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1836 SOUTH AUSTRALIA 1886

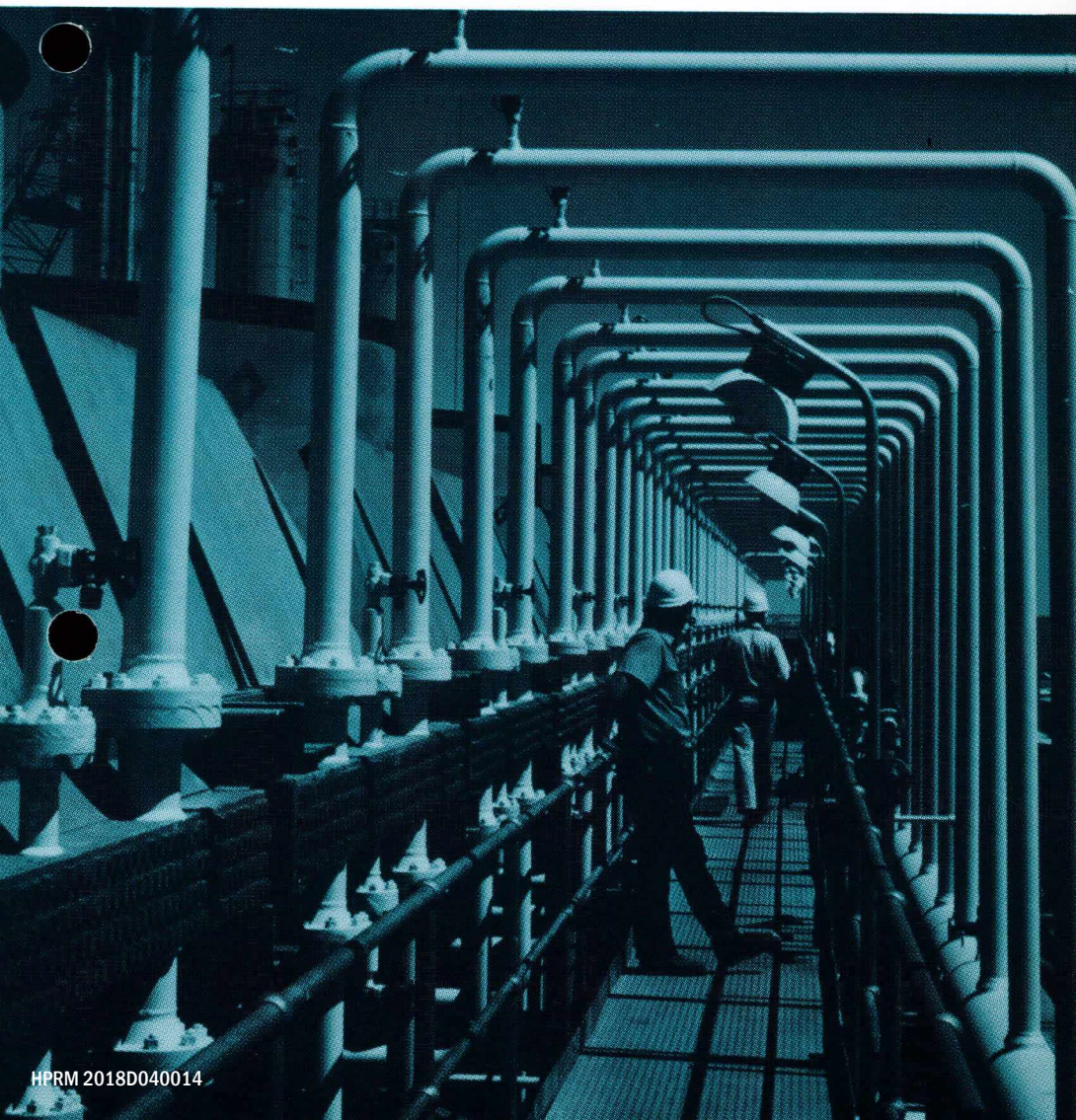
DEPARTMENT OF
MINES AND ENERGY

MINERAL INDUSTRY QUARTERLY

SOUTH AUSTRALIA

NUMBER 40

DECEMBER 1985



OLYMPIC DAM PROJECT

Western Mining Corporation Holdings Limited and BP Australia Limited announced on 8 December that BP had notified its commitment to the development of the Olympic Dam Project. Accordingly, the Joint Venturers (Roxby Mining Corporation Pty Ltd, a wholly owned subsidiary of Western Mining Corporation Holdings Limited (51 percent), and the BP Group (49 percent)) are now committed to the Project. The final feasibility study completed earlier this year was based on annual production of approximately 2 000 tonnes of uranium oxide, 55 000 tonnes of copper and 90 000 ounces of gold.

Further investigation of process routes and the final characteristics of the copper and precious metal products are expected to be completed shortly. Final decisions on the copper process route of the initial stage of the Project can be made when the remaining metallurgical testwork has been concluded. Sales negotiations are proceeding satisfactorily.

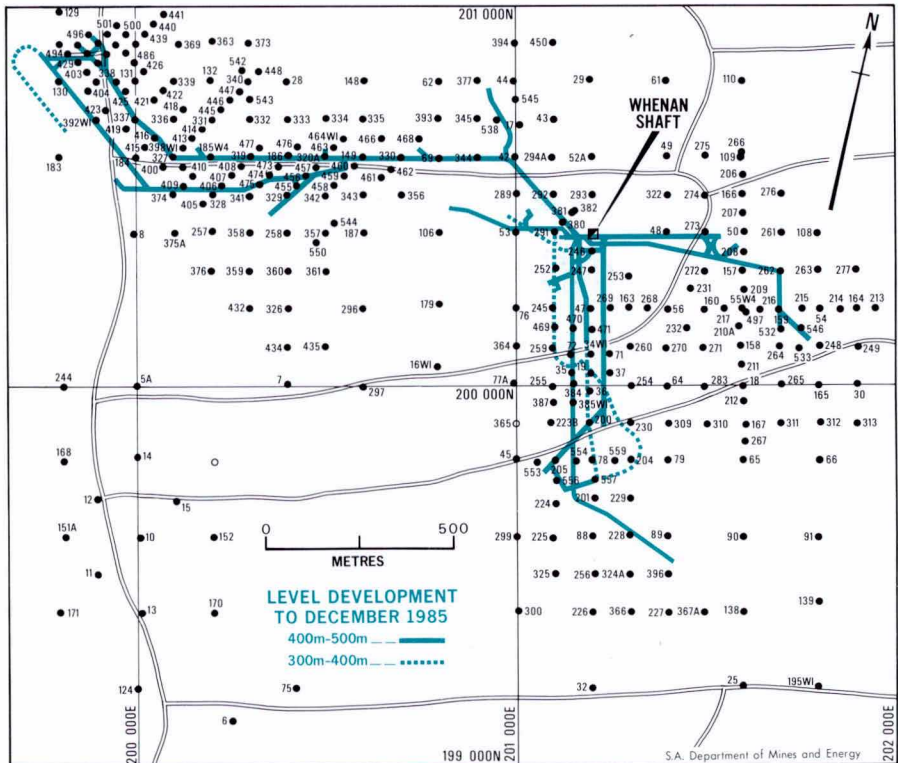
Construction is expected to commence in the first half of 1986 and production of copper and uranium during 1988. Production of gold may begin earlier, depending on the final decisions yet to be made. The total capital cost of the initial Project is estimated to be in the range of \$550-600 million (1984 Australian dollars).

Underground development during the quarter totalled 1 172 m on mine headings accessed from Whenan Shaft.

Exploration drilling comprised:

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

	metres
- surface diamond-drilling	2 408
- underground percussion-drilling	3 773
- underground diamond-drilling	10 013



EXPLORATION LICENCES

Exploration Licences Granted October—December 1985

No.	Licensee	Term	Expiry	Area (km ²)
1306	Western Mining Corporation Ltd	1 year	2/10/86	2 395
1307	PNC Exploration (Aust.) Pty Ltd	1 year	2/10/86	571
1308	PNC Exploration (Aust.) Pty Ltd	1 year	2/10/86	149
1309	CRA Exploration Pty Ltd	1 year	14/11/86	1 033
1310	BHP Minerals Ltd	1 year	1/12/86	279
1311	CRA Exploration Pty Ltd	1 year	1/12/86	437
1312	Aberfoyle Exploration Pty Ltd	1 year	1/12/86	451

Exploration Licences Surrendered or Expired

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

SML 81, 145, 145A, 175, 176, 186, 265, 413, 691; EL 140, 265, 533, 944
(Oilmin NL (formerly Exoil NL) and Transoil NL)

Exploration in the Mount Painter region between 1965 and 1972 disclosed widespread uranium mineralisation with drill-indicated reserves of six million tonnes at an average grade of 0.8 kg/tonne U₃O₈ in five major deposits.

