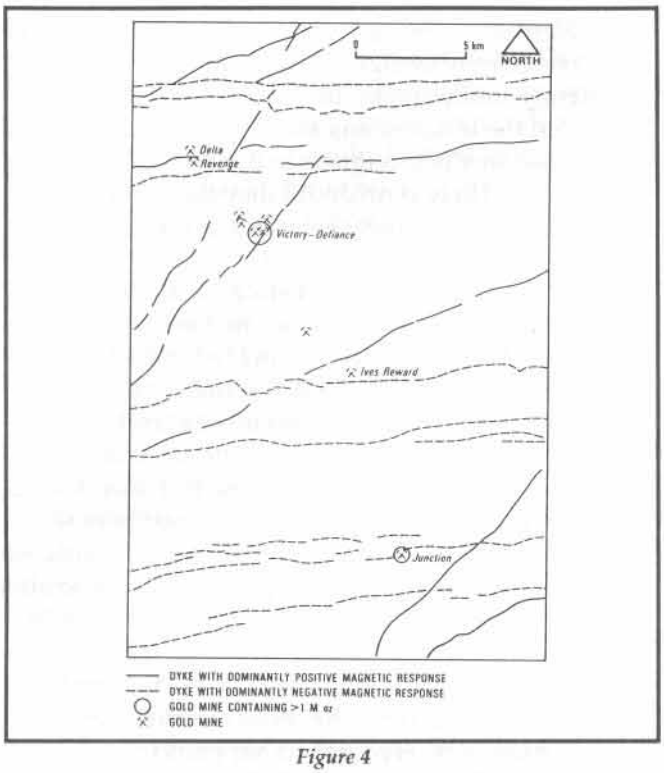


Figure 4

Gold Deposits and Post Cratonization Dykes - Victory-Defiance District

Tectonic Model

From the foregoing observations, we infer that the emplacement of post-cratonization dykes was strongly influenced by earlier tectonic events which themselves influenced the localization of gold. Current research (Groves et al, 1989) indicates that the Yilgarn Block gold deposits are intimately related to structural features such as shear zones and faults. More specifically they occur at localities within these structures which have experienced fluid over-pressuring and fracturing, allowing wall-rock reaction and veining. Such localities may occur in most types of structures under certain conditions and they may broadly be described as "tensile positions" within the structures.

The geometry of the post-cratonization dykes in the Yilgarn Block strongly suggests that they were emplaced in tensile fractures developed under the influence of a regime of dominantly east-west compression. This is based largely on the similarity of the dykes to sets of Griffith fractures (Jaeger and Cook, 1969) and the inference that such fractures can only propagate in a stable manner under compression. The proposed link to the prior structural history of the Yilgarn Block is the fact that the main deformation of the greenstone belts was dominated by approximately east-west crustal shortening.

Discussion

We propose that the post-cratonization dykes occupy zones of weakness established during the long period of EW shortening coinciding with the latter stages of greenstone belt deformation and including the main mineralizing events. It is reasonable to suppose that positions of high differential stress favourable for gold mineralization and initiated by EW oriented tectonic controls would be preferentially reactivated under EW compression after cratonization.

Conclusion

From a gold exploration standpoint this model should lead to a review of the positions where strike parallel contacts and structures are intersected by the dyke suites. Many apparently unmineralized sections of the greenstone belts have this characteristic. Could they be the Yilgarn Block's undiscovered gold camps ?

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[Editorial note: This article is adapted and condensed from:

Isles, D.J., and Cooke, A.C., 1990, Spatial associations between post-cratonisation dykes and gold deposits in the Yilgarn Block, Western Australia: In Mafic Dykes and Emplacement Mechanisms, Parker, Rickwood & Tucker (eds), Balkema, Rotterdam (pub), p. 157-162.]

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Conference Going in '91: Contact with Neighbouring Societies

by RJ Henderson

In the last few months of 1991 I attended three international conferences by geophysical societies with which the ASEG has some affiliation. All three are very keen to maintain a relationship with ASEG.

The first was in Johannesburg where the South African Geophysical Association (SAGA) held their biennial meeting over two days, with one parallel session on the second day - 53 papers in all. The extended abstracts were provided. SAGA has 285 members at present and is growing at the rate of about 10% per year (unlike ASEG).

