



DEPARTMENT OF
MINES AND ENERGY

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ENERGY PLANNING IN SA

The Minister of Mines and Energy, Mr Ron Payne, announced on 24 July a package of measures to upgrade and coordinate State energy planning, including:

- . establishment of an Energy Planning Executive to overview and coordinate key energy development and management activities and provide a single source of advice to Government
- . establishment of an Energy Forum, replacing the SA Energy Council, to ensure that the views of the community are brought into the energy planning process through a wide and representative membership
- . strengthening management of the Pipelines Authority of SA (PASA) to improve its capacity to negotiate and secure the State's future gas supplies.

Mr Payne said:

'Recognition of the need for a body to coordinate State energy planning has grown out of the experience and understanding of the work of the Advisory Committee on Future Electricity Options and the Future Energy Action Committee. The establishment of an Energy Planning Executive combines the beneficial features of these Committees with the recommendations of the review of energy planning structures carried out by W.D. Scott and Company in 1983.

The Energy Planning Executive would comprise the Chief Executives of EISA, SAGASCO, PASA, officers of SADME, with an independent Chairman and other appropriate individuals able to contribute to the energy planning process.

However, unlike NSW and WA, we will not be building a new bureaucracy in the form of a separate authority or commission. The Energy Planning Executive will be serviced by the Energy Division of SADME and will second skilled personnel from the various utilities to undertake specific tasks.

The Energy Forum would also be serviced by the Energy Division. The intention is to achieve a wide and representative membership of the Forum and enable its development as a 'watchdog' of community attitudes and a source of expertise and opinion. Its membership will include middle management representatives of the energy utilities and a range of community groups and individuals with interests in energy matters. The objective is to ensure that the views of the community are given a pipeline to the energy planning process.

Moves to strengthen management resources and responsibilities of PASA have already begun. These moves reflect the vital significance which the Government attaches to the future supply and pricing of natural gas to SA. The changes will strengthen the Authority's capacity to handle such key functions as:

- . negotiation and securement of gas supplies
- . coordination of the State's case (social, economic, commercial and technical) for gas price reviews
- . consideration of future gas supplies and alternatives
- . involvement in related activities important to the State's development.'

On 12 September, the Minister introduced a Bill for an Act to amend the Pipelines Authority Act 1967 (*by providing that the Authority is subject to*

control and direction by the Minister. Provision is also made to enable a member of the Authority to hold the office of Chief Executive Officer of the Authority), the Electricity Trust of South Australia Act 1946 (by providing that the Trust is subject to control and direction by the Minister), and the South Australian Gas Company Act 1861 (by providing that the Company must, at the request of the Minister, provide him with such information in relation to the acquisition, supply and delivery of gas by the Company as he may request).

OLYMPIC DAM PROJECT

Underground evaluation drilling continued in most areas and surface exploration drilling continued southeast and northeast of Whenan Shaft as follow:

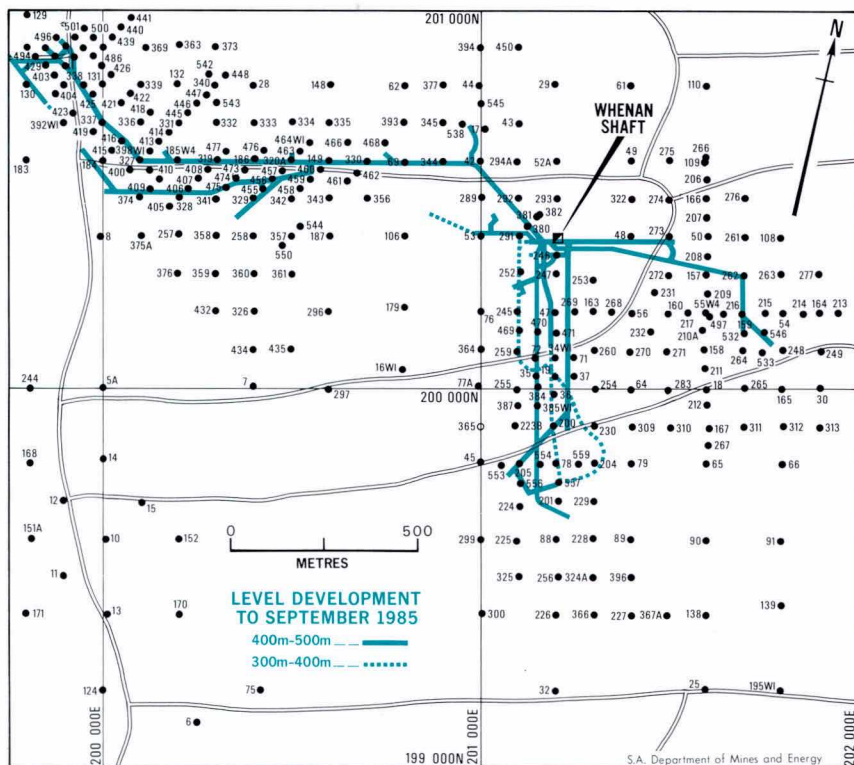
Exploration drilling (m)

- surface percussion drilling
- surface diamond drilling
- underground diamond drilling

12 weeks	
19/6/85 to	
<u>10/9/85</u>	
	5 550
	1 075
	<u>7 851</u>
	<u>14 476</u>

During the period, 992 m of mine development driving was completed and 91 670 tonnes of ore and mullock were hoisted.

At the pilot plant, metallurgical research included gravity separation of gold.



EXPLORATION LICENCES

Exploration Licences Granted July—September 1985

No.	Licensee	Term	Expiry	Area (km ²)
1289	Abaleen Minerals NL	6 mths	10/ 1/86	67
1290	BHP Minerals Limited	6 mths	29/ 1/86	1 490
1291	BHP Minerals Limited	6 mths	29/ 1/86	472
1292	BHP Minerals Limited	6 mths	29/ 1/86	1 147
1293	BHP Minerals Limited	6 mths	29/ 1/86	1 764
1294	CRA Exploration Pty Limited	1 year	29/ 7/86	2 390
1295	Getty Oil Development Company Ltd	1 year	29/ 7/86	1 382
1296	Esso Exploration and Production Australia Inc.	1 year	29/ 7/86	1 825
1297	BHP Minerals Limited	6 mths	29/ 1/86	273
1298	CRA Exploration Pty Limited	1 year	29/ 7/86	1 348
1299	CRA Exploration Pty Limited	6 mths	29/ 1/86	1 705
1300	CRA Exploration Pty Limited	6 mths	29/ 1/86	2 450
1301	Pan Australian Mining Ltd and North Flinders Mines Limited	6 mths	7/ 2/86	119
1302	Australian Anglo American Searches Proprietary Limited	1 year	5/ 9/86	932
1303	John F. Gilfillan and Associates Pty Limited	6 mths	5/ 3/86	259
1304	John F. Gilfillan and Associates Pty Limited	6 mths	5/ 3/86	527
1305	John F. Gilfillan and Associates Pty Limited	6 mths	8/ 3/86	207

Exploration Licences Surrendered or Expired

Reports which have been placed on open file during the period include the following:

SML 222, 440, 595, 677, 714 and EL 47, 62, 85, 132 (Carpentaria Exploration Co. Pty Ltd, Mines Administration Pty Ltd, Teton Exploration Drilling Co. Inc.)

On relinquishment of part EL 1004, data relating to exploration in the Kalabity region during the period 1968-1976 were released. Regional exploration included aerial magnetic and radiometric surveys and geological mapping; in the search for base metals, soil, stream and rock chip geochemistry, detailed geological mapping, ground magnetic, IP and EM surveys, and drilling (586 open holes, aggregate 15 646 m and three cored holes, aggregate 1 278 m) were undertaken. Exploration for uranium delineated a section of the Yarramba palaeochannel, culminating in discovery of the (South Eagle) Honeymoon uranium deposit, and included detailed resistivity surveys and drilling (287 open holes, aggregate 29 882 m and six cored holes, aggregate 682 m). Details of ore reserves and in-situ leaching studies are provided (Envs 999, 1111, 1372, 1562, 1926, 2251, 2283, 2325, 2426, 2511).

SML 543, 544 and EL 42, 45, 109, 227, 411, 722 (CSR Ltd, Pacminex Pty Ltd, Pacminex (Operations) Pty Ltd, Mines Administration Pty Ltd, Teton Exploration Drilling Co. Inc., Esso Australia Ltd)

Intensive investigation of the uranium potential of the Billeroo and Curnamona Tertiary palaeochannels was undertaken in the period 1971-1980. Aerial magnetic and radiometric surveys were followed by ground resistivity, gravity, magnetic and seismic reflection surveys. Broadly spaced and detailed drilling (589 holes including 73 850 m open hole and 1 220 m of core) were undertaken, resulting in the delineation of Goulds Dam uranium

prospect. Ore reserve estimates and in-situ leaching studies were carried out.

Exploration for uranium and base metals in basement rocks was limited to ground magnetic and gravity surveys (Envs 1604, 1605, 1853, 2264, 2265, 2361, 2713, 2809, 3329).

EL 378, 613, 1026 (Westinghouse International Power Systems Co. Inc., Esso Australia Ltd, Shell Company of Australia Ltd)

Exploration for uranium and base metals has been conducted in the Yadnarie-Campoona area since 1978. Uranium exploration comprised aerial magnetic and radiometric surveys with follow-up of over seventy radiometric anomalies. Geological mapping, rock chip sampling, spectrometer and track-etch surveys, RAB drilling (1 242 holes, aggregate 10 027 m) and percussion drilling (seven holes, aggregate 1 150 m) were undertaken at several locations and minor uranium mineralisation was encountered. Base metal exploration comprised ground magnetic traverses, limited Sirotem surveys, rock chip sampling and RAB drilling (103 holes, aggregate 2 842 m) (Env. 3235).