The programme included aerial magnetic and radiometric surveys and ground scintillometer surveys. Drilling of 625 holes totalling 53 000 m tested the major deposits and twenty-three other prospects. Metallurgical testing and feasibility studies were also undertaken (Env. 542, 780, 826, 919, 939, 942, 960, 967, 971, 984, 1004, 1026, 1061, 1062, 1105, 1273, 1303, 1304, 1321, 2130, 2431, 2893, 3633).

EL 286, 485, 876, 1182 (CRA Exploration Pty Ltd, The Shell Company of Australia Ltd)

Exploration for base metals in the Mount Shannan area, north of Cleve, included aerial magnetic, radiometric and INPUT surveys, geological mapping and geochemical surveys. Follow-up included ground magnetic, IP, Sirotem and geochemical surveys and three drillholes (aggregate 472 m). Minor zinc and lead mineralisation was intersected at the Silver Monarch and Iragie prospects (Env. 2966, 3541).

PART EL 695, 696, 697, 1069, 1070, 1071; EL 698, 699, 700, 701, 702, 703, 704, 1072, 1073, 1074, 1075, 1076, 1077, 1078 (Comalco Aluminium Ltd)

Exploration for trona and base metals in the eastern Officer Basin and for coal near the northwest margin of the Arckaringa Basin included a 14 500 km² aerial magnetic survey, a 40 km seismic reflection traverse, and ground magnetic, gravity and CSAMT surveys. Nine drill-holes (aggregate 7 912 m) tested potential trona horizons and cores were analysed for base metals; a further hole (557 m) was sited on a magnetic anomaly. Coal drilling comprised fourteen holes (aggregate 3 741 m); coal was intersected in seven (Env. 6259).

EL 942 (Utah Development Co. Ltd)

Exploration for stratabound gold mineralisation in the Waukaringa area included stream and rock chip sampling, reconnaissance and detailed geological mapping. Drilling of seven percussion holes (total 1 548 m) and five cored holes (total 2 089 m) disclosed low gold content in tillitic units (Env. 4547).

PART EL 1102 (Utah Development Ltd)

Stratabound gold was the target for exploration in the Wadnaminga area.

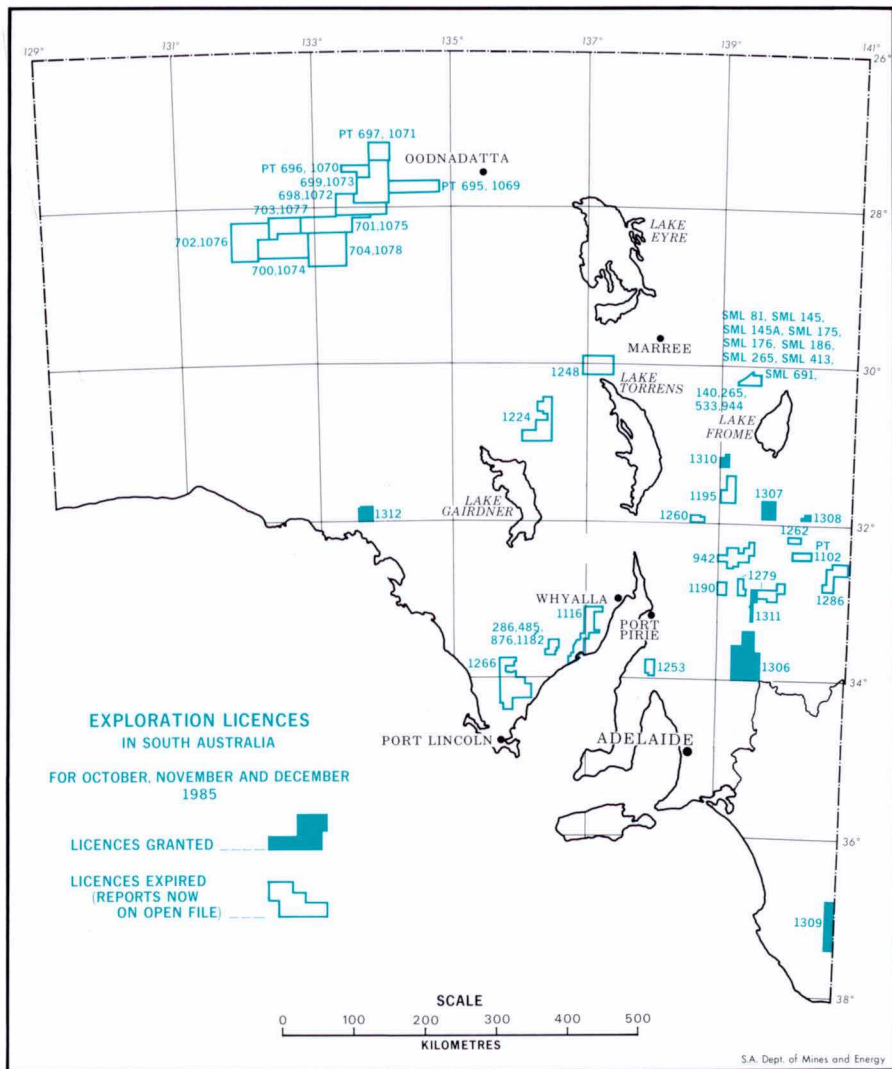
Geological mapping, bedrock geochemical sampling (3 435 holes; aggregate 8 397 m) and diamond-drilling (two holes, aggregate 339 m) were undertaken but no significant mineralisation was disclosed (Env. 6292).

EL 1116 (The Shell Company of Australia Ltd)

Base metals were the target for exploration in the Middleback and Minbrie Ranges. Regional ground magnetic traverses followed by RAB drilling (twenty-nine holes, aggregate 766 m) and examination of previous drill samples failed to disclose significant mineralisation (Env. 6284).

EL 1190 (Jarmand Minerals and Exploration Pty Ltd,
Cambrian Exploration Ltd)

Exploration for gold in the Mount Grainger area comprised geological



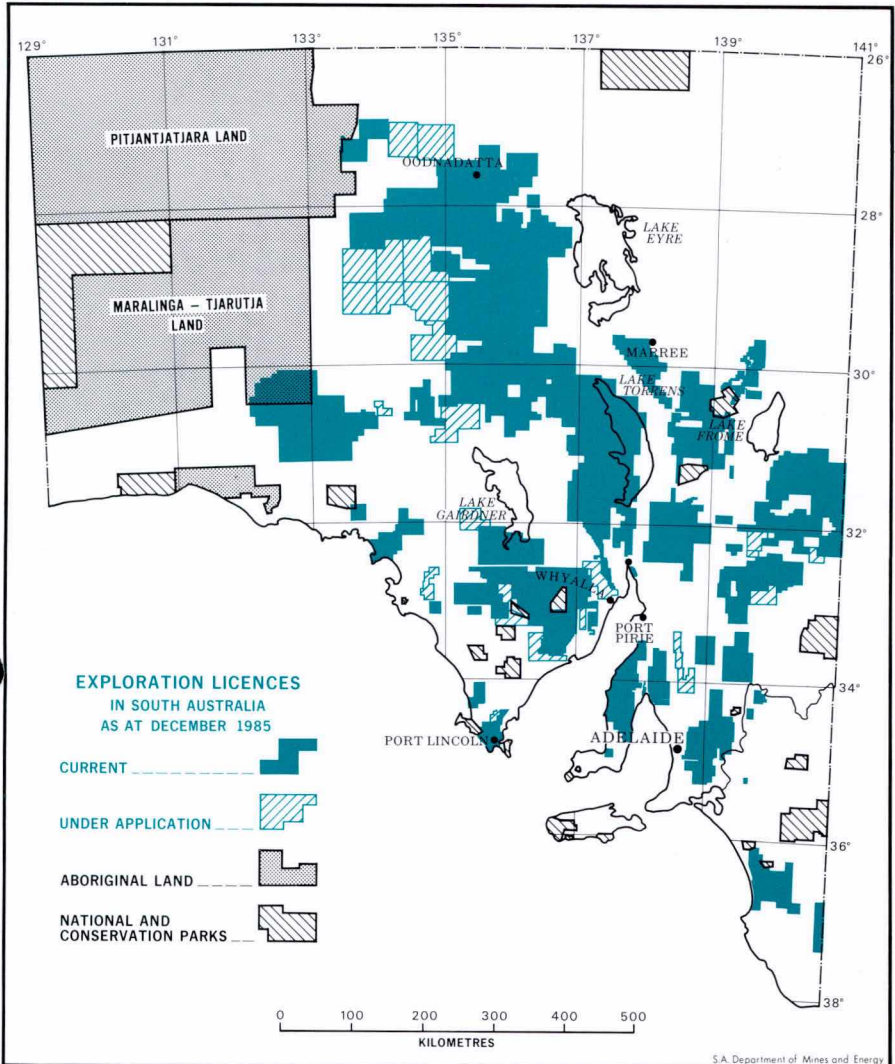
mapping, rock chip sampling and channel sampling of costeans. No significant gold values were recorded (Env. 5422).