Trade sanctions are now beginning to be lifted and so few foreign delegates such as myself thought it an opportune time to start up relations with South African geophysicists again. Sam Bullock of Aerodata and I were the only delegates from Australia and we were both given special billing for our presentations. About 200 attended in all and my overall impression was that South African geophysicists are at a very similar level of expertise to us and are, what's more, suffering the same problems of too little research funding and a shortage of qualified graduates. These aspects were highlighted in the keynote speech entitled; 'Quo Vadis', given by the Chairman, Ken Biesheuvel of Anglo American. A small exhibition was held in the foyer of the Geophysics Dept of the University of Witwatersrand in much the same way as we held exhibitions before we graduated to hotel venues. As their conference and exhibition is growing each time, they expect to move into a more professional environment in future.

In the following month I attended the Indonesian Geophysical Association (HAGI) Meeting in Bandung. This is an annual event and again I had the (mis)fortune of being in the company of Reg Nelson and Dave Tucker at this event too. The conference was attended by over 300 of the total membership of HAGI which is more than 800 and growing. The presentations were of a high standard and a high percentage were from foreign speakers so as to make this a truly international meeting. It is my impression that the Indonesians are very happy to accept the assistance of foreigners and are quick to learn their ways. There is no doubt they have some dynamic geology to further their own dynamism.

The next conference was the Indian Association of Exploration Geophysics (AEG) 17th Annual Conference in Hyderabad which was also billed as the First International conference. The AEG has 1,000 members and about 300 attended the conference. The organisers hoped for more like 700 attendees, but due to recent government cuts, most of the members who are predominantly in government run organisations were not given the means or permission to attend the conference. For example, where over 70 had been expected to attend from the Geological Survey of India in Calcutta, only one representative (the boss) came from there. Fortunately, Hyderabad happens to be the centre of geophysics research in India with the National Remote Sensing Agency as well as sections of the Geological Survey. Thus the attendance was able to be boosted by dragooning most of these employees into attending. The situation here is much like holding a conference in Canberra and having everyone from the BMR attend. The institutions were thus able to assist with the running of the conference by providing their services such as old Indian-made cars to meet delegates at the airport driven by Sikhs who spent the days of the conference polishing the chrome.

The conference was too long (6 days) as there were no parallel sessions by design to force everyone to sit through all the methods and applications. This led to some of the sessions being very poorly attended. There were 300 papers and Extended Abstracts were printed in two thick volumes which didn't fall apart at the binding until the second time they were opened. The short abstracts are also made available in a separate issue entitled "Souvenir" which also contained the 12 valedictories presented to distinguished members in the longest opening session I've ever experienced. I was the only delegate from Australia this time and there were not many other foreign delegates except for a few from Canada. Each of us was made Chairman of the session in which we gave our paper.

Also, because of the budget cuts and the prospect of the conference running at a loss, last minute cost savings had to be made which included forcing the exhibition to be held in the

underground carpark of the conference hotel. This was a gloomy area fit for the appearance of Deep Throat, with no ventilation and bare concrete floors thick with dust. A small committee of disgruntled exhibitors hastily formed to survey other potential sites in the hotel, only to conclude that the carpark was still the only satisfactory area for power and security. (Otherwise the front lawn was favoured). Old threadbare rugs were laid on the concrete and lots of old electric fans on stands were placed about the area. It was by far the worst exhibition area I have ever had to be in and I found myself returning frequently to the technical sessions which were airconditioned. A compensation was the excellent food that was provided on the lawn of the hotel under a marquee every lunch time. These were wonderfully authentic Indian curries and while the attendance at the sessions seemed to fall off towards the end of the week, there was no diminution of attendance at these lunches. I suspects by this time geophysicists from the local institutes had gone back to work in the last few days but returned to the conference each day for the lunch only.

India, in my experience, hasn't changed its vast diversity of peoples and lifestyles. I must admit I had some difficulty understanding a lot of the 'Peter Sellers' accents at the conference and witnessed some strange perversities, such as airport police telling a smoker to remove himself to the airport tarmac if he wanted to continue smoking, as there was definitely no smoking in the departure lounge. Entering and departing at the airport at Madras was an horrendous experience and I have never waited in a queue for passport control for so long before; one and a half hours at least, and even then the baggage was only just then appearing on the carousel and a further two hours was spent getting through customs when absolutely everyone went through the red channel, all with duty to pay on their overseas purchases. Apart from the usual procedures for departure, there were four or five additional ones at Madras, making 12 different barrier checks and procedures to go through. These included the usual practice at all Indian airports where you identify your luggage on the tarmac before it is loaded on the aircraft. Because I had forgotten to do this on departure, I did not have the requisite customs stamp on my boarding pass at the second body check and in going back to get this I failed to get the body check stamp so that at the third boarding pass check at the door of the aircraft, I again had to return for this.