EL 398, 692, 1041 (Samedan Oil Corporation, Esso Australia Ltd)

Intensive base metal exploration has been undertaken in the Roopena area since 1978. Stream and soil geochemistry, geological mapping and gravity, magnetic, IP and SP surveys were used to define drill targets at several prospects. Drilling comprised 1 410 RAB holes (aggregate 31 988 m), twenty-five percussion holes (aggregate 2 648 m) and fourteen diamond-drillholes (aggregate 1 926 m). Subeconomic mineralisation - Pb-Ag and Cu-Pb-Ag-Co at the Fresh Well prospect, and Cu-Ag-Co at the 1050 and 1050E prospects - was encountered (Env. 3292).

EL 403, 707, 908, 1213 (Thiess Brothers Pty Ltd, CSR Ltd)

Exploration for base metals in the Coomandook region comprised ground magnetic and gravity surveys followed up by eight rotary-drillholes (aggregate 1 016 m). Tertiary lignites intersected were evaluated with a further forty-one rotary-drillholes totalling 3 296 m and the Yarrowonga lignite deposit with indicated reserves of 45 million tonnes was defined. A concurrent shallow auger-drilling programme (thirty-one holes, total 57 m) defined 150 000 tonnes of seed gypsum and 12 000 tonnes of kopi. Base metal exploration resumed with aerial magnetic and radiometric surveys, with subsequent ground magnetic surveys. Several magnetic anomalies were drill tested (nine holes, aggregate 1 535 m). Basic to intermediate volcanics were intersected in all holes (Env. 3317).

EL 431, 492, 803, 893, 1067 (Pancontinental Mining Ltd, PNC Exploration (Australia) Pty Ltd, Afmeco Pty Ltd and Lachlan Resources NL)

Uranium in Proterozoic sequences and in Cainozoic cover was the target for exploration in the Verran-Darke Peak-Rudall region. Aerial magnetic and radiometric surveys, together with regional mapping, were followed up by detailed exploration in several areas. Detailed work included soil, rock chip and water geochemistry, gravity, magnetic, Sirotem, radiometric and radon gas surveys, and diamond (four holes, aggregate 413 m) and open-hole drilling (thirty-two holes, aggregate 1 676 m) (Envs 3412, 3551, 5019).

EL 590, 999 (Marathon Petroleum Australia Ltd, Pan Australian Mining Ltd)

An aeromagnetic anomaly in the Moolawatana area was tested with a 174 m diamond-drillhole. Scattered minor pyrite and pyrrhotite, with trace molybdenite and chalcopyrite, were intersected. A follow-up IP survey indicated an IP anomaly south of the drill site (Env. 3795).

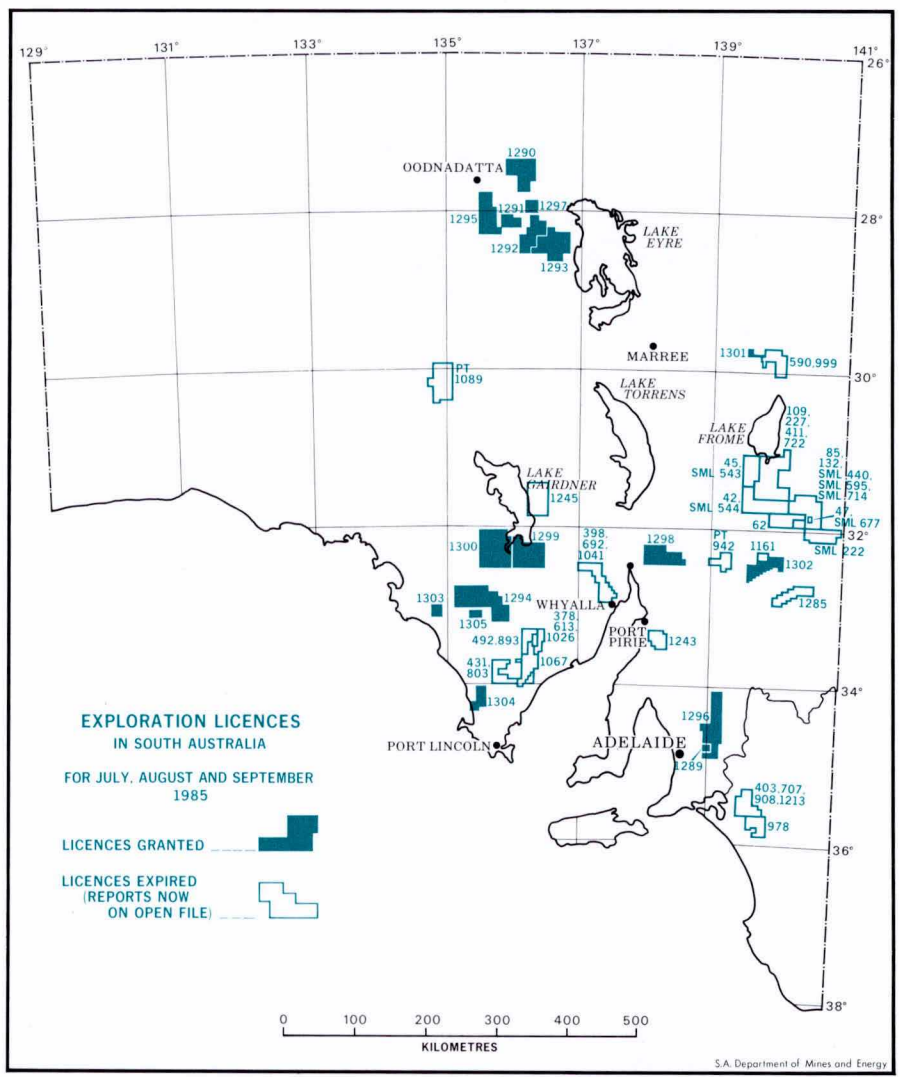
Part EL 942 (Utah Development Co.)

Exploration for stratabound gold mineralisation southwest of Waukaringa included stream and rock chip sampling, and reconnaissance and detailed

geological mapping. Follow-up drilling comprised three percussion-drillholes (aggregate 714 m) and 500 m diamond drilling. No anomalous gold intersections were recorded (Env. 6127).

EL 978 (CSR Limited)

Exploration for base metals in the Coonalpyn area comprised geological and geochemical reconnaissance and airborne magnetic and radiometric surveys. Magnetic anomalies were followed up with ground magnetics and four were drill tested (four holes, aggregate 443 m). Extrusive and intrusive igneous rocks were intersected in all holes (Env. 4719).

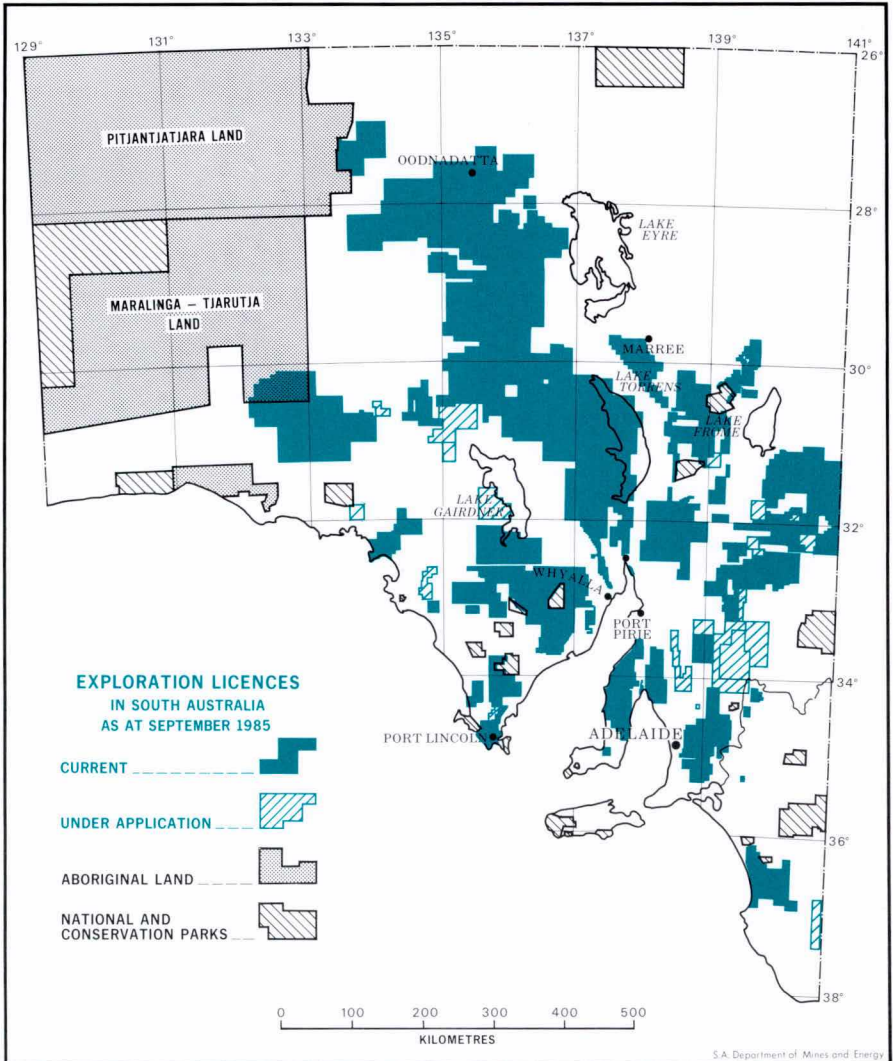


Part EL 1089 (CRA Exploration Pty Ltd)

Magnetic anomalies south of McDouall Peak were investigated as possible kimberlites. Ground magnetic traverses and loam sampling were followed by five reverse-circulation drillholes (aggregate 302 m) with negative results. The base metal potential of one magnetic anomaly was assessed with ground magnetic and gravity surveys followed by three open drillholes (aggregate 475 m). The anomaly is related to magnetite concentrations in Gawler Range Volcanics (Env. 6128).