EL 1195 (Electrolytic Zinc Company of Australasia Ltd)

Exploration for base metals in the Martin's Well area, including stream sediment and rock chip sampling, failed to disclose anomalous mineralisation (Env. 5472).

EL 1224 (BHP Minerals Ltd)

An aerial magnetic and radiometric survey was undertaken to delineate potential kimberlite and base metal targets in the Koolymilka area. Ground follow-up included magnetic and gravity surveys. Drilling of two kimberlite targets (five open holes, aggregate 94 m) failed to reach target depth (Env. 5547).



EL 1248 (CRA Exploration Pty Ltd)

Exploration for diamonds and base metals in the Stuart Creek area involved aerial magnetic/radiometric surveys and gravel and stream sediment sampling. Kimberlitic indicator minerals were disclosed (Env. 5943).

EL 1253 (CRA Exploration Pty Ltd)

Reinterpretation of gravity data and geochemical analysis of diamond-drillcore from previous drilling failed to provide encouragement for further base metal exploration in the Bute area (Env. 5860).

EL 1260 (Utah Development Co. Ltd)

Geological mapping and geochemical sampling led to the conclusion that the Worumba diapir was unprospective for shale-hosted lead/zinc mineralisation (Env. 6021).

EL 1262 (Aberfoyle Exploration Pty Ltd)

Rock chip sampling at old mines in the Outalpa area failed to disclose significant base or precious metal contents (Env. 5986).

EL 1266 (CSR Ltd)

Ground magnetic surveys were followed up with RAB drill traverses (eighty holes) in the unsuccessful search for base and precious metals in the Yeelanna area (Env. 5987).

EL 1279 (CSR Ltd)

Stream sediment and rock chip sampling in the Manunda area failed to indicate potential for gold mineralisation (Env. 6340).

EL 1286 (The Shell Company of Australia Ltd)

Rock chip sampling and analysis of core from previous drilling was undertaken in the search for copper-gold mineralisation southwest of Mutooroo (Env. 6307).

PETROLEUM EXPLORATION

New Petroleum Exploration Licences

Officer Basin

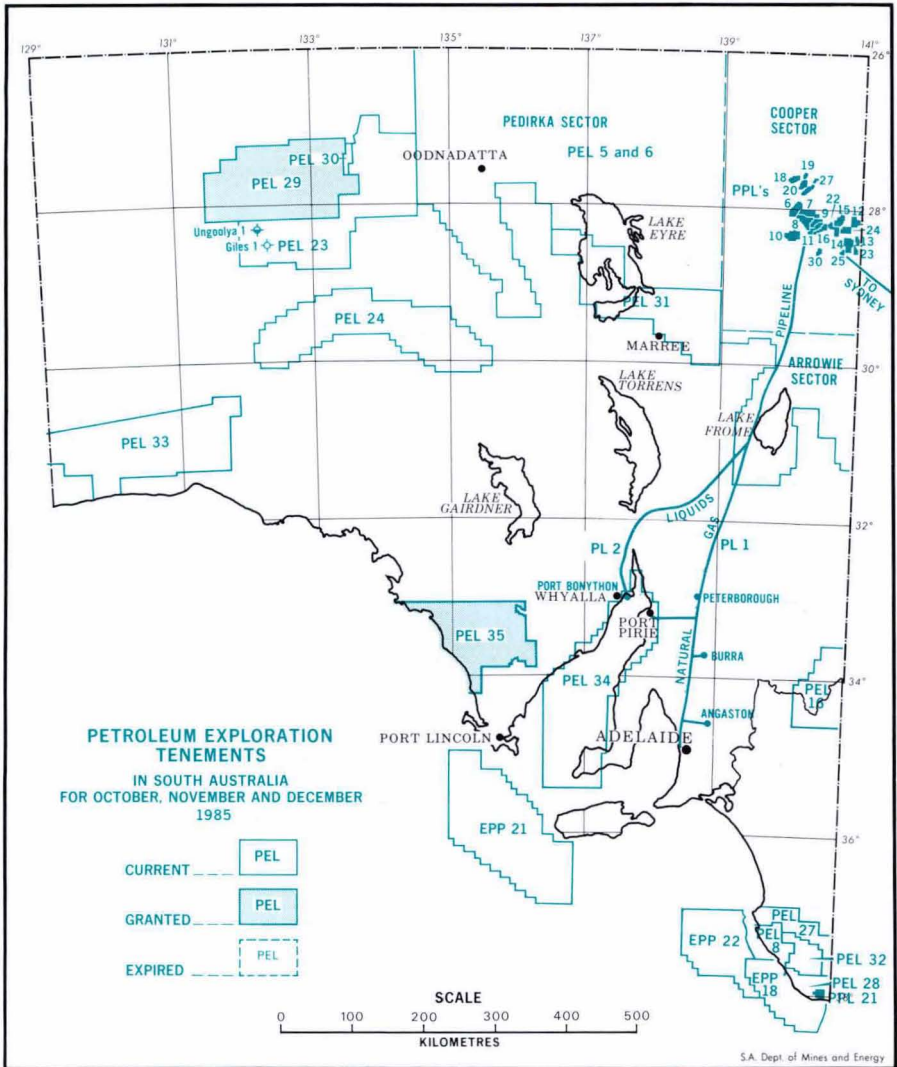
PEL 29, covering 20 749 km² of the northern Officer Basin, was granted to Amoco Australia Petroleum Company (fifty percent), AP Oil Pty Ltd (twenty percent), Crusader Oil NL (fifteen percent) and Quadrant Energy Development Limited (fifteen percent) for a term of five years from 1 November. The new licence lies within Pitjantjatjara Aboriginal Lands.

AP Oil's twenty percent participation in PEL 29 will be a carried-interest funded by the other parties. The Pitjantjatjara Council have negotiated with the other partners for AP Oil to have the right at any time, up to that of application for a petroleum production licence if exploration is successful, to elect to either pay forty percent of all previous joint exploration account costs to maintain their twenty percent interest, or convert their holding to a ten percent net profits interest. The income from shares in AP Oil Pty Ltd will be held in trust for the Pitjantjatjara community.

The work programme over the initial five-year term of the licence involves expenditure of a minimum of \$32.5 million on acquisition, processing and interpretation of 3 400 line kilometres of seismic surveying and drilling of five wells. The first well, Munyarai 2, is scheduled to be drilled in March 1986; road construction to the drill site will commence early January.

Frolda Basin

PEL 35, covering 12 708 km² of the onshore Frolda Basin on southern Eyre Peninsula, was granted to a newly-formed South Australian petroleum exploration company, Quadrant Energy Development Limited, for five years from 24 November. The licence excludes conservation parks which lie within its boundaries. The five-year initial licence term work commitment includes a review of existing geological and geophysical data, completion of 300 line kilometres of seismic surveying and drilling of two wells, at an estimated total cost of \$2.75 million.