A feature of the country seems to be that reservations for airlines and hotels are never certain. Every hotel that I checked into did not have any pre-arranged reservation, even the conference hotel which really didn't seem to know they had a conference on there when I arrived with the head conference organiser, who also confirmed if, and when, you actually appear at the check-in counter. Phoning doesn't work. However, all in all I don't think India is now as bad as it used to be or as some people still think. In asking a colleague, who had just been there, what his advice was for me in going to India, it was "don't".

BMR Wins Overseas Contract

Reprinted from First Break, Vol 9, #12, December 1991

The Australian Bureau of Mineral Resources (BMR) research vessel, Rig Seismic, has won a A$4.7 million contract, its first overseas, for a marine seismic survey and collection of geochemical data off the Philippines.

Funded by the Australian Development Aid Bureau, the survey project will focus on the Visayan basin in the central Philippines and the Southern Cuyo platform in the north east Palawan, southern Philippines.

Obituary

Bud Grant

We regret to inform that the American SEG's immediate Past President, Bud Grant, passed away on Monday, January 20.

Mr Grant is survived by his wife, Pat, and his six children. He is also survived by 12 grandchildren.

The 1991 Revision of the International Geomagnetic Reference Field

Charles Barton
Geomagnetism Section
Bureau of Mineral Resources, Geology and Geophysics

A revision of the International Geomagnetic Reference Field (IGRF) has recently been issued by the International Association of Geomagnetism and Aeronomy (IAGA). The existing IGRF85 model has been replaced by a definitive model, DGRF85, and a new provisional model, IGRF90, has been adopted.

The new version of IGRF thus comprises the following spherical harmonic models:

- nine definitive main-field models, for 5-year epochs from 1945 to 1985 (DGRF45 to DGRF85);
- a main-field model for 1990 called IGRF90; and
- a secular variation model for the interval 1990 to 1995, deemed to be part of IGRF90.

Between 1945 and 1990 the IGRF main field is determined by linear interpolation between spherical harmonic coefficients of the two adjacent 5-year epoch models. The DGRF models are definitive in the sense that no subsequent revision by IAGA is planned. The IGRF90 model is provisional and will eventually be replaced by a definitive model for 1990, and a provisional model for 1995.

IGRF is intended primarily to be a representation of the Earth's main (core) field, and is truncated to remove most of the crustal contribution to the field. Accordingly, the main field models are truncated at maximum degree and order 10. The secular variation model is truncated at maximum degree and order 8 which is the limit of significance of the secular variation coefficients.

IGRF is produced by IAGA Working Group V-8: Analysis of the Main Field and Secular Variations. The full set of spherical harmonic coefficients for IGRF is being published in several journals (Geophysics, PAGEOPH, Geophys. J. Int., J. Geomag. Geoelectr., Geomag. Aeronomy, Phys. Earth Planet. Int., EOS Trans. Am. Geophys. Un. and IAGA News).

Coefficients for the new models are listed in Table 1 (see page 11).

A software package for computing field and secular variation (annual charge) values of IGRF is available from BMR Geology and Geophysics.

The package includes an ASCII file of the complete set of IGRF coefficients, together with program IGRF for computing IGRF values between 1940 and 1995 for a given site (specified by latitude, longitude and elevation), and program ANYMOD for evaluating any spherical harmonic model.