EL 1161 (Jarmand Minerals and Exploration Pty Ltd, CSR Ltd)

Reconnaissance geological mapping and geochemical sampling were undertaken in the Mannahill goldfield (Env. 5260).



EL 1243 (The Electricity Trust of South Australia)

A percussion-drilling programme (six holes, aggregate 669 m) in the Merriton area intersected carbonaceous Tertiary sediments but no coal in a graben marking the northernmost extension of the St Vincent Basin (Env. 5892).

EL 1245 (PNC Exploration (Australia) Pty Ltd)

Exploration for uranium and base metals was undertaken in the Mahanewo area. Airborne magnetic/radiometric surveys were followed up with ground checking of radiometric anomalies and percussion-drill testing of two magnetic anomalies (three holes, aggregate 904 m). No significant mineralisation was encountered (Env. 5868).

EL 1285 (Shell Company of Australia Ltd)

Rock chip sampling and resampling of available drillcore from the Anabama Hill area indicated that gold mineralisation is of very low tenor (0.1-0.3 ppm) (Env. 6192).

PETROLEUM EXPLORATION

Cooper Basin Drilling

Meranji 1 Accelerated Gas Programme (AGP) exploration wildcat in the Merrimelia-Innamincka Block was cased and suspended at TD 10 106 feet on 15 July for later completion as a Namur Sandstone Member oil producer and Toolachee/Patchawarra Formation gas producer. The well discovered a significant new field when it encountered and tested an oil pool in the Jurassic Namur Sandstone Member of the Mooga Formation, and four gas reservoirs within the Permian Gidgealpa Group. The field is on an anticlinal dome on the southwestern extension of the Gidgealpa-Merrimelia-Innamincka Trend, in a saddle between the Merrimelia and Gidgealpa Fields.

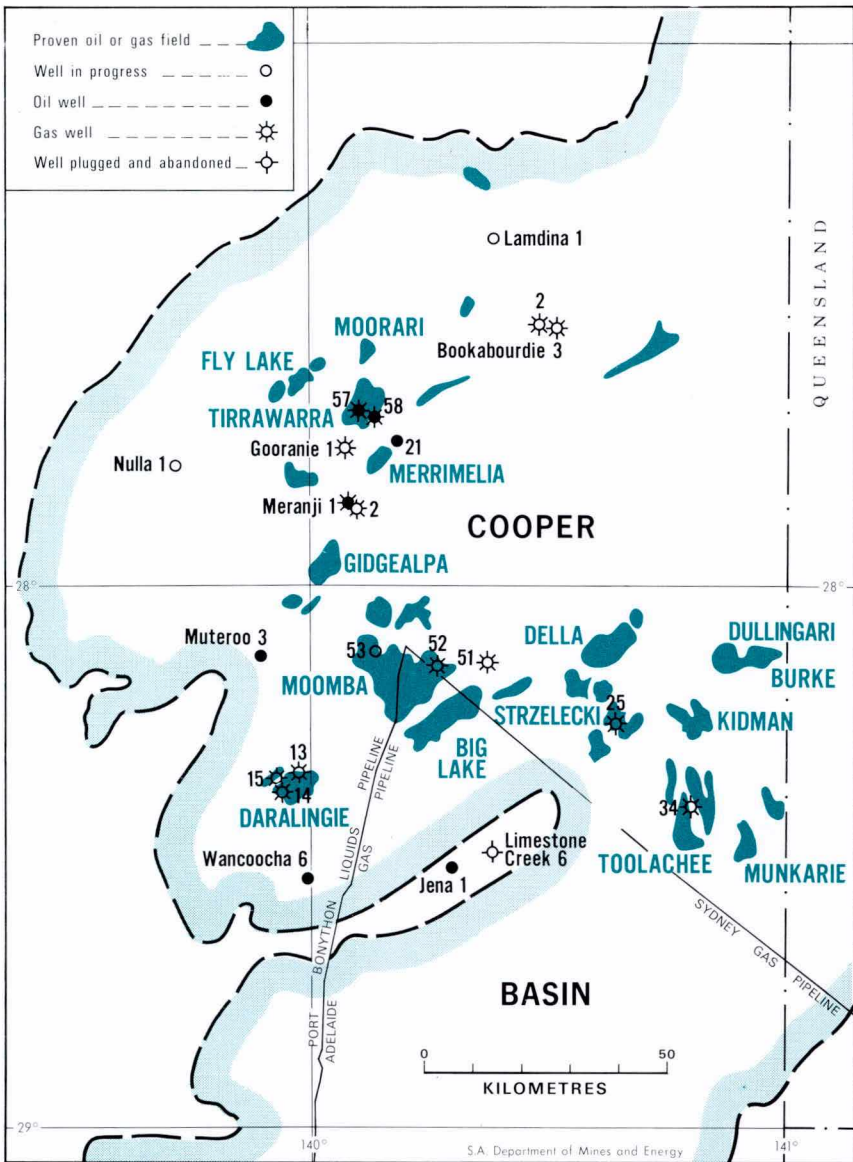
DST 2 over the interval 5620-5655 feet in Namur Sandstone flowed 41.7° API gravity oil to the surface through a ½-inch choke at a rate of 800 barrels per day with a flowing pressure of 48 psi. DST 3 and 4 over the intervals 7933-7980 feet and 8102-8147 feet in the Toolachee Formation flowed gas through the same size choke at rates of 5.5 and 10.9 MMCFD respectively (corresponding to surface flowing pressures of 1 050 and 2 100 psig). DST 3 recovered 50 feet of 36.3° API condensate and 40 feet of condensate-cut water in the drillpipe. DST 5 and 6 over the intervals 8350-8435 feet and 8530-8614 feet in the Patchawarra Formation also flowed gas through a ½-inch choke at rates of 2.9 and 1.7 MMCFD, respectively.

Daralingie 13 Unit development well in PPL 10 was completed as a shut-in Patchawarra Formation gas producer at TD 7 761 feet on 6 July.

Jena 1 base exploration programme wildcat was cased and suspended at TD 5 239 feet on 9 July for later completion as a Cretaceous Murta Member oil producer. A DST of the Murta interval 3890-3934 feet discovered a small new oil pool when it recovered 2 222 feet of 51.5° API gravity oil in the drillstring. A further Murta DST over the interval 3936-3962 feet failed to recover hydrocarbons, as did an earlier DST in the shallower Cretaceous Coorikiana Sandstone. Jena 1 is 3.4 km southwest of the Alwyn 1 discovery well, on the crest of the Murteree Horst, and is the eighth Mesozoic oil accumulation found at that general locality.

Tirrawarra 57 Unit development well in PPL 20 was completed as a shut-in Tirrawarra Sandstone oil producer and Patchawarra Formation gas producer at TD 9 916 feet on 22 July.

Gooranie 1 AGP exploration wildcat in PPL 20 in the Patchawarra Central Block was cased and suspended at TD 10 388 feet on 31 July for later completion as a Patchawarra Formation gas producer. It discovered a new gas accumulation on an independent structural culmination 5 km south of



Tirrawarra Field. DST 2, over the Patchawarra interval 9078-9190 feet, flowed gas at a rate of 6.6 MMCFD through a $\frac{1}{2}$ -inch choke, accompanied by 192 barrels of condensate per day (51.0° API at 60°F), all with surface flowing pressure of 1 540 psi. DST 1, over the interval 8938-9000 feet in the upper Patchawarra, flowed gas at a rate too small to measure.

Daralingie 14 Unit development well in PPL 10 was cased and suspended at TD 7 741 feet on 22 July for future completion as a Patchawarra Formation gas producer.

Merrimelia 21 Block oil development well in PPL 17 of the Merrimelia-Innamincka Block was completed as a shut-in Namur Sandstone Member oil well at TD 6 408 feet on 26 July. It was drilled to develop oil in the Jurassic Hutton Sandstone and to evaluate the Namur 350 m north-northwest of Merrimelia 11.

Irrawarra 58 Unit development well in PPL 20 was cased and suspended at TD 9 859 feet on 20 August for later completion as a Permian oil and gas producer.

Toolachee 34 Unit development well in PPL 14 in the Toolachee Block was cased and suspended at TD 7 599 feet on 14 August for future completion as a Patchawarra Formation gas producer.

Moomba 51 AGP exploration in PPL 9 of the Moomba Block was cased and suspended at TD 11 065 feet on 9 September for later completion as a Permian Toolachee Formation gas producer. It is located on a previously untested culmination of the Moomba Dome. DST 2, conducted in the Toolachee Formation over the interval 8190-8268 feet, flowed gas at a rate of 0.23 MMCFD with a surface flowing pressure of 25 psi; DST 3 over the lower Toolachee interval 8361-8435 feet flowed gas at 0.26 MMCFD and 33 psi. A DST conducted over the interval 10 045-10 100 feet in the Patchawarra Formation flowed gas at a rate too small to measure. DST 1 in the Hutton Sandstone failed to recover hydrocarbons.

Meranji 2 AGP appraisal well, 1.2 km east-southeast of Meranji 1, was cased and suspended at TD 10 932 feet on 3 September for later completion as a Patchawarra Formation gas producer. DST 1 in the Patchawarra Formation at 8583-8655 feet, failed to recover hydrocarbons. DST 2 in the Patchawarra Formation at 9143-9191 feet flowed gas at 4.0 MMCFD and water at 40 barrels per day. A surface flowing pressure of 900 psi was recorded. DST 3 over the Patchawarra interval 9664-9724 feet flowed gas at a rate too small to measure.