Cooper Basin Drilling

Nulla 1 Accelerated Gas Programme (AGP) exploration wildcat in the Patchawarra Southwest Block was cased and suspended at TD 9 182 feet on 7 October for later completion as a Permian Patchawarra Formation gas/condensate producer. It discovered a new gasfield 20 km west of the Andree-Leleptian Field when DST 2 over the interval 8272-8333 feet in the Lower Permian Patchawarra Formation flowed gas, with a condensate mist, at an un stabilised rate of 3.06 MMCFD. A surface flowing pressure of 580 psig was recorded. DST 3, in the Patchawarra Formation over the interval 8348-8415 feet, flowed gas with condensate mist at a rate of 3.1 MMCFD and a surface flowing pressure of 765 psig; DST 4 over the basal Patchawarra interval 8489-8556 feet flowed gas at a rate too small to measure and recovered gas-cut water.

Moomba 53 Unit development well in PPL 9 was cased and suspended at TD 8 292 feet on 4 October for later completion as a Permian Toolachee Formation and Daralingie Formation gas producer.

Lamdina 1 base exploration programme wildcat was plugged and abandoned as a dry hole at TD 10 912 feet on 31 October. It is 20 km northeast of Moolion Field in the Patchawarra East Block on an anticlinal feature developed at the intersection of two fold/fault trends. DST 1 over the interval 10 086-10 142 feet in the Patchawarra Formation flowed gas at a rate too small to measure with 6 psi surface flowing pressure.

Meranji 3 Block oil development well in the Merrimelia-Innamincka Block was cased and suspended at TD 5 828 feet on 27 October for later completion as a Namur Sandstone oil producer. It is 500 m southeast of Meranji 1.

Keeto 1 base exploration programme wildcat in the Toolachee Block was plugged and abandoned as a dry hole at TD 7 720 feet on 10 November. It is on a northeast-southwest trending anticline 4.7 km west of the Toolachee Gasfield. DST 1 over the interval 7383-7454 feet in the Patchawarra Formation failed to produce hydrocarbons.

Dullingari 39 base exploration programme gas appraisal well in the Toolachee Block has been cased and suspended as a potential Patchawarra Formation gas producer; TD 8 838 feet was reached on 7 December. The primary objective of the well was to evaluate the Patchawarra Formation on the northeastern flank of the Dullingari Gasfield, 1.5 km north-northeast of Dullingari 24; the Murta Member was a secondary target. Three DST in the Murta, Toolachee and Patchawarra Formations failed to produce hydrocarbons. Several zones with significant shows remain untested in the Permian interval and may be worked over later.

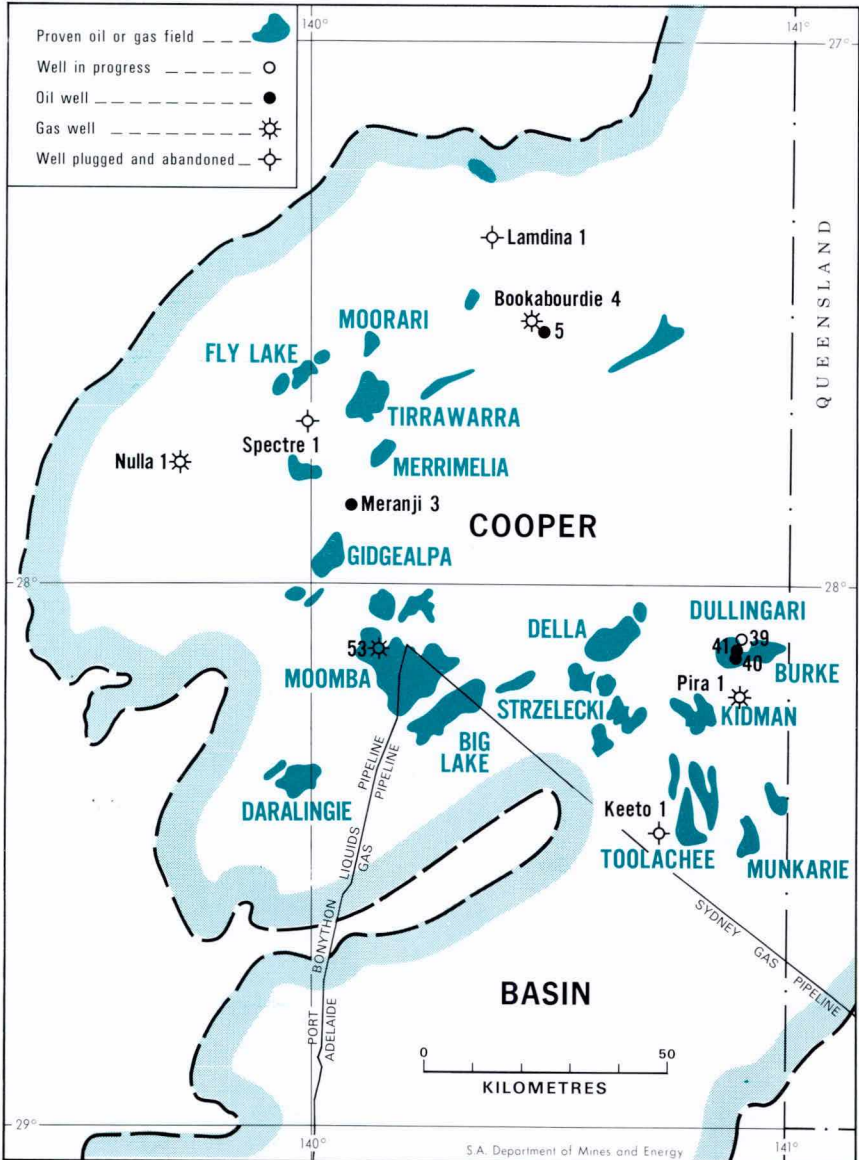
Bookabourdie 4 base exploration programme gas appraisal well in the Merrimelia-Innamincka Block was cased and suspended at TD 9 642 feet on 20 December for future completion as a Permian Tirrawarra Sandstone gas producer. It is approximately 3.7 km northwest of the Bookabourdie 1 oil and gas discovery well, and 2.5 km northwest of Bookabourdie 2. DST 1 over the interval 9340-9392 feet in the Tirrawarra Sandstone flowed gas at a rate of 7.5 MMCFD with a surface flowing pressure of 1 400 psi; 30 feet of 36.8° API condensate and 90 feet of very condensate-cut water were recovered in the drillpipe.

Paxton 1 exploration wildcat in the Tinga-Tingana Block was plugged and abandoned as a dry hole at TD 3 580 feet on 27 November. It is 150 km southeast of Moomba and 3.8 km east-northeast of Fortville 3, a stratigraphic well drilled by SADME in 1964. Paxton 1 is the sixth well drilled in this Block. The primary objective was the Jurassic Namur Sandstone Member of the Mooga Formation; the Cretaceous Murta Member constituted a secondary target.

Bookabourdie 5 Block oil appraisal well in the Merrimelia-Innamincka Block was cased and suspended at TD 7 730 feet on 8 December for later completion as a Jurassic Hutton Sandstone oil producer. It is 750 m south of Bookabourdie 1 oil and gas discovery well. DST 1 in the Birkhead

Formation over the interval 6919-6981 feet failed to recover hydrocarbons. DST 2 over the Hutton Sandstone interval 7007-7028 feet recovered 660 feet of 45.9° API oil and 50 feet of water in the drillpipe.

Dullingari 40 development well in PPL 12 was cased and suspended at TD 5 104 feet on 13 December for subsequent workover and extended production testing prior to implementation as a waterflood injection well to artificially maintain fluid pressure in the Murta Member oil reservoir. Two cores totalling 90 feet were cut over the Murta interval 4800-4890 feet to allow evaluation of unknown reservoir properties between Dullingari 1 and 2. This well extended the known northeastern limits of the underlying Namur Sandstone Member oil reservoir, thus adding to reserves.



Dullingari 41 development well in PPL 12 was cased and suspended at TD 5 210 feet on 23 December for subsequent use as for Dullingari 40. Forty-two feet of core were cut in the Murta Member over the interval 4852-4894 feet to enable reservoir characterisation in an area between Dullingari 4 and 8.

Wells in Progress

Drilling ahead at 31 December were Pira 1 and Spectre 1 (Cooper Basin) and Ungoolya 1 (Officer Basin).