An additional program, GRIDCON, is provided for converting from eastings and northings on the Australian Map Grid to latitudes and longitudes on the Australian Geodetic Datum, and vice-versa. The software package is available in either IBM PC-compatible or Apple Macintosh versions, at a cost of $50, from:

Geomagnetism Section
BMR Geology and Geophysics
PO Box 378
Canberra ACT 2061
Tel: 06 249 9111
Fax: 06 257 6041

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Table 1. Spherical harmonic-coefficients for DGRF85 and IGRF90

	n	m	DGRF 1985	IGRF 1990	1990-95*
g	1	0	-29873	-29775	18.0
g	1	1	-1905	-1851	10.6
h	1	1	5500	5411	-16.1
g	2	0	-2072	-2136	-12.9
g	2	1	3044	3058	2.4
h	2	1	-2197	-2278	-15.8
g	2	2	1687	1693	0.0
h	2	2	-306	-380	-13.8
g	3	0	1296	1315	3.3
g	3	1	-2208	-2240	-6.7
h	3	1	-310	-287	4.4
g	3	2	1247	1246	0.1
h	3	2	284	293	1.6
g	3	3	829	807	-5.9
h	3	3	-297	-348	-10.6
g	4	0	936	939	0.5
g	4	1	780	782	0.6
h	4	1	232	248	2.6
g	4	2	361	324	-7.0
h	4	2	-249	-240	1.8
g	4	3	-424	-423	0.5
h	4	3	69	87	3.1
g	4	4	170	142	-5.5
h	4	4	-297	-299	-1.4
g	5	0	-214	-211	0.6
g	5	1	355	353	-0.1
h	5	1	47	47	-0.1
g	5	2	253	244	-1.6
h	5	2	150	153	0.5
g	5	3	-93	-111	-3.1
h	5	3	-154	-154	0.4
g	5	4	-164	-166	-0.1
h	5	4	-75	-69	1.7
g	5	5	-46	-37	2.3
h	5	5	95	98	0.4
g	6	0	53	61	1.3
g	6	1	65	64	-0.2
h	6	1	-16	-16	0.2
g	6	2	51	60	1.8
h	6	2	88	83	-1.3
g	6	3	-185	-178	1.3
h	6	3	69	68	0.0
g	6	4	4	2	-0.2
h	6	4	-48	-52	-0.9
g	6	5	16	17	0.1
h	6	5	-1	2	0.5
g	6	6	-102	-96	1.2
h	6	6	21	27	1.2
g	7	0	74	77	0.6
g	7	1	-62	-64	-0.5
h	7	1	-83	-81	0.6
g	7	2	3	4	-0.3
h	7	2	-27	-27	0.2
g	7	3	24	28	0.6
h	7	3	-2	1	0.8
g	7	4	-6	1	1.6
h	7	4	20	20	-0.5
g	7	5	4	6	0.2
h	7	5	17	16	-0.2
g	7	6	10	10	0.2
h	7	6	-23	-23	0.0
g	7	7	0	0	0.3
h	7	7	-7	-5	0.0
g	8	0	21	22	0.2
g	8	1	6	5	-0.7
h	8	1	8	10	0.5
g	8	2	0	-1	-0.2
h	8	2	-19	-20	-0.2
g	8	3	-11	-11	0.1
h	8	3	5	7	0.3
g	8	4	-9	-12	-1.1
h	8	4	-23	-22	0.3
g	8	5	4	4	0.0
h	8	5	11	12	0.4
g	8	6	4	4	-0.1
h	8	6	14	11	-0.5
g	8	7	4	3	-0.5
h	8	7	-15	-16	-0.3
g	8	8	-4	-6	-0.6
h	8	8	-11	-11	0.6
g	9	0	5	4	0.0
g	9	1	10	10	0.0
h	9	1	-21	-21	0.0
g	9	2	1	1	0.0
h	9	2	15	15	0.0
g	9	3	-12	-12	0.0
h	9	3	9	10	0.0
g	9	4	9	9	0.0
h	9	4	-6	-6	0.0
g	9	5	-3	-4	0.0
h	9	5	-6	-6	0.0
g	9	6	-1	-1	0.0
h	9	6	9	9	0.0
g	9	7	7	7	0.0
h	9	7	9	9	0.0
g	9	8	1	2	0.0
h	9	8	-7	-7	0.0
g	9	9	-5	-6	0.0
h	9	9	2	2	0.0
g	10	0	-4	-4	0.0
g	10	1	-4	-4	0.0
h	10	1	1	1	0.0
g	10	2	3	2	0.0
h	10	2	0	0	0.0
g	10	3	-5	-5	0.0
h	10	3	3	3	0.0
g	10	4	-2	-2	0.0
h	10	4	6	6	0.0
g	10	5	5	4	0.0
h	10	5	-4	-4	0.0
g	10	6	3	3	0.0
h	10	6	0	0	0.0
g	10	7	1	1	0.0
h	10	7	-1	-1	0.0
g	10	8	2	2	0.0
h	10	8	4	4	0.0
g	10	9	3	3	0.0
h	10	9	0	0	0.0
g	10	10	0	0	0.0
h	10	10	-6	-6	0.0