Evaluation of electric logs over the Toolachee and Namur intervals revealed only thin gas pay in the Toolachee.

Daralingie 15 Unit development well in PPL 10 was cased and suspended at TD 7 815 feet on 2 September for later completion as a Patchawarra Formation gas producer.

Moomba 52 Unit development well in PPL 9 was cased and suspended at TD 8 300 feet on 11 September for later completion as a Toolachee Formation gas producer.

Wanoocha 6 Block oil development well in the Murta Block was cased and suspended at TD 5 901 feet on 14 September for future completion as a Jurassic Birkhead Formation oil producer. The well is 400 m east-northeast of Wanoocha 2.

DST in the Murta Member over the interval 4270-4326 feet recovered 30 feet of 48.9° API gravity oil in the drillpipes.

Muteroo 3 Block oil development well in the Murta Block was cased and suspended at TD 5 799 feet on 15 September for later completion as a Hutton Sandstone oil producer. It is 400 m northeast of Muteroo 2 and 800 m northeast of Muteroo 1.

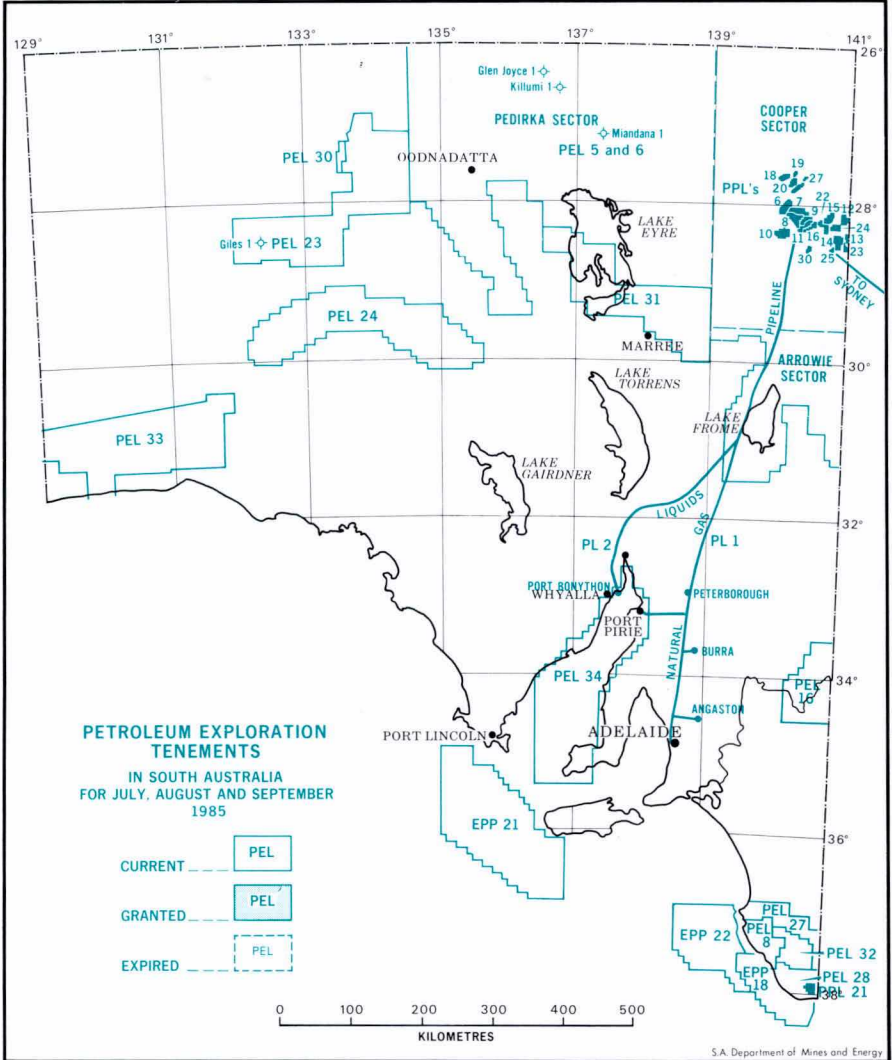
Delhi Petroleum Pty Ltd have disclosed that workover operations on Muteroo 2 produced the biggest single sand-interval onshore oil flow in Australia. A clean-up flow of casing perforations over the interval 5627-5650 feet flowed oil at a rate of 4 600 barrels per day as measured through a ½-inch surface choke. This compares with oil flow of 1 742 barrels per day from the Hutton interval 5666-5686 feet in Muteroo 1, and exceeds the previous record oil flow of 3752 barrels per day from Wanoocha 2.

Limestone Creek 6 Block oil development well in the Nappacoongee-Murteree Block was plugged and abandoned as a dry hole at TD 4 378 feet on 25 September. It is 1.5 km north of Limestone Creek 1 on the Biala/Limestone Creek Mesozoic Dome above the Central Murteree High. DST 1 over the Murta interval 3998-4028 feet failed to recover hydrocarbons.

Pedirka Basin Drilling

Killumi 1 base exploration programme wildcat was plugged and abandoned as a dry hole at TD 7 587 feet on 26 July. The drilling was terminated in Triassic Peera-Peera Beds following lost circulation since penetration of Lower Jurassic Poolowanna Beds target zone. The well is on an anticlinal dome 13.5 km west-southwest of Macumba 1.

Glen Joyce 1 base exploration programme wildcat was plugged and abandoned as a dry hole following electric logging at TD 7 512 feet on 16 August. The primary objectives in Glen Joyce 1 were the Algebuckina Sandstone and the Poolowanna and Purni Formations. The well is on an anticlinal dome 8 km east of Mokari 1.



Miandana 1 base exploration programme wildcat was plugged and abandoned as a dry hole at TD 8 768 feet on 15 September. It is on the crest of an elongated anticlinal dome 55 km south of Walkandi 1.

Wells in Progress

Drilling ahead at 30 September were Nulla 1, Lamdina 1 and Moomba 53 (Cooper Basin), and Giles 1 (Officer Basin).

ACCELERATED GAS PROGRAMME

The three-year Cooper Basin Accelerated Gas Programme (AGP), initiated in September 1982 as part of the negotiated SA gas price settlement, will conclude when Nulla 1 is completed. It was designed to identify natural gas supply for PASA on expiry of the existing contract at the end of December 1987.

The Producers were required to spend a minimum \$55 million on accelerated search for free-flow and 'tight' (low permeability reservoir) gas reserves. It had three basic components:

- wildcat drilling to discover new gas fields
- appraisal drilling to prove up extensions to existing fields
- drilling and massive hydraulic fracturing to test production potential of 'tight' gas reservoirs known to exist at depth in the Cooper Basin.

The programme was expected to result in drilling of at least twenty-six wells and in 2 400 line kilometres of seismic surveys. The Producers have reviewed progress on a monthly basis with SADME officers; a particular aim has been to identify up to 900 billion cubic feet of additional gas within the Subject Area of the Cooper Basin.

The AGP has proven quite successful; \$60 million has been spent on drilling forty-three wells and acquiring 2 559 line kilometres of seismic data, resulting in the discovery of twelve new hydrocarbon pools (nine gas and three oil) in ten new fields. Newly discovered gas reserves remain to be assessed.

CRUDE OIL PRICE ADJUSTMENT

Import parity prices (IPP) for domestic crude oils have been adjusted to apply from 1 September. They result from significant appreciation of the Australian dollar since the 1 July adjustment to crude prices (from \$A/\$US0.6691 to 0.7114) slightly offset by a firming of the spot price for Arab Light crude.

The IPP for Bass Strait crude oil will be reduced by \$2.25 to \$42.25 per barrel. Similar changes will be made for other crudes.

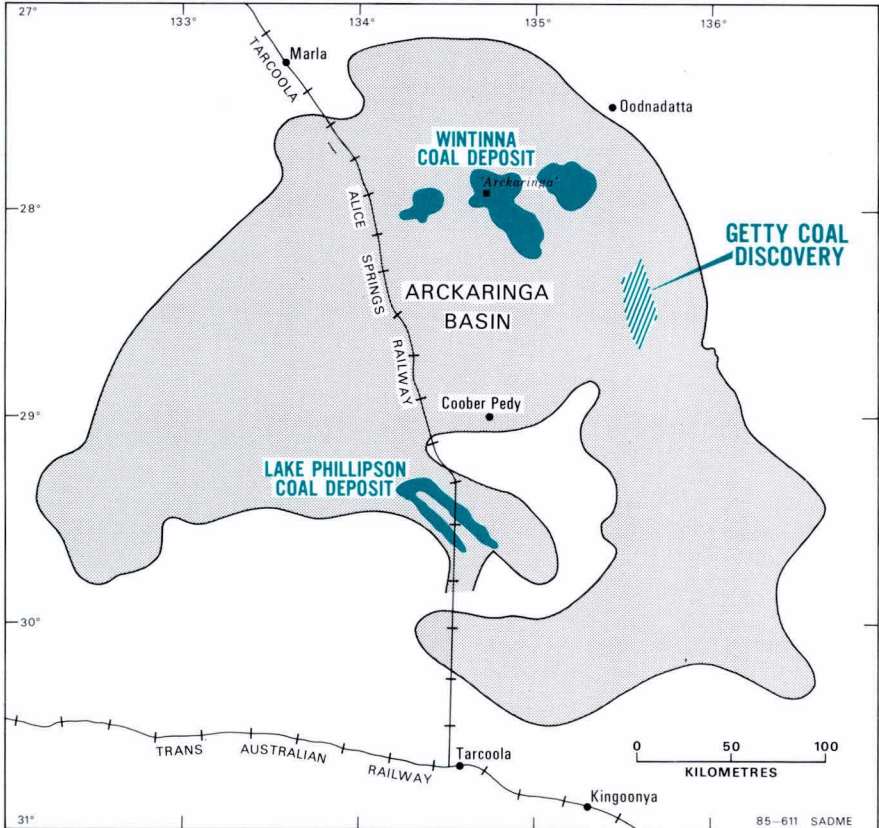
Reductions in crude oil prices are expected to translate into an average reduction of about 1.4 cents a litre in the retail price of petrol.