Officer Basin Drilling

Comalco Aluminium Ltd, licensee of PEL 23 in northeast Officer Basin, has drilled two fully-cored stratigraphic/exploration wells.

Giles 1 was plugged and abandoned as a dry hole at TD 1 326 m on 26 October.

Ungoolya 1 encountered oil shows and traces of gas whilst coring the Cambrian sequence. The well is sited midway between Exoil Pty Ltd (Emu 1) and Continental Oil Company (US) Ltd (Munyarai 1), dry holes drilled in 1963 and 1968 respectively. Minor oil shows, with fluorescence and solvent cuts, were observed in tight sediments between 1 202 and 1 210 m and between 1 388 and 1 680 m. Crush cut fluorescence was also observed from 1 680 to TD 2 193 m. Drillstem tests were not carried out since very low porosities and permeabilities were measured in the cores.

Seismic Surveys

- PEL 27 : Geophysical Service Inc. recorded 213 line kilometres of regional Vibroseis data for the operator, Hartogen Energy Ltd, in the Lucindale 1985 Seismic Survey which commenced on 5 December.
- PEL 31 : Norpac International recorded 307 line kilometres of regional Vibroseis data in the Marree Block for Adelaide Petroleum NL in the Marree 1985 Seismic Survey, from 20 September to 12 October. SADME recorded 75 line kilometres of dynamite reconnaissance data in the Curdimurka Block south of Lake Eyre during 27 November to 12 December to assist delineation of aquifer systems near the Great Artesian Basin margin.
- PEL 34 : Geophysical Service Inc., using the survey vessel M.V. 'Eugene McDermott II', recorded 262 line kilometres of shallow marine airgun seismic data for Felstea Pty Ltd in the Karemanda Seismic Survey in northern Spencer Gulf during 16 - 17 December.
- Gulf St Vincent: The same contractor as used in PEL 34 recently undertook a scientific investigation survey for SADME in the Stansbury Basin of Gulf St Vincent. The Eugene McDermott II recorded 299.5 line kilometres of reconnaissance data during 18-19 December in Backstairs Passage near Cape Jervis.
- EPPSA 21 : Geomex Surveys (Australia) of Perth, using the contract survey boat M.V. 'Sprightly', conducted a high-resolution marine seismic survey of the proposed Duntroon No. 1 wellsite, 65 km south-southwest of Cape Carnot during 20 October-3 November. The multi-electrode sparker survey of an area of 3 km² investigated seafloor characteristics.



Field operations, Geophysical Service Inc.

:: On 22 December, Geophysical Service Inc. and Eugene McDermott II commenced this northern Otway Basin permit Year 2 marine seismic survey of 500 line kilometres of detailed airgun coverage for operator Chevron Overseas Petroleum Inc.



"Eugene McDermott II", offshore seismic survey, St Vincent Gulf.

Petroleum Tenement Changes of Interest

PEL 5 and 6

Following the decision of Santos Ltd in early 1985 to broaden oil exploration efforts throughout Australia, the company, together with Vamgas Ltd and the South Australian Oil & Gas Corporation Pty Ltd, is concluding three farmout agreements for parts of PEL 5 and 6.

Weeks Australia Ltd have acquired an 8.25 percent stake on the Birdsville Track Ridge (Haddon Block) from Santos (6.25 percent), Vamgas (1.25 percent) and SAOG (1.25 percent). Canada Northwest Australia Ltd will farm-in to 6.25 percent of the Koonchera Block from Santos; Poseidon Oil Pty Ltd will earn an 8.25 percent interest in the Mulka Block east of Lake Eyre from Santos (6.25 percent), Vamgas (0.75 percent) and SAOG (1.25 percent) and have bought a further 4 percent of Vamgas share in this block. To earn equity, the farminees will fund one-eighth of the Santos-Vamgas-SAOG share of the part-licence commitment to drill seven wells and shoot 3 900 line kilometres of new seismic data over the next three years of the second term of PEL 5 and 6, at an estimated cost of \$19.5 million.

Other portions of Santos' PEL 5 and 6 interest on offer include 2.5 percent each of the Dalhousie and Lake Eyre blocks and 6.25 percent each of the Clifton and Arrowie blocks. The Arrowie Block partners have applied to surrender 50 percent of that block.

PEL 31

Adelaide Petroleum has decreased its holding arising from the 7.86 percent direct participating interest acquired through a farm-out assignment from Western Mining Corporation (Exploration) Pty Ltd (WMC) by assigning 5 percent of that interest to Trans-Canada Pipelines Limited (TCPL) who will pay farm-in debts to earn equity.

Adelaide Petroleum is exercising an option to acquire a further 5 percent of WMC's Pedirka Block interest, on condition that existing block partner Bridge Oil Ltd funds part of its extra 5 percent cost share of the remaining work commitment in return for earning an immediate 3.36 percent direct interest in the block. This manoeuvre forms part of an assets swapping exercise with Bridge who have mounted a take-over bid for Adelaide Petroleum's parent company National Oil NL.

Subject to approvals, the company intends to farm in to a 2.5 percent share of the Patchawarra East Block of PEL 5 and 6 (from 37.5 percent previously held by WMC) and 5 percent Dalhousie and Lake Eyre Blocks (from 10 percent previously held by Bridge).

To support funding of commitments to PEL 31, the licence has been split into the Marree and Curdimurka Blocks, 15 percent of which are being acquired by Permian Petroleum NL. A regional seismic survey of 307 line kilometres was recently completed in the Marree Block at a cost of \$1.8 million.

NORTHERN POWER STATION

The Northern Power Station at Port Augusta was officially opened by the Premier, Mr John Bannon, on 17 October when the first of two 250 MW generating units became operational. This raises the total generating capacity of the Electricity Trust of South Australia by 11 percent to 2 430 MW. The second 250 MW unit is expected to be commissioned in 1986 and a third (NPS 3) is planned. Built at a cost of \$500 million, the station was erected on land reclaimed by placing and levelling 455 000 m³ of spoil from the adjacent 330 MW Thomas Playford Power Station ash dumps.

The two 80 m high, 14 400 tonne boilers are of the 'once through' Benson type and were manufactured by Vereinigte Kesselwerke AG (VKW). The two turbo-generators, each of 250 megawatt capacity, constructed by

Mitsubishi, rotate at 3 000 rpm to produce electricity at 18 000 volts. Technically, they are described as being 'two-cylinder, tandem-compound, double-exhaust, condensing reheat turbines'. Each turbo-generator is supported on a reinforced concrete pad 3.8 x 10.5 m and 2.5 m thick weighing 1 300 tonnes. To minimise the transfer of vibration to other parts of the structure, each pad is supported on 34 helical coil springs. The station's reinforced concrete chimney is 200 m high.

Each boiler has 24 burners, consuming 170 tonnes/hour of coal, and has two electrostatic precipitators for removal of 250 000 tonnes/year of flyash from each boiler. Of this quantity, 80 000 tonnes/year is sold for cement manufacture.

Cooling water is drawn from a channel connecting to Spencer Gulf.

The Station is fuelled by Leigh Creek coal, transported by rail 260 km to Port Augusta where it is delivered to a coal handling plant capable of carrying up to four million tonnes of coal each year for supply of NPS 1, NPS 2 and the adjacent Playford Power Stations.

COMPANY NEWS

Santos Ltd

Directors of Santos Ltd, in a report to the Stock Exchange for the quarter ended 30 September, advised that Santos Group Sales for the period totalled \$148.7 million as under:

Natural gas	24 576 terajoules	\$32.4 million
Crude oil	288 481 kilolitres	\$75.8 million
Condensate	106 149 kilolitres	\$25.0 million
Propane	35 634 tonnes	\$10.4 million
Butane	17 105 tonnes	\$ 4.9 million
Carbon dioxide	6 408 tonnes	\$ 0.2 million.

Santos revenue for the third quarter of 1984 was \$100.7 million.

Five new wells were connected to the Moomba plant, increasing available supplies of oil and gas. Commissioning of a new 2 000 h.p. compressor at Tirrawarra and Toolachee began, aimed at boosting production of gas and natural gas liquids.