*Annual change

ASEG PUBLICATIONS *are a non-profit forwarding agent for the* SEG Digital Cumulative Index of SEG, EAEG, ASEG and CSEG Publications

The Digital Cumulative Index, a two-year project by the SEG Publications Committee, provides the working geophysicist with a powerful, computerised working resource typically found only in major oil companies. The Digital Index bridges the gap between a printed index that sits on a bookshelf and powerful on-line data bases accessed by large research libraries.

The Digital Cumulative Index contains 13,000 journal articles, books and reprints of four geophysical societies - SEG, EAEG, and the Australian and Canadian SEGs. For the first time, annual meeting titles, for which Expanded Abstracts are available, are included. Unique to the Index is complete cross-referencing of discussions, replies, errata and addenda. The geophysicist can quickly search for key information on authors, titles and keywords, and create a bibliography of all papers on a specific topic. References can be easily formatted in any of the supplied bibliographic styles (including GEOPHYSICS and *Geophysical Prospecting*). The formatted references may then be printed or added to your word-processor document.

Most users will purchase the Index with run-time bibliographic software (EndNote or Papyrus for the PC; EndNote Plus for the Macintosh). These programs are fully compatible with common word-processing programs such as Microsoft Word and Word-Perfect. Other formats, such as text-delimited ASCII are easily imported into existing database programs on desktop workstations and mainframe computers. *The main advantage, though, is that the base price of the Index is only A$21.* An article describing the background and use of the Index, with detailed technical information, was published in the October 1991 issue of THE LEADING EDGE. The following summary of technical information will be helpful in ordering.

Technical Information

The Digital Cumulative Index is distributed in five separate files for ease of use and maximum flexibility. Version 1.0 of the database, released October 1, 1991 is complete and up to the end of 1990. These files are:

Table 1: File Descriptions

Filename	Description	# Titles	Size ASCII	Size Bibl.*
GEOTLE	Geophysics and The Leading Edge	5343	960	1750
SEGBKS	SEG books and book chapters	1142	290	480
EAEG	Geophysical Prospecting, First Break and EAEG Workshops	2102	380	660
ASEGC	Publications of the Australian SEG and Canadian SEG	1147	300	450
SEGCON	SEG Annual Meetings	3466	1050	1650
Total		13200	2980	4990

* EndNote or Papyrus bibliographic format

Database formats

EndNote and Papyrus Internal Bibliographic Format. These formats are used in the database libraries of End Note and Papyrus. The runtime versions of these programs allow the user to perform all the major bibliographic functions, but not to add to, or modify the database. The bibliographic software provided, being a run-time only version, can only be used with the SEG database. If the user wishes to add other references, reference types or styles, the complete software package (EndNote or Papyrus) should be purchased.

Text Delimited. This is a field-delimited, variable-length ASCII format, suitable for importing into common database programs. This format is also known as a sequential data file or text file:

Field delimiter	*Double Quotes*
Field separator	*Comma*
Item separator (within field)	*Semicolon*
Physical record delimiter	*CR/LF (ie after each reference)*

Each record has 20 fields. Depending on the reference type, some fields may be empty. Several fields are reserved for future use. An example is given below:

"GEO40 05 08510864", "Zonge, Kenneth L.; Wynn, Jeffrey C.","1975","Recent advances and applications in complex resistivity measurements*","","","","Geophysics", "40","5","851-864","spectral, rock, induced polarization, sulphide","","Discussion in GEO-42-0100120; Reply in GEO-4201-0121","","","","","","","

Refer format. Refer is a simple text file in which each field is listed separately on a new line and preceded by a tag to indicate the type of information on the line. The Refer tags used for the four publication types are shown in Table 2. Files in Refer format can be imported into EndNote or Papyrus bibliographic programs (but not into the run-time or demonstration versions). Refer files (also known as BibIX) are also compatible with Nroff/Troff in Unix. Several supplementary tags (eg, $0) are used to facilitate import. An example of Refer format is given below:

% F GEO40 05 08510864
% A Zonge, Kenneth L.
% A Wynn, Jeffrey C.
% D 1975
*% T Recent advances and applications in complex resistivity measurements**
% J Geophysics
% V 40
% N 5
% P 851-864
% K spectral, rock induced polarization, sulphide
% O Discussion in GEO-42-01,0120; Reply in GEO-42-01-0121

End Note and Papyrus Bibliographic Software. While it is not the policy to SEG to endorse third-party software products, the Cumulative Index Subcommittee has selected these two bibliographic programs for their ease of use and low price. EndNote (and Endnote Plus) is available from Niles and Associates, 2000 Hearst Street, Berkeley, CA 94709; phone 510-649-8176. Endnote Plus has more powerful search capabilities than Endnote and supports sorting.

Endnote for the PC has a convenient windows-like user environment. Both Endnote and Endnote Plus are available for Macintosh computers. Note that the run-time versions of these programs do not support automatic

formatted export, but allow the full range of search and retrieval.

Table 2. Refer Tags*

Database Field	Refer tag	Item	Journal Article	Book	Book Section	Conference proceeding
1	%F	Identifier (label)	%F	%F	%F	%F
2	%A	Author(s)	%A	%A	%A	%A
3	%D	Year	%D	%D	%D	%D
4	%T	Title	%T	%T	%T	%T
5	%E	Editor(s)			%E	%E
6	%?	Translator		%?	%?	
7	%I	Publisher		%I	%I	%I
8	%C	Place Published		%C	%C	%C
9	%B	Edited book or conference title			%B	%B
10	%J	Journal	%J			
11	%V	Volume	%V	(%V)	(%V)	(%V)
12	%N	Issue	%N			(%N)
13	%P	Pages	%P	(%P)	%P	%P
14	%K	Keywords	(%K)	(%K)	(%K)	(%K)
15	%S	Authors' affiliation				(%S)
16	%O	Notes	(%O)	(%O)	(%O)	(%O)
17	%X	Abstract (not used yet)				

* Items in parentheses are optional

Papyrus is available from Research Software Design, 2718 SW Kelly Street, Suite 181, Portland, OR 97201; phone 503-796-1368. Papyrus is extremely flexible in it use, but takes somewhat longer to learn than Endnote. It does, however, offer unlimited exporting in the run-time version. Run-time Papyrus is supported on PCs under Dos, and also on Vaxes under VMS. A Macintosh version is scheduled for late 1992.

Table 3. Software specifications

	EndNote	EndNote Plus	Papyrus
Hardware (hard drive strongly recommended)	IBM PC or compatible with 512K memory; mouse optional		IBM PC or compatible, inc PS/2; 512K memory
	Macintosh 512KE, plus SE/30 or Mac II family	Macintosh 512KE Plus SE/30 or MacII family	
Operating System	Dos 2.0 or higher (3.0 or higher preferred)	Mac 4.2 or higher (inc System 7)	MS Dos 2.0 or higher (disk catching s/w pref). Windows as Dos application.
	Mac 4.2 or higher (incl System 7)		
Capacity	32 000 references	32 000 references	2 000 000 references
Maximum record length	64 000 characters/ record 32 000 characters/field	64 000 characters/ record 32 000 characters/field	16 000 characters/ record 16 000 characters/field
Word processor compatibility	PC wordPerfect, any ASCII file, Rich Text Format	PC WordPerfect, any ASCII file. Rich Text format	WordPerfect, Microsoft Word, Wordstar Prof, Wordstart 2000, Xywrite, PCWrite, MSWordwindows, ASCII files, RichText Format
	Mac: Microsoft word, Word perfect, WriteNow, MacWrite	Mac: Microsoft Word, Word Perfect, WriteNow, MacWrite	
Rec retail price*	US$149	US$249	US$99

*Considerably cheaper at discount software houses. Currently not avail from ASEG

SEG Data Exchange Format

Request for Comment

The SEG Executive Committee, meeting in conjunction with the SEG Annual Meeting in November 1991, expressed an Intent to Endorse API RP-66 as a syntax for exchange of seismic data. The SEGDEF sub-committee of the SEG Standards Committee is requesting comments on the proposed adoption of this syntax.