NEW COALFIELD DISCOVERY

Getty Oil Development Co. Ltd has announced the discovery of a large coal resource in the Arckaringa Basin.

After several years evaluation of geological and geophysical data, Scout drilling was undertaken in late 1984 which disclosed occurrence of significant deposits of coal within the Permian Mt Toondina Formation. Prospective areas were identified for more detailed exploration drilling which is in progress.

Sub-bituminous coal, similar to that of the Wintinna Coalfield which is being investigated by Meekatharra Minerals (Australia) Pty Ltd, occurs in several seams totalling 20 m thickness over a stratigraphic interval of 100 m; cover sediments total 100 m.



ETSA COAL COMBUSTION TEST FACILITY

The Electricity Trust of South Australia has commissioned a \$2 million facility at Osborne which provides testing capability previously only available overseas. It will be used to determine combustion characteristics of coals to aid in design of power-station boilers and for evaluating operational parameters, including:

- pulveriser performance
- flame stability and combustion
- ash deposition and slagging on simulated waterwall surfaces and its effect on heat transfer characteristics
- emissivity dependence on deposit characteristics
- SO₂ fireside absorption by ash and mineral additives
- ash deposition and deposit strength on simulated superheater and reheater surfaces

- . high temperature corrosion on simulated waterwall surfaces and simulated superheater and reheater surfaces.
- The general design features include the following:
- . nominal thermal input of 0.25/0.30 mW nett/gross (approximately 100kg/h) for brown coals and 0.33/0.34 mW nett/gross (approximately 45 kg/h) for black coals. The firing rate may be altered twenty-five percent up or down from the nominal firing rate
 - . single flame, down-fired furnace with multiple ports for flame observation and measurement
 - . capability for on-line modifications of coal composition by selected mineral additions
 - . adjustable furnace heat extraction
 - . adjustable furnace residence time
 - . direct firing and separation firing capability
 - . adjustable pulverised fuel moisture content and fineness
 - . slag assessment with furnace test panel
 - . fouling assessment with simulated superheater and reheater tubes
 - . deposit sootblowing capability
 - . assessment of high temperature corrosion on simulated waterwall tubes
 - . assessment of high temperature corrosion on simulated superheater and reheater tubes
 - . assessment of low temperature corrosion
 - . flue gas monitoring of CO, CO₂, O₂, NO_x and SO_x
 - . assessment of sulphur dioxide absorption by alkali minerals added to the furnace
 - . assessment of sulphur dioxide absorption by flyash collected on a bag filter.

COMPANY NEWS

BHP Coke Sales

The BHP Co. Ltd recently completed the first overseas export order for coke nuts, produced in the smelter complex ovens at Whyalla. Brazil purchased 10 000 tonnes and India 12 000 tonnes. Several Australian companies take coke from Whyalla.

High-calorific value gas as a by-product of coke production replaces fuel oil with a net saving at Whyalla of about \$3 million per year.

Lloyd's New Aircraft

Adelaide-based Lloyd Aviation have purchased a new Fokker F28-4000 jet aircraft for the Adelaide-Moomba-Jackson-Brisbane service. The \$13 million per year, five-year contract will carry 70 000 per year Santos/Delhi employees, contractors and visitors to the Moomba and Jackson (Qld) oil and gas fields. Moomba is SA's busiest airport, outside Adelaide.

CSR Ltd/Delhi Petroleum Pty Ltd

While CSR had previously invited bids for the sale of a half share of Delhi Petroleum, on 30 September CSR announced a \$1 billion rationalisation of its business portfolio aimed at increasing group profits and substantially reducing group debt.

CSR will retain 100 percent of its Delhi oil and gas investment, complete the previously announced financial restructuring of Delhi by 31 March 1986, and sell its interests in Mt Newman and Thiess Dampier Mitsui Coal Pty Ltd. The restructuring will give CSR direct access to 100 percent

of Delhi's profits and cash flow from oil and gas from 1 April 1986. The group's overall debt including the present off-balance sheet Delhi Australia Fund debt will be reduced by around \$1 billion, or more than fifty percent.

The retention of 100 percent of Delhi, coupled with the early prepayment and restructuring of the Delhi debt, will enhance CSR's after-tax profits and cash flows. The loss of profits from Pilbara Iron and TDM in the immediate future will be more than offset by the reduction in group interest expense and access to the Delhi oil and liquids profits. Whilst the restructuring will not impact to any great degree on profits in the year ending 31 March 1986, Delhi profits are expected to add significantly to CSR profits in the following financial year.

CSR received four firm offers to purchase varying proportions of its investment in Delhi and a separate offer to purchase interests in a number of specific Cooper Basin blocks. Whilst several of these offers were considered to be reasonably satisfactory, they did not provide a sufficient premium over the value to CSR of retaining 100 percent of the Delhi investment. CSR has therefore decided to retain 100 percent of Delhi. The financing risks previously associated with this project will be largely eliminated following the restructure.

Santos Ltd

Directors of Santos Ltd, in a report to the Stock Exchange for the quarter ended 30 June (consolidated to include Reef Oil NL and Santos ninety-six percent share of Alliance Oil Development Australia NL), advised that Santos group sales for the quarter totalled \$128.6 million. The group's share of product volumes sold was:

Natural gas	-	20 707	terajoules
Crude oil	-	271 520	kilolitres
Condensate	-	80 457	kilolitres
Propane	-	39 369	tonnes
Butane	-	21 169	tonnes
Carbon dioxide	-	6 214	tonnes.

During the quarter, four LPG vessels were loaded at Port Bonython with a total of 136 306 tonnes; the liftings were by Idemitsu, Total International, and ICI. A further 8 831 tonnes were sold locally through the truck loading facility.

Ten vessels were loaded at Port Bonython with 332 558 kilolitres of crude oil and 180 563 kilolitres of condensate. There were four crude oil, four condensate and two combined crude oil and condensate liftings. Two cargoes of condensate were exported to the United States.

Negotiations are continuing for a new long-term gas sales contract with SA, while arbitration proceedings have commenced to determine a new three-year gas price for sales to AGL, Sydney.

South Australian Uranium Corp. Ltd

The South Australian Uranium Corporation Ltd closed its Adelaide office at the end of July. Formed in 1981, it was to have been operator of the Beverley uranium mine on behalf of joint venturers Western Nuclear, Oilmin NL, Transoil NL, and Petromin NL (the last three named being now controlled by The Moonie Oil Co. Ltd).

Rapid Bay

Adelaide Brighton Cement Ltd have committed to an upgrading of crushing facilities at Rapid Bay. Low magnesium limestone production will be boosted from 220 000 tpa to 400 000 tpa following commissioning of the new crusher in November.

Calca Red Granite

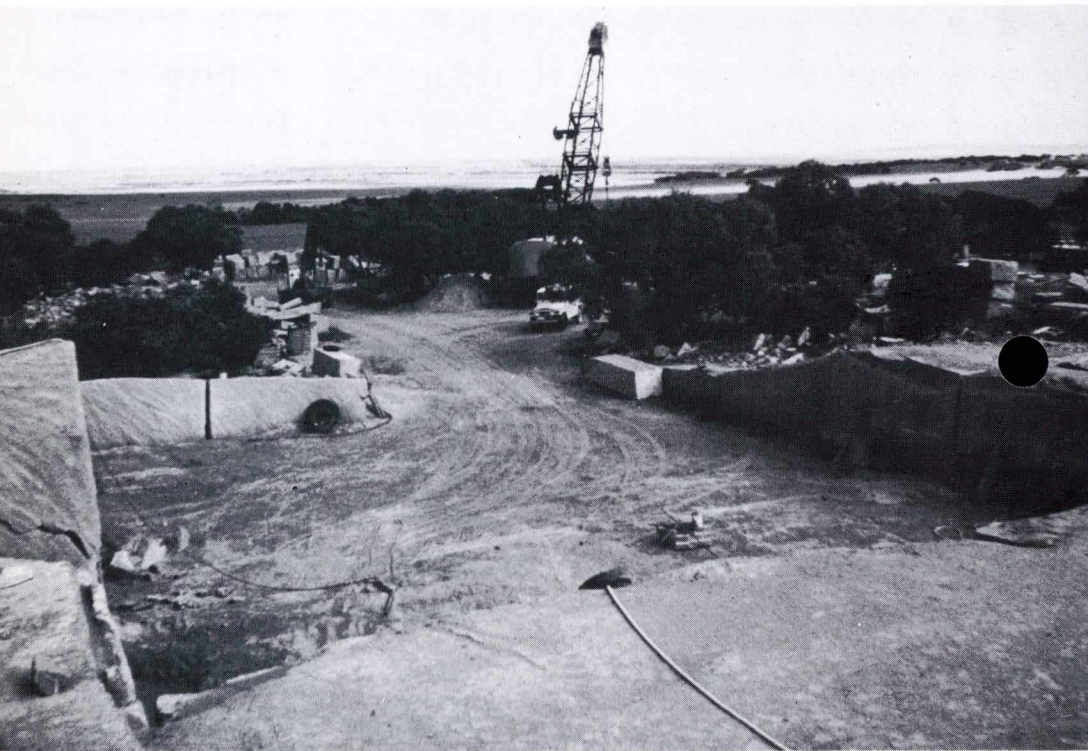
The beauty of the even-textured and red, even-coloured granite (Hiltaba Granite Equivalent) at Calca near Streaky Bay, is now being recognised by architects throughout Australia. This is reflected in the recent production of a Calca Red board room table for the State Bank of NSW new office block in Martin Plaza, Sydney.