Site work is proceeding to schedule at Port Bonython on replacement of the high pressure flare and installation of additional pressure storage for propane and butane for recovery and reprocessing of off-specification product, increasing the quantities of propane and butane available for sale.

Arbitration hearings commenced in September to determine a new price for gas sold to the Australian Gas Light Company.

Discussions are continuing with the Queensland Government, other producer groups and potential customers on the possible development of gas reserves in southwest Queensland.

Four vessels were loaded at Port Bonython with 105 917 tonnes of LPG, the liftings were by Idemitsu, Total International and ICI. In addition, 11 375 tonnes were sold locally through the truck loading facility.

Ten vessels were loaded with 342 083 kL of crude oil and 203 545 kL of condensate. There were three crude oil, one condensate and six combined crude oil and condensate liftings. The first export shipment of condensate to Japan took place on 29 August and was sold to the Mitsubishi Corporation.

ABC Holdings Ltd

Adelaide Brighton Cement Holdings Ltd has called for tenders for the supply of fuel to South Australian plants for five years from 1987.

Gas from the Cooper Basin, purchased through PASA, is used to fire company kilns at Birkenhead and Angaston.

Production of Gold

According to 'Australian Mining', world production of gold amounts to 95 000 tonnes. Of this, 39 000 tonnes is in bullion held in major banks throughout the world, 23 000 tonnes are in private collections, 24 000 tonnes have been made into jewellery, and 9 000 tonnes are unaccounted for. Annual production, worldwide, is 1 100 tonnes.

Mount Gunson

The EMAC Mount Gunson Partnership has completed its first year of operation at the former CSR open-cut copper mine.

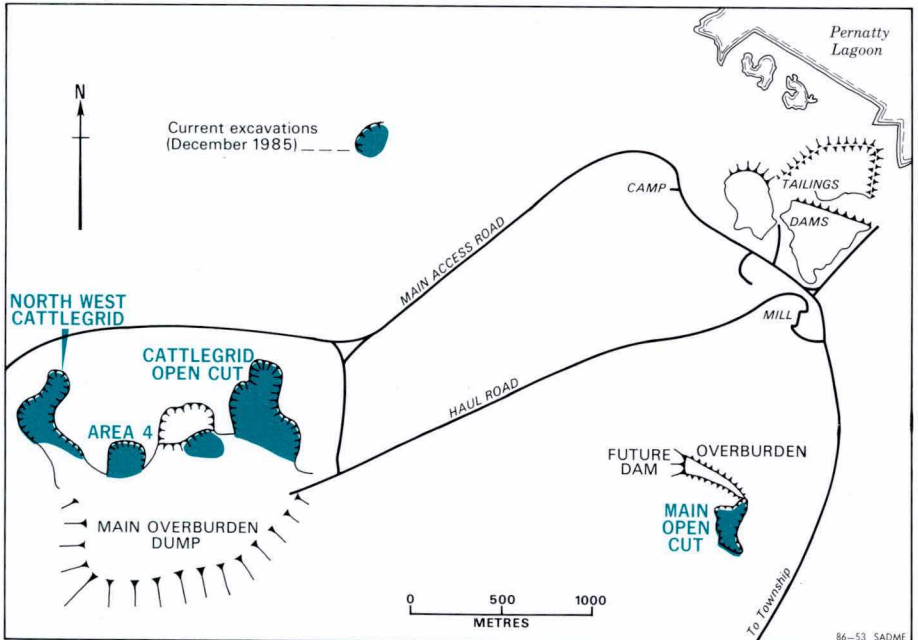
Since November 1984, 950 000 tonnes of ore have been treated, yielding 23 400 tonnes of copper concentrate containing 12 500 tonnes of copper.

In the main open cut, 1.04 million tonnes of sandstone capped with silcrete were removed to expose 240 000 tonnes of partially oxidised ore, which was satisfactorily milled with the Cattlegrid ore.

The main source of ore, the North West Cattlegrid, produced 530 000 tonnes following the stripping of up to 44 m of overburden totalling 5.5 million tonnes. Of the 330 000 tonnes of low-grade ore exposed by removing 2 million tonnes of waste in Area 4, about 200 000 tonnes remains to be treated together with a further 30 000 tonnes from a small extension to the main open cut.

Rehabilitation of the overburden dump, which partially backfills the Cattlegrid open cut, is proceeding satisfactorily. Some 70 million tonnes of grey-white sandstone have been capped with about 5 million tonnes of red sand or sandy clay. The final layer of sand on the more exposed areas of the overburden dump has not been graded. Instead, truck load mounds are left as dumped, creating a dimpled effect in which plants can establish with a reduced chance of deflation.

The current workforce totals eighty-eight; operations are expected to be completed by 30 April 1986.



New Coal Scanner

Adelaide-based Mineral Control Instrumentation Pty Ltd has been licenced to manufacture a coal scanning device developed by the CSIRO Division of Mineral Physics.

Named COALSCAN, the system is capable of continuous analysis of coal in a sample tube or on a conveyor belt to determine non-combustible (ash) content.

Dissolution of Uranium

The CSIRO Division of Mineral Chemistry has devised a new process for removing uranium from Olympic Dam copper concentrates. The process, for which patent application has been made, offers several metallurgical and economic advantages over other proposals. Successful testing has been undertaken at the Olympic Dam pilot plant.

Roxby Management Services Pty Ltd has spent several years developing and testing various routes for processing the copper-uranium-gold ore deposit. Common to all processing options is initial flotation to obtain a copper concentrate containing substantial uranium. Until recently, the favoured route for recovering this uranium was by smelting, followed by pressure leaching of the uranium-containing slag.

CSIRO research, supported by RMS, has now shown that uranium can be selectively removed from the copper concentrate by hydrometallurgical treatment. The copper concentrate is reacted with controlled amounts of sulphuric acid at atmospheric pressure at temperatures of 30-60°C. Up to 97 percent of the uranium dissolves in 24 hours. By limiting access of oxygen to the suspension, oxidation of copper sulphides in the concentrate and dissolution of copper can be minimised. The low uranium content of the treated concentrate obviates need for subsequent uranium recovery from slag.

ROWLAND FLAT REHABILITATION

A sandpit operated since the 1940 s near Rowland Flat is being progressively rehabilitated to prevent erosion of tailings by North Para River. Monier Sands have liaised with SADME and E&WS to formulate proposals and carry out the work utilising a local earthmoving contractor.