RP-66 is a standard adopted May 1, 1991 by the American Petroleum Institute specifically for well log data. Many of the chapters in the standard are specific to well log information. However, the syntax is adaptable to seismic data and to many other types of data that may need to be exchanged. The SEGDEF sub-committee is proposing to adopt this syntax for seismic data exchange, and to supplement it with models designed specifically for seismic data. Examples of such models would be minimum requirements for 2D and 3D post stack data, precise information for geodetics - locating points on the earth, and various types of velocity functions.

RP-66 meets several goals that have plagued other formats. RP-66 is comprehensive, being able to describe many different types of seismic data that are not now possible with SEGY. RP-66 is self-defining, in which the file itself specifies the information, its meaning, and how it is stored. RP-66 is expandable, allowing for easy introduction of new technology without having to redo the standard. And finally, since RP-66 is a well log standard, it will allow easier integration of seismic data with other types of geophysical and petrophysical data.

RP-66 is available from:
The American Petroleum Institute
Publications and Distribution Section
1220 L Street NW
Washington DC 2005 Tel: (202) 682 8375

Please address all comments and questions to:
John Bobbitt
Chairman, SEGDEF Sub-Committee
BP Exploration Inc
PO Box 4587
Houston TX 77210 Telephone: (713) 552 8273

The deadline for comments on the endorsement of the RP-66 syntax is July 30, 1992.

Book Review from the AMF

Active margin basins/ edited by Kevin T. Biddle. Tulsa, Okla.: American Association of Petroleum Geologists, 1991. vii, 324p.: ill.: 28 cm. (AAPG memoir; 52) includes bibliographies and index. ISBN 0-89181-330-6 (Australian agent: AMF Bookshop, 63 Conyngham St, Glenside SA 5065). Price US$60.00

The AAPG World Petroleum project is another of the Association's initiatives aimed at providing petroleum explorationists with access to world experience in their study and evaluation of sedimentary basins. Two volumes of the series have already been reviewed by the AMF ("Divergent/Passive Margin Basins" and "Interior Cratonic Basins") while, in addition to the present compilation, two more are in the press ("Foreland Basins and Foldbelts", and "Interior Rift Basins".) In general format, each volume follows a scheme in which a major well-delineated and thoroughly explored basin of the nominated type is described in considerable detail in order that it might provide an analogue for similar but less well known basins elsewhere. Thus, eight chapters of this boo are devoted to the Los Angeles Basin, each written by a specialist on the particular chosen aspect, while the remaining three chapters refer more briefly to three other basins of comparable origin and structure.

The editor, a member of Exxon International of Houston, Texas, points out in his foreword that an "active margin" may be dominantly convergent, divergent or transform, and that, in the case of the Los Angeles Basin, the key episodes in its evolution have been the transform displacements between the North American and Pacific plates. The San Andreas transform system is the best studied in the world, and the Los Angeles Basin, the richest basin in the world in terms of hydrocarbons per volume of sedimentary fill, is the most studied within that system, and thus a well-chosen analogue candidate.

The eight Los Angeles Basin chapters commence with a general overview, followed by an historical description of the discovery of oil in the early 1890s (by means of a hand-sunk shaft), followed by the spectacular boom which saw suburban L.A. sprout a forest of steel and wooden derricks, with some five hundred wells in production b 1897. Some extraordinary photographs of the day are reproduced. Thereafter the presentation settles down to the technical details with chapters covering the structural geology and tectonic evaluation of the Basin, the Neogene biostratigraphy, the Basin subsidence and thermal implications for tectonic evolution, the geochemistry of the oil and gas systems, the stratigraphic control of oil migration and entrapment, and oil and gas production from submarine fan sandstone and conglomerate reservoirs.

At the other end of the productivity scale, but structurally comparable, is the offshore Late Cretaceous-Early Tertiary Taranaki Basin of New Zealand, associated in this case with the Taranaki Fault. A chapter describes this Basin - New Zealand's only hydrocarbon-producing basin - outlining the stratigraphy and structure and providing seismic profiles, subsidence curves, maturation data and reservoir characteristics.

The other two comparable basins selected for inclusion are the Middle and Upper Magdalena Basins of Columbia (with substantial oil and gas production), and the Falcon Basin of north-western Venezuela which has eight small producing fields both on and off-shore.

In both these chapters stratigraphic and seismic detail is presented and the organic geochemistry and reservoir characteristics discussed.