This order required the quarrying of the biggest single slab of granite in Australia - 2.76 by 2.76 m and 0.3 m thick. After quarrying, the slab was split in half by line drilling and controlled use of explosives.

The completed table top, 2.74 m in diameter and 6.5 cm thick, was hoisted to the top of the building during construction and suspended from the ceiling of the top storey until the Board Room was completed and furnished. The table top will be supported by six octagonal legs also of Calca granite.

Four SA companies were involved in the project: Monier Granite Ltd negotiated the contract and finished the table and legs; the stone was quarried by Calca Granite Pty Ltd; the slab was wire-sawn at Black Hill by Martins Granite Quarries Ltd and polished in Adelaide by S.D. Tillett Memorials who have the only machine capable of handling such a large slab.

The workforce at the Calca Quarry totals four men. Refit is being undertaken of a recently purchased crawler crane of ninety-one tonnes weight, a Lima 1201 with 22 m boom. Lifting capacity is fifteen tonnes at 11 m and ten tonnes at full extent. Power is supplied by a Cummins diesel air-start motor with maximum 260 brake h.p. at 950 r.p.m. The two bench quarry is being expanded and a third bench is to be developed to provide flexibility.



The Calca red granite quarry (Neg. 34486).

AUSTRALIAN MINERALS AND ENERGY COUNCIL

The fifteenth meeting of the Australian Minerals and Energy Council (AMEC) was held in Melbourne on 3 October.

Offshore Petroleum Legislation

Ministers noted that the Commonwealth's review of the offshore constitutional settlement was proceeding and that a decision by the Commonwealth was expected shortly.

Ministers discussed the Commonwealth's proposals for modifications to the work programme approach to award of offshore petroleum exploration permits, designed to overcome deficiencies in existing arrangements, and proposals for signature bonuses and retention lease premiums, provision for which had been made in the 1985/86 Commonwealth budget.

State/NT Ministers expressed concern about aspects of the proposed modifications and the possibility that funds could be diverted away from exploration.

Crude Oil Allocation Scheme

Ministers noted the outcome of the recent review of the marketing arrangements for crude oil and the Commonwealth's decision to continue present arrangements until 1988. The arrangements to apply from 1988 would be the subject of a further review in 1987.

Natural Gas

Ministers received an interim report by the Working Party to review natural gas markets and supply issues. On a national basis, Australia was expected to be self sufficient in natural gas for at least the next twenty-five years. However, regional shortfalls could arise. Supply in these areas might best be met by extension and interconnection of existing pipelines and by further exploration and appraisal of local gas resources.

The working party will continue examination of a range of natural gas issues. Tasmania and New Zealand will participate in the further study.

Compressed Natural Gas

Ministers considered a proposal for promotion of the use of CNG in transport applications. The New Zealand Minister described New Zealand's successful policy of displacing petrol with CNG in appropriate circumstances. The council directed officials to consider the potential for wider use of CNG in Australia and on scope for possible action by Governments.

Minerals and Petroleum Processing

On the question of further processing of minerals and petroleum in Australia, Ministers agreed that officials identify a programme of work.

Resource Rent Taxation

Commonwealth legislation to implement the offshore 'Greenfields' resource rent tax was expected to be introduced into Parliament early in 1986. The basis of the recent agreement between the Commonwealth and WA and the operators of the Barrow Island oilfield to apply a resource rent royalty to income from recovery of petroleum on Barrow Island was outlined.

Ministers noted the Commonwealth's offer to consider similar arrangements with any other interested states on particular projects but indicated that any such arrangements should not lead to revenue loss by a State or Territory.

Taxation of Fringe Benefits in the Mining and Petroleum Industry

Senator Evans gave a detailed explanation of the taxation package as it bears on the mining and petroleum industry, noting that the Government had agreed to a number of proposals and concessions to relieve the burden upon the industry while maintaining the integrity of the overall package.

Figures being quoted in the press on the cost of the package to the resource industry seemed somewhat over-stated and would need to be looked at in the

light of the net cost of the total package, actual experience and assessments yet to be made by the taxation office; the Commonwealth's estimates were more modest.

State Ministers drew attention to certain anomalies and difficulties which they foresaw and raised a number of specific questions regarding the impact of particular provisions of the package. There was a need to follow up, keep under review and consult as necessary, after further consideration and experience.

Arrangements would be put in hand to ensure that the tax office is fully advised of the concerns raised by Ministers and their suggestions for a rational approach to application of the measures.

Energy Management

Ministers agreed a proposal to restructure the Coordinating Committee on energy conservation to facilitate changes in the Committee's activities which will emphasise energy management in industry and transport. The Committee was renamed the Coordinating Committee on Energy Management to reflect the change.

Ministers noted that the Commonwealth was placing greater emphasis on the industry/commerce sector and, in collaboration with the States/Territory and industry associations, wished to facilitate the transfer to industry of technology arising from the Programme's research and development work.

Energy Labelling of Appliances

NSW and Victoria propose to introduce a common system of mandatory energy labelling for refrigerators and freezers. Other Ministers expressed preference for a voluntary scheme and intend to observe development of the NSW/Victorian scheme and effect on appliance efficiency.

National Energy Policy

State Ministers were advised of a review of National Energy Policy being conducted by the Department of Resources and Energy. The review would address energy supply and demand issues and serve to identify potential problems and imbalances likely to require decisions by Government at various levels during the next fifteen years or so. The review was at a very early stage. It was agreed that an appropriate time draft sectoral and other papers would be circulated for comment and as a basis for further discussion in AMEC.

Tin

Ministers were informed of discussions in the tin industry on revising tin quota allocation arrangements. Ministers took the opportunity to review the present difficult situation facing the world tin industry and implications for the Australian industry of a possible injection of funds to underpin the buffer stock arrangements of the international tin agreement.

GEMSTONES

Opal and Jade

An exhibition of rare and valuable pieces of SA opal and jade, as uncut and polished gemstones, will be held during the Adelaide Festival of Arts in March 1986 in the Grand Marble Hall entrance to the Casino. The display will include jewellery designed and crafted locally together with background to mining and processing of gems; an award of \$1000 for the best jewellery design has been offered.

Opal—South Australia's Gemstone

Opal has been adopted by the SA Government as the gemstone emblem of SA. Precious opal ranks with diamond, emerald, ruby, and sapphire as one of the most valuable of gemstones. SA is the main source of this gem; Coober Pedy, Mintabie, and Andamooka supply an estimated eighty percent of world production.

WAUKARINGA GOLDFIELD

From 1873 to 1894, over 1 400 kg of gold bullion were produced from 65 000 tonnes of ore, mainly from Alma-Victoria mine, 38 km north of Yunta. During 1914-1916, SADM cored two deep drillholes to test the southwesterly extension of Alma-Victoria ore shoot. Intersections were 30 cm thick at 9.3 g/t Au.

SADME investigations recommenced in 1983 when sampling of tailings outlined nearly 40 000 tonnes at 2.7 g/t Au.

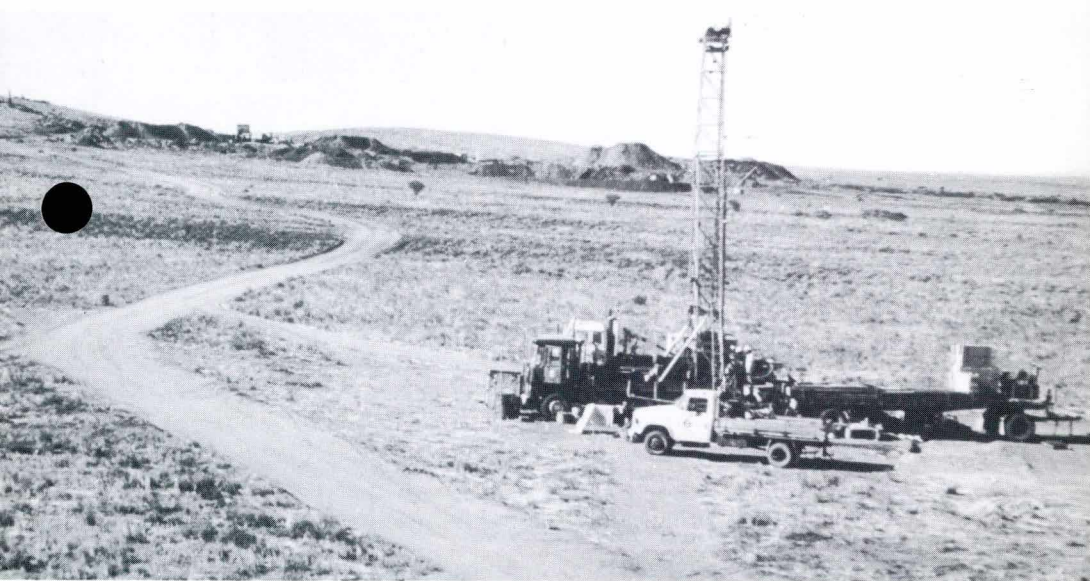
Geological mapping and sampling of underground workings above the watertable, and open cuts, followed in 1984. Seven fully cored diamond-drillholes were completed in 1985. A total of 916.9 m were drilled, mainly HQ with 36 m of wedging in DDH3.

Only DDH7 recorded encouraging results from quartz reefs and shear zones:

43.4 - 43.5 m (0.1 m)	28	g/t Au
43.5 - 43.8 m (0.3 m)	0.45	g/t Au
43.8 - 44.1 m (0.3 m)	0.4	g/t Au
74.0 - 74.2 m (0.2 m)	13.0	g/t Au.