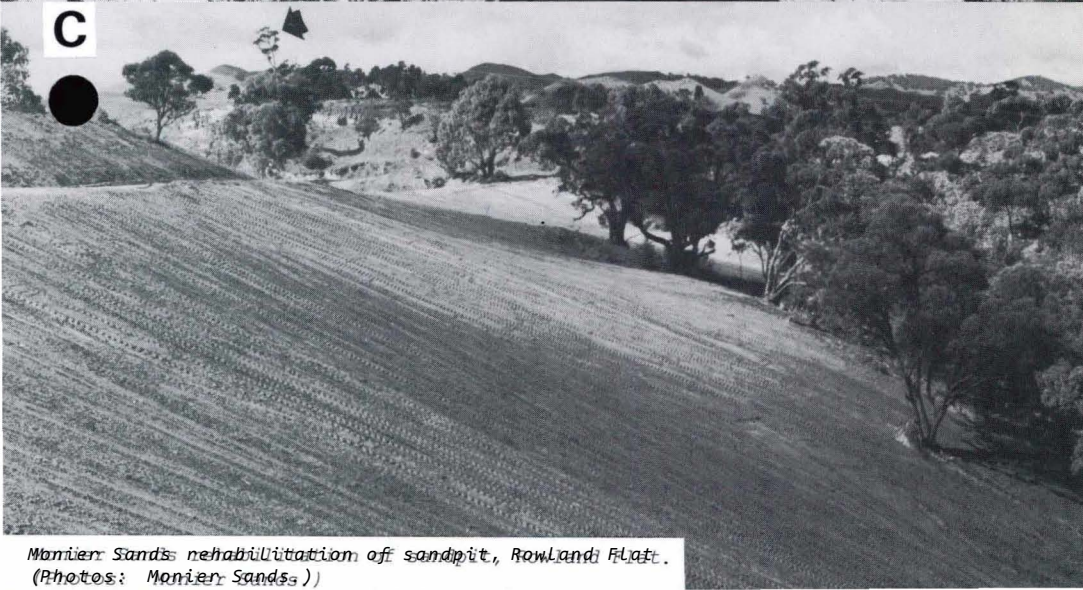
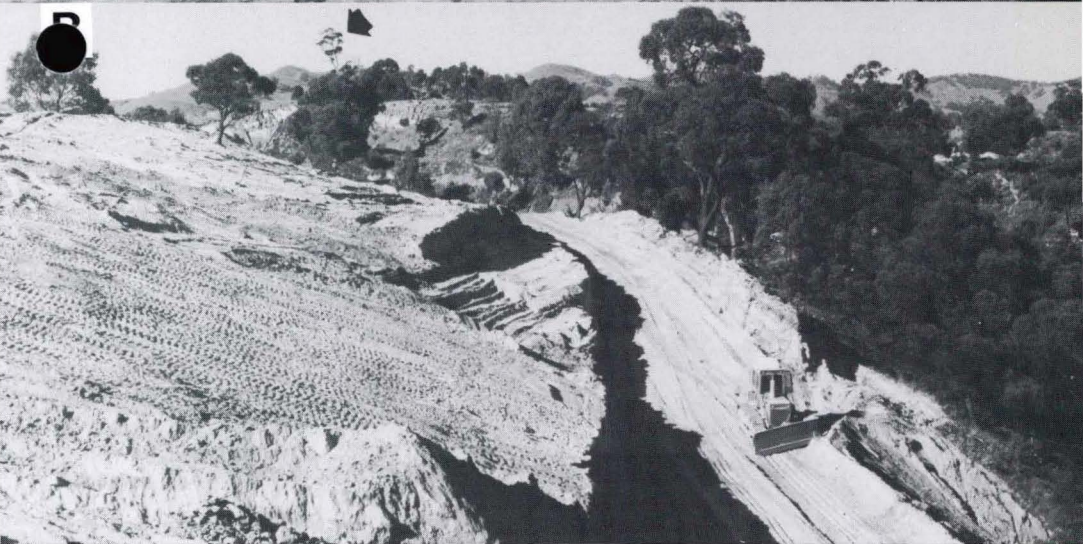
The recently completed first stage repaired 300 m of river frontage by bulldozing the spoil to an overall slope of 17-25°. This was covered with topsoil, selectively removed from an adjacent area and seeded.

Funding of \$228 000 was provided by the Extractive Areas Rehabilitation Fund; further work is in progress.

CRUDE OIL PRICE ADJUSTMENT

Import parity prices (IPP) for indigenous crude oils will be adjusted from 1 January 1986 to reflect changes in the parameters of the IPP formula since the previous adjustment and amendments to the IPP formula. The IPP for Bass Strait crude will rise by \$1.46 to \$43.71 per barrel and result in an increase in price of petrol at the pump of about 0.9 cents per litre.

The major factor in the increase in domestic oil prices has been the depreciation of the Australian dollar. Since the 1 September 1985 adjustment to IPP, the \$A/\$US exchange rate has fallen from 0.7114 to \$0.6832. While the official price of Arab Light, the crude on which IPP is based, has remained unchanged at \$US28 a barrel, the spot price has firmed from \$US27.23 to \$US27.59 a barrel.



Monier Sands: rehabilitation of sandpit, Rowland Flat.
(Photos: Monier Sands)

MOONTA MINES

The State Heritage Branch of the Department of Environment and Planning has recognised the 'Copper Triangle', which includes Moonta, Kadina and Wallaroo, by including many structures and sites on the State Heritage Register.

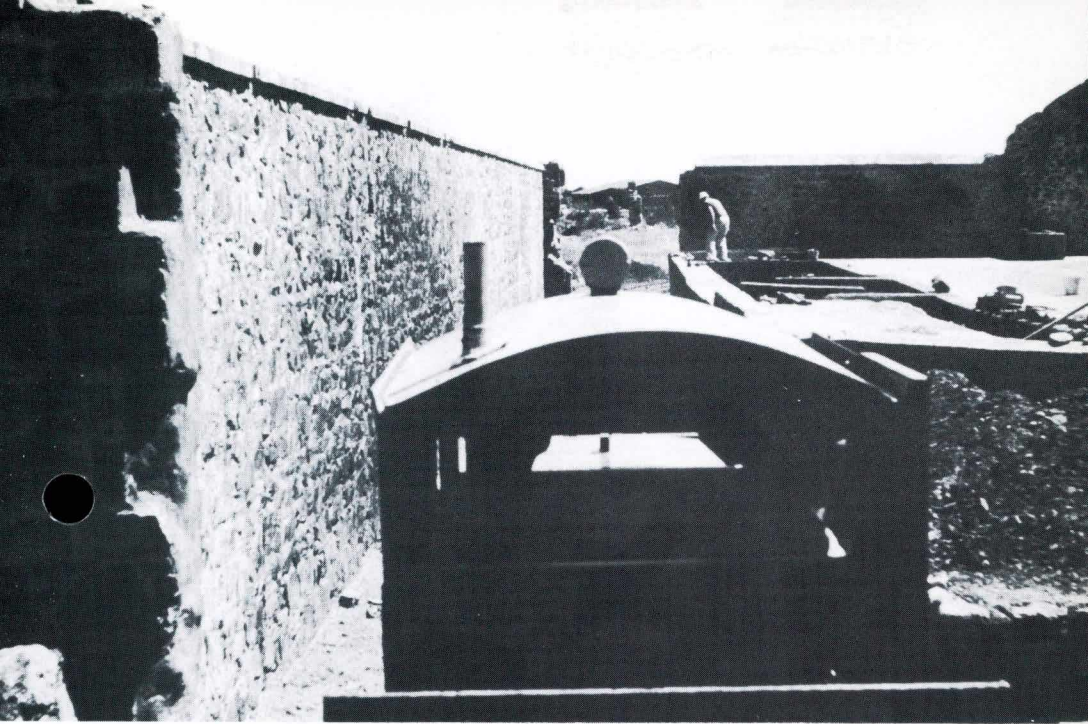
Over the past two and a half years, considerable conservation work has been undertaken in the Moonta Mines area. In January 1984, a \$303 000 Jubilee 150 grant was provided for major site works including:

- repairs to Richman's Engine-House
- establishment of a tourist road with directional and interpretive signs
- fencing of fragile and/or dangerous sites
- construction of walkways and interpretive stations on tailing dumps
- upgrading of displays in the National Trust museum in the former model school.

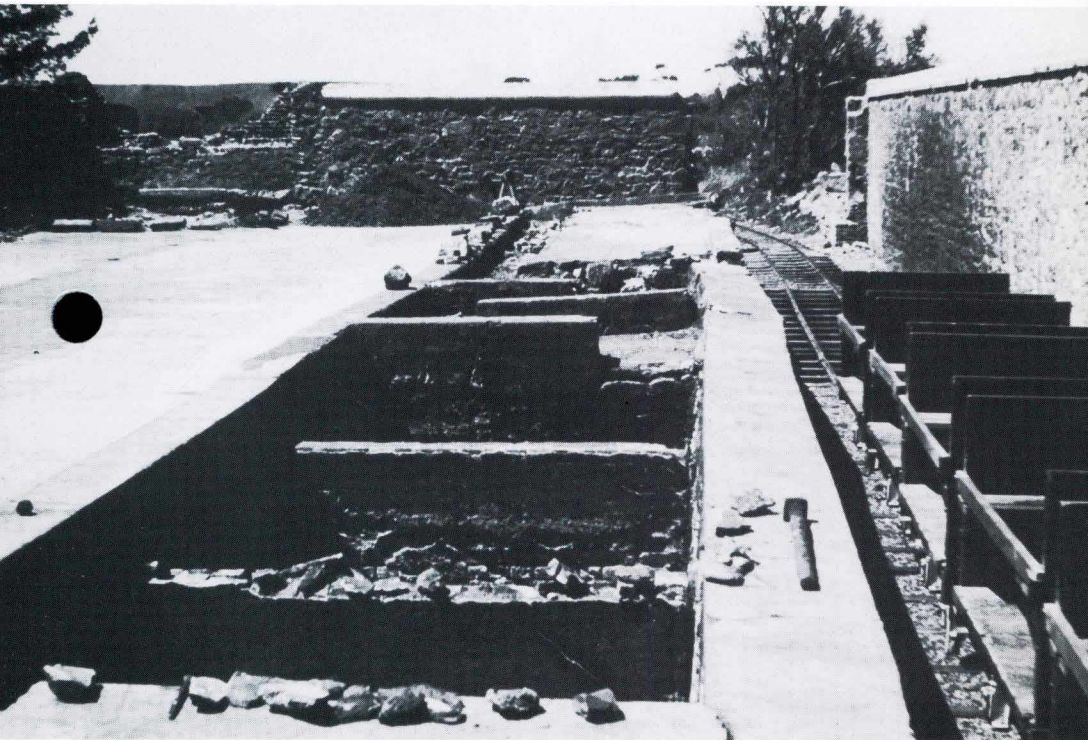
Work was guided by the Moonta Mines Jubilee 150 Steering Committee with representatives from the District Council of Northern Yorke Peninsula, the Department of Tourism, the Department of Lands, the History Trust of South Australia, the Jubilee 150 Board, the National Trust and the State Heritage Branch.



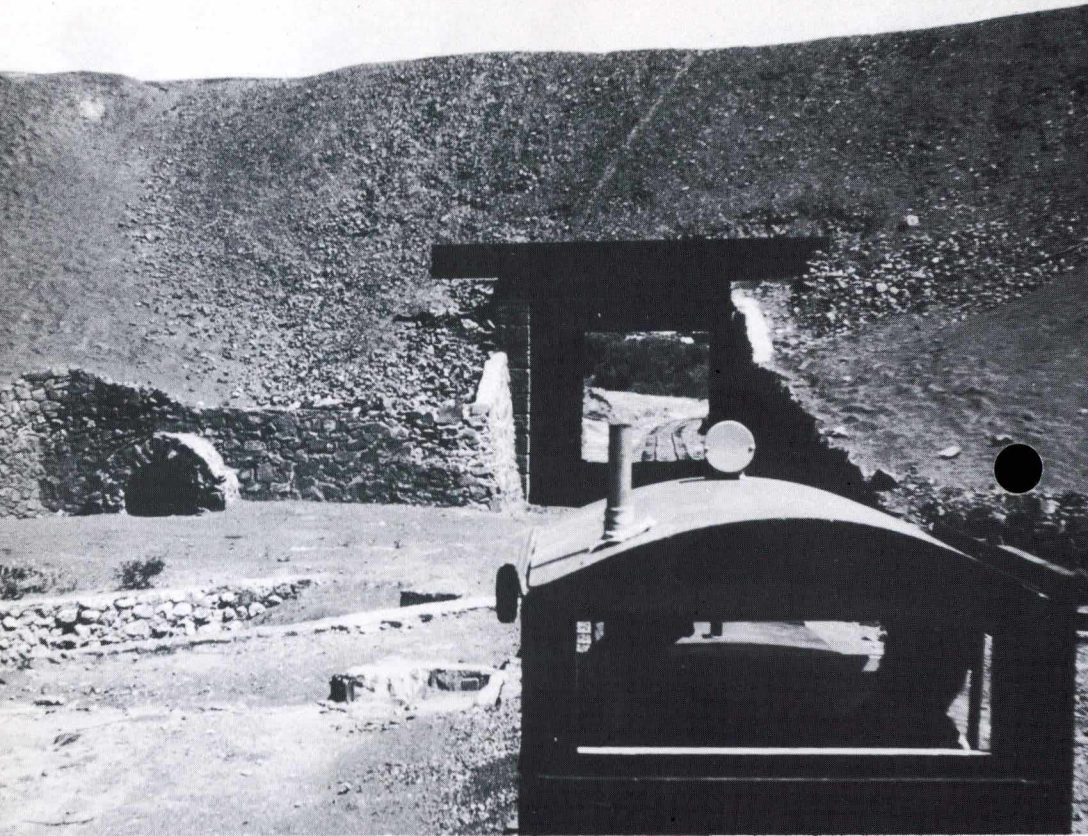
Moonta Railway Station.



Moonta Mines tailings, copper leach.



Moonta Mines leach ponds drying floor.



Moonta Mines tailings dump.

In March 1984, Moonta Mines was declared a State Heritage Area on the basis of studies of the 'Copper Triangle' and of Moonta Mines which established heritage significance and need to control development to maintain integrity of the site.

The Moonta Mines Narrow Gauge Railway Project, completed in December 1984, was funded by a \$159 000 Community Employment Programme grant. Three kilometres of track were laid along original railway embankments to link the National Trust Museum to the Moonta railway station. The State Heritage Branch established the route and supervised stabilisation of structures adjacent to the track. Funds totalling \$11 500 were spent on stabilisation of ruins and to provide an interpretive display in the former Washing and Drying House; twenty metal-photo screened aluminium signs explain mineral recovery and treatment processes. The narrow gauge railway provides restricted public access.

In July 1985, a Draft Management Plan for the Moonta Mines State Heritage Area was released; its aim is to:

- . maintain cultural significance
- . provide development principles to facilitate management
- . provide guidelines for conservation and public use
- . produce a framework for management.

The heritage resources within the Copper Triangle are of national significance; their conservation and interpretation will contribute to cultural tourism and understanding of an important chapter of Australia's industrial history.

GREAT ARTESIAN BASIN

SADME has completed a seismic reflection traverse from GAB 3 to Morris Creek Bore as the first stage of a five-year regional geophysical programme which will contribute to an improved understanding of the SA portion of the Great Artesian Basin. One of the aims is to quantify natural leakage which is believed to be only marginally less than the sum of well and spring discharges. This information will assist in development of management strategies for this important water resource.

Other Departmental activities will include:

- surveying of Great Artesian Basin bores
- geophysical logging of selected bores
- establishment of monitoring points at selected bores
- use of remote sensing techniques (thermal imagery)
- further geophysical traversing including HRS, TEM, electrical sounding and electro-magnetic profiling.

The information derived by Roxby Management Services in the well field area is providing useful information in the regional assessment but the present study does not directly relate to provision of groundwater to the Olympic Dam project.

LPG PRICING AND EXCISE

Following pricing and excise determinations for LPG, in accordance with Commonwealth Government policy announced in March 1984, the wholesale price of LPG was increased in line with the fuel and light component of the Consumer Price Index on 1 October. The increase of 3.5 percent (less than 0.5 cents per litre) will result in a new price of \$262.21 per tonne (from \$253.34).

The LPG subsidy will be abolished from 1 October (was \$21.03/tonne for traditional (non-auto) uses) resulting in a once-only retail price increase of three percent. This increase will be in addition to that outlined above but will only apply to consumers whose LPG was previously subsidised.

The rate of excise on naturally-occurring LPG will be increased by \$13.42 per kilolitre to \$50.36 per kilolitre. This adjustment will not affect domestic prices of LPG.

ENERGY RESEARCH

SENRAC Grants

Following recommendations made by the State Energy Research Advisory Committee, the Government has approved funding of \$295 253 for energy research projects, including:

- upgrading of South Australian lignites by high temperature pretreatment - \$22 932 (University of Adelaide)
- thermal characteristics of minerals associated with South Australian lignites - \$25 000 (SA Institute of Technology)
- kinetic parameters for the evolution of volatile species during coal pyrolysis in fluidised beds - \$10 906 (University of Adelaide)
- passive drying of soft brown coal during transportation by overland belt conveyor - \$38 882 (Kinhill Stearns)
- an analytical study of wind energy potential - \$10 000 plus \$10 000 from ETSA (A. Skinner)

- . static synchronous converter, Stage 2 - \$23 180 (J. Piechnick)
- . remote area energy supply (SA), a pilot study - \$29 785 (INFODEC)
- . review of mining cost for Bowmans coal - \$40 000 (consultant to be arranged).

DEPARTMENTAL PUBLICATIONS AND REPORTS

Quarterly Geological Notes No. 94

- . Palynology of limestone nodules as an aid in determining the age of marine Cretaceous strata in the Eromanga Basin (N.F. Alley and P.A. Rogers).
- . Site excavation within a deeply weathered siltstone, at Happy Valley Reservoir (J.C. Beal).
- . A revision of the Toolachee and Daralingie Formations, Cooper Basin, South Australia (J.G.G. Morton and C.G. Gatehouse