Petroleum geologists are guided as much by experience as by technical know-how, experience gathered both the hard way and by studied familiarity with the world's productive and well-explored provinces. This AAPG series is for them an entree not to be neglected.

amf

Grahame Sands Award for Innovation in Applied Geoscience

The award was inaugurated in early 1986 in memory of Grahame Sands who lost his life while on a flight testing one of the many innovations that he produced in his lifetime.

The capital funds to enable this award to become a reality were raised through donations from his many friends and associates in the Australian Geoscience community.

The award is made to a person or persons who has or have been responsible for a significant practical development of benefit to Australian applied geoscience. This could be in the field of instrumentation, data acquisition, interpretation or theory.

Applicants should be nominated by two referees and the application should include (3) complete copies of documentation of the innovation and reference.

Applications should be forwarded as soon as possible to:

Lindsay N Ingall
Chairman
ASEG Honours and Awards Committee
22 Kurraba Road
North Sydney NSW 2060

VELOCITY AS AN INTERPRETATION TOOL

A COURSE BY MELVAN CARTER

Adelaide
1-3 April 1992
US$1295 per person

Hotel Adelaide
62 Brougham Place
North Adelaide

Perth
6-8 April 1992
US$1295 per person

Hyatt Regency
99 Adelaide Tce
Perth

This course explains the types of velocity and most of the common methods of depth conversion. Afternoon workshops are used to employ the various methods on different structural situations and to study particular velocity problems brought to the class by the students. Methods of coping with most of the major velocity problems will be described and illustrated using both real and model data. This course is designed to meet the needs of explorationists working in a variety of circumstances - frontier areas where structural depths and lithology are required to properly evaluate the acreage as well as more mature areas where depth closures have very little or no time closure and a solid depth conversion background is needed to ensure reliable depth maps. Any explorationist who is tired of wondering why the wells and seismic depth maps do not tie will find this subject of interest.

CONTENTS

- Velocity Definitions: terminology; velocity formulae; NMO vs V; NMO vs o ve x; velocity comparisons; homework
- Well Velocities: objectives - V_{Int} vs Z_{mid} vs age V^{f}_{Int} vs lithology vs age, picking template; editing sonics (Fischer) - sonic synthesis; check shots; drift curves; anistropy
- Depth Conversion Techniques
- Time Line Techniques: Definition; Z_w vs T_s V_{app} vs T_s; errors - depth, time
- Normalised V_{Int} IDA Techniques; Pennebaker; Tegland; Acheson; Jankowsky; homework; normalised velocities - well velocities, seismic examples; V^{1}_{Int} vs lithology; V_{Int} IDA - algorithm, example
- Seismic Velocity Database; flow chart, processing; time database; time mapping; velocity database - repicking V, smoothing, quality control; depth conversion; Mistle Study (Banik); depth mapping; proposed flow sequence

THE INSTRUCTOR

Melvan D Carter holds degrees in mathematics and physics from the University of Oklahoma. From 1961-1974 he worked with Texas Instruments (GSI) in various capacities, including collection, digital processing and interpretation of seismic data and technical support of field and data processing crews in the US and London. He is president of the firm Energy Analysts, a wholely owned subsidiary of Landmark Graphics Inc, doing worldwide consulting work using well and seismic velocities for velocity databases and lithologic analysis.

REGISTRATION

Contact Energy Personnel & Development Services, PO Box 730, North Sydney, NSW 2059, Tel: (02) 957 6345, Fax: (02) 929 6657

ASEG Research Foundation

The ASEGRF formally commenced its function in September 1989. The aim of the Foundation is to support research into exploration geophysics via approved research projects at B.Sc.Hons. and M.Sc. level in Australian tertiary institutions.

The ASEG Research Foundation Committee is made up of the following members:

Prof David Boyd	University of Adelaide
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Steve Mudge	RCG Exploration Pty Ltd
Peter Priest	R F Walters & Bolaffi
Bob Smith	CRA Exploration
Greg Street	Aerodata Holdings Ltd
Wes Jamieson	Bridge Oil Limited

The Past President of the Federal Executive, Greg Street, is an ex officio member. Norm Uren will take over this position after the AGM.

Peter Priest has recently taken over from Nigel Hungerford as Treasurer of the Foundation. We extend sincere thanks to Nigel for his contribution to the Foundation.

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

WESTERN MINING CORPORATION $5,000

★ ★ ★ ★ ★ ★

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