Mapping and drilling confirmed the presence of four quartz reefs and proved that Cox Sandstone Member is part of Tarcowie Siltstone, not part of underlying Tapley Hill Formation as assumed by previous workers.

Waukaringa was used as a base camp for the twenty member Burmese party (ADAB scheme) and Departmental officers during their two-week tour of gold mines in SA.



Diamond drillhole operation, Waukaringa goldfield (Neg. 34487).

FLINDERS RANGES BASE METALS INVESTIGATION

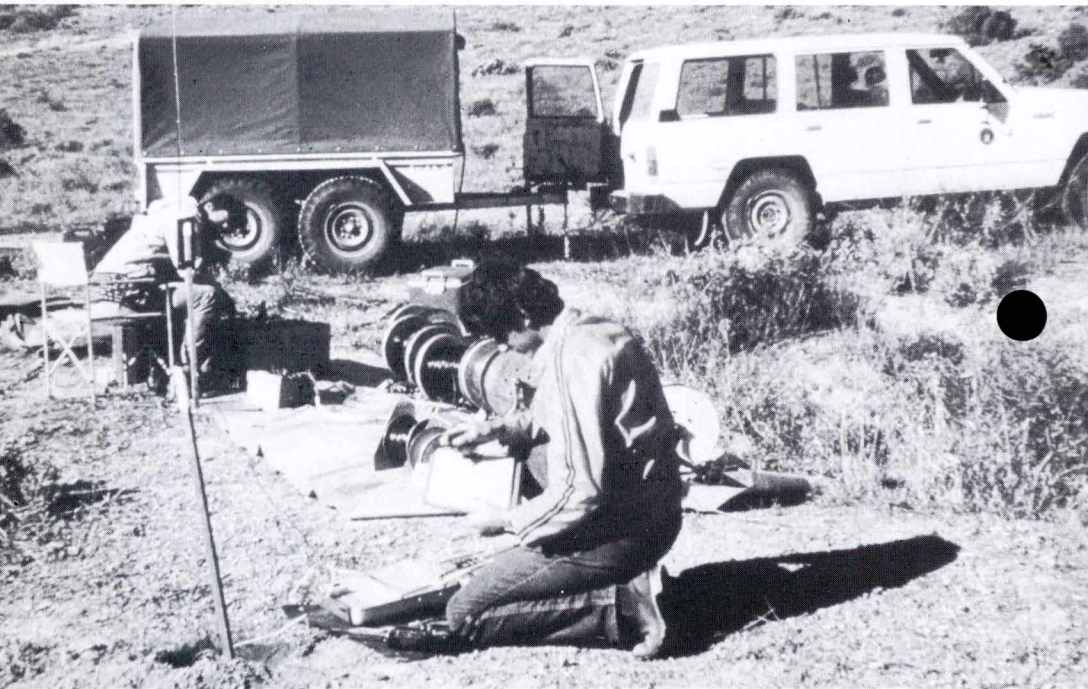
SADME exploration in the Flinders Ranges National Park is part of a regional study of Lower Cambrian rocks as hosts to Mississippi Valley-type lead-zinc mineralisation to find an alternative feedstock for the BHAS Port Pirie smelters which rely on Broken Hill lead-zinc sulphide ore. The area inside the Park is of particular interest because of excellent rock exposure, the interpretation of which will assist in defining target areas elsewhere in the Flinders Ranges.

SADME exploration Stage 1, along the western foothills of the Flinders Ranges extending from Edeowie Gorge 24 km to the northern boundary of Flinders Ranges National Park, was completed in 1983. The programme comprised regional stream sediment, rock chip and geological mapping centred on Lower Cambrian Wilkawillina Limestone. Eight prospect areas, each containing karstic features, major cross faults, geochemical anomalies, and outcrops of lead and zinc minerals in several areas, were defined for follow-up exploration.

Stage 2 exploration, comprising mapping of all prospects at 1:5000 scale, detailed rock chip sampling of seven prospects, detailed soil sampling of one prospect, and IP and Sirotem surveys of two prospects, was completed during the periods August to November 1984, and June to September 1985.

Major karstic features and dolomitisation below the palaeo-surface at the top of the Wilkawillina Limestone and below an unconformity lower in the sequence, with significant lead, zinc, copper, cadmium and arsenic rock chip anomalies often with surface hydro-zincite, smithsonite, willemite, galena and malachite/chalcocite occurrences, have been defined at most prospects.

Geophysics has not been particularly encouraging although weak coincident IP and Sirotem anomalies at two prospects may represent down-dip extensions of surface lead/zinc mineralisation.



IP survey, Flinders Ranges National Park (Neg. 34485).



Stream sediment sampling, Flinders Ranges National Park (Neg. 34484).



Hydromulcher at Mount Schank quarry.



The rehabilitated Mount Schank quarry.

MOUNT SCHANK REHABILITATION

Mount Schank, an 8 000 year old volcanic cone, 160 m high and 1 km in diameter has been declared a geological monument.

The District Council of Mount Gambier intermittently extracted ash and lapilli, from a quarry on the eastern flank of the cone, between 1948 and 1980 before slope instability forced closure.

Rehabilitation undertaken in September 1981 included bulldozing of friable ash and lapilli to the quarry floor to reduce batter angle and pin the toe of a large rotational shear behind the working face.

Hydromulching of the resultant surface was carried out with converted fire-fighting equipment capable of throwing the seed-fertilizer-wood pulp slurry up to 30 m. The mulch contained twelve percent by weight wood pulp, and fertilizer at the rate of 500 kg/hectare; grass seeds were spread at the rate of 60 kg/hectare. The seed mixture contained Couch, Simeta Fescue, Perennial ryegrass, Curry's Cocksfoot and Perennial Veldt Grass in the proportions of 5:8:8:2:2.

Slopes have been stabilised satisfactorily in the rehabilitated quarry.

SADME CORE LIBRARY

During the period, sixty-five inspections were carried out as follows:

No. of inspections	Personnel involved	Core/cuttings inspected
16	Company	Company drilling
20	Company	Other company drilling
18	SADME	Company drilling - mainly petroleum samples
11	SADME	Departmental drilling.

Core and cuttings derived from an intensive base-metal exploration programme carried out by Samedan Oil Corporation and Esso Australia Ltd at Roopena have been received. Subeconomic mineralisation, including lead-silver and copper-lead-silver-cobalt at the Fresh Well prospect, was encountered.

ASEG CONFERENCE

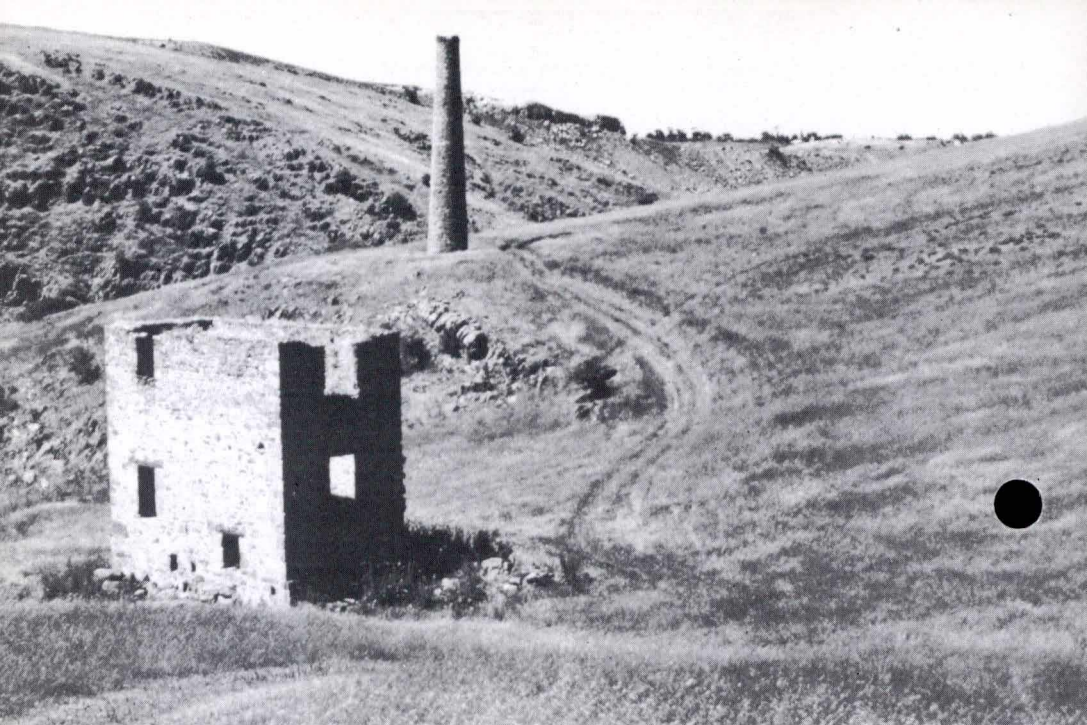
The fourth ASEG Biennial Conference and Exhibition, held in Sydney during 9-12 September, was attended by 512 delegates from overseas and Australia, eight of whom were geophysicists from SADME. Of the fifty-three papers presented, three were given by SADME:

- 'A geophysical review of the Polda Basin, South Australia', by T.N. Crabb, R.A. Gerdes and R.G. Nelson.
- 'Integrated geophysical methods used for groundwater studies in the Polda and Murray Basins', by A.R. Dodds and D. Ivic.
- 'Geophysical investigations of dolines in lateritic terrain', by J.E. Haigh and R.G. Nelson.

SEMINAR ON MINING HISTORY

The AIMM Adelaide Branch, in conjunction with the AIMM Mineral Heritage Committee, will hold a seminar 'The Mining History of South Australia - the First 50 Years' on 25-27 March 1986.

Papers will be presented on technical aspects of, and the contribution of, mining in SA to 1890. Excursions will visit former copper mining centres at Burra and Moonta.



Worthing Mine enginehouse and chimney, Hallett Cove (Neg. 34489).



Hughes enginehouse and chimney, Moonta Mines (Neg. 34488).

EIGHTH AUSTRALIAN GEOLOGICAL CONVENTION

Over 120 papers have been programmed for the Convention, to be presented at three concurrent sessions at Flinders University, Adelaide, 16-21 February 1986 having as the theme 'Earth Resources in Time and Space', with major topics including:

- . Precious metals through time
- . Archaean and Early Proterozoic
- . Silica in the geological environment
- . Earth resources and people: historical perspectives.

Of great interest will be the excursions to Olympic Dam (surface and underground inspection), classic Adelaidean sequences in the Flinders Ranges, Coober Pedy and Andamooka Opalfields, southern Eyre Peninsula, the Olary-Broken Hill area (including mine visits). One-day excursions will be conducted during the Convention.

DEPARTMENTAL PUBLICATIONS AND REPORTS

Quarterly Geological Notes No.93

- . Comments on Rb-Sr total rock dating measurements for the Wardang Volcanics, Yorke Peninsula (C.M. Fanning).
- . Strained and unstrained quartz in the Cambrian Observatory Hill Beds. A means of subsurface correlation in the Officer Basin (M.G. Farrand and C.G. Gatehouse).

Bulletin 52

'Stratigraphy and Tectonics of the Worumba Anticline and Associated Intrusive Breccias' by W.V. Preiss.

This eighty-five page Bulletin, containing twenty-five diagrams and sixty-two photographs, describes the geology of the Worumba Anticline, situated 25 km east of Hawker in the Flinders Ranges.

Emphasis is on stratigraphy and sedimentation of the late Precambrian Callanna Group, Burra Group, and lower part of the Umberatana Group, and on the tectonic setting during sedimentation and later folding. The evolution of ideas on diapirism in the Flinders Ranges is traced, and alternative models for origin presented.

Mineralisation is discussed in terms of brief descriptions of the seventeen small copper prospects in the map area. Stromatolites and microfossils are described. A selection of AMDEL petrological reports is included as an appendix.

All Bulletins, Mining/Mineral Resources Reviews, and Reports of Investigations are now available on microfiche.

Selected Unpublished Reports

<u>Report No.</u>	<u>Author</u>	<u>Title</u>
84/71	Dubowski, E.A.	Keyneton banded calc-silicate deposit - geological investigation - hundred of Jellicoe, section 531.
84/76	Fradd, W.P.	ML 5088 Victoria Tower gold mine, Wadnaminga Goldfield, history and production.
85/11	Read, R.E.	Hawker-Marree road - drilling for construction water, Beltana Siding to Puttapa Gap.
85/16	Martin, A.R.	Geology of the Whidbey Islands. Greenly Island, Rocky Island (North) and Rocky Island (South), LINCOLN 1:250 000 map sheet.

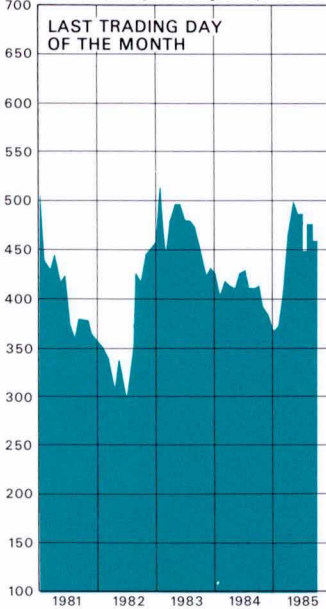
AUSTRALIAN LEAD PRICE
(\$A per tonne)



AUSTRALIAN COPPER PRICE
(\$A per tonne)



AUSTRALIAN GOLD PRICE
(\$A per troy oz.)



AUSTRALIAN ZINC PRICE
(\$A per tonne)



METAL PRICE MOVEMENTS

SOURCE:
BUREAU OF MINERAL RESOURCES

S.A. Department of Mines and Energy

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|-------|--|--|
| 85/22 | Read, R.E. | Leigh Creek water supply, possibilities for artificial recharge. |
| 85/25 | Farrand, M.G. | Supplementary data on pseudo-igneous rocks from Fossil Hill in the Springfield Basin near Quorn, SA. |
| 85/31 | Lindsay, J.M. and McGowran, B. | Eocene/Oligocene boundary, Adelaide, SA. |
| 85/32 | Farrand, M.G. | Rocks from the Kanmantoo Trough near Sedan Hill including possible equivalents to the Truro Volcanics. |
| 85/37 | Wildy, R.L., Felstead, M.D. and Mannik, M. | Mineral production statistics, six month period ended 31 December 1984. |
| 832 | Morton, J.G.G. and Gatehouse, C.G. | A revision of the Toolachee and Daralingie Formations, Cooper Basin, SA. |

PEOPLE IN THE INDUSTRY

BRIAN BROOKS, Deputy General Manager, Santos Ltd addressed a meeting of PESA on 16 August on 'The Processing and Underground Storage of Natural Gas and Ethane at Moomba, South Australia'

PHIL PLUMMER, geophysicist, formerly attached to Shell Petroleum Development Tanzania, has joined Petroleum/Management Associates Pty Ltd (PMA) in Adelaide.

LEONARD BROWN, Professor of Geological Sciences at The University of Texas at Austin, the 1985 Distinguished Lecturer from overseas, visited Adelaide 4-5 July.

DOUG STEWART (Chairman) and MALCOLM MESSENGER have been appointed Members of the Pipelines Authority of South Australia following resignation of RON BARNES and LEE PARKIN.

LAWRENCE FRAKES has been appointed to the Douglas Mawson Chair in Geology at the University of Adelaide. He is at present a leader in the Department of Earth Sciences at Monash University and will take up his appointment in December. The Department of Geology and Geophysics, designated as a Key Centre for Advanced Studies in Petroleum Geology and Geophysics, will receive funding of \$500 000 over three years. The principal aims are 'to promote cooperation between higher education and industry; to help higher education respond to the demands for expertise, particularly in areas relevant to national development; to improve teaching and research standards through concentration of effort; and to assist the transfer of high-quality students and staff between higher education institutions'.

THE AUSTRALIAN PIPELINE INDUSTRY ASSOCIATION held its annual general meeting in Adelaide on 13 August - President of PIA is PETER RICHARDSON.

BRIAN HILL (Commonwealth Department of Resources and Energy) has been appointed to AMDEL Council (correction to MIQ 38, p. 35).

WARREN LESLIE returned to Adelaide on 4 August as Manager, Poseidon Oil Pty Ltd, a wholly owned subsidiary of Poseidon Ltd, after eleven years with Gulf Oil Corporation, USA.

JOHN KEELING, Senior Geologist, Mineral Resources SADME, has taken twelve months study leave to complete an M.Sc. in industrial minerals at the University of Hull.

MARZUKI SANI, geophysicist with the Geological Research and Development Centre, Bandung, Indonesia, is working with SADME Geophysics Section from July to October 1985. His employment is part of an ADAB project focussing on gravity and magnetic acquisition and interpretation.

DON ARMSTRONG, Chief Geologist Groundwater and Engineering Geology, SADME, attended a two-week conference/excursion on aspects of mine dewatering, in Granada Spain.

New graduates who have recently joined the Oil, Gas and Coal Division of SADME include ELINOR ALEXANDER and MICHAEL KOUTROUZAS (Petroleum Exploration Branch) and RICHARD McDONOUGH and MICHAEL MALAVAZOS (Reservoir Engineering).

KEN DUPES, TREVOR MOUNT and PHIL RYLES of Delhi Petroleum have transferred to Hainan Province, China.

HIS EXCELLENCY SENOR RAFAEL GOWLAND, Ambassador of the Argentine Republic, visited Adelaide on 21 August.

SCOTT KERR has left Adelaide to take up a new position with BHP Co. Ltd at Port Kembla.

RUSSELL FYNMORE, Executive General Manager, BHP Petroleum delivered the Essington Lewis Memorial Lecture as part of the AIMM (Adelaide Branch) programme on 19 September - his address was entitled 'International oil - changes in structure and control'.

HIS EXCELLENCY TOSHISIRO NAKAJIMA, Ambassador of Japan, together with the First Secretary MR K. HIROSE visited Adelaide on 4 September.

MR GILBERT OKANY, High Commissioner of Nigeria, visited Adelaide on 12 September.

PROFESSOR DENG CONG-HAO, President of Shandong University, People's Republic of China visited the University of Adelaide on 30 September where he gave a public lecture entitled 'Development of Education, Science and Technology in modern China'.

ROGER DOWDING is to assume responsibility for activities of BP Australia Ltd in South Australia to replace TONY BROOKES who has been transferred to Brisbane with responsibility for Qld, NT and Papua New Guinea.

CLIVE ARMOUR, formerly Deputy General Manager SA, Santos Ltd, has been appointed General Manager, Corporate Services responsible for personnel, Government affairs, legal and information services.

ROD WORTLEY has been appointed General Manager Accounting, Santos Ltd, responsible for the Group's accounting and related functions.

REG NELSON, Chief Geophysicist SADME, is visiting the US as the Australian President of ASEG.

JIM HAMMER, who was Manager Nairne Pyrites Ltd before retirement, died on 21 July, aged 76.

S.A. DEPARTMENT OF MINES AND ENERGY 191 GREENHILL ROAD, PARKSIDE 5063

COVER PHOTO: Catwalk, sprinklers; Crude Stabilisation Plant, Moomba.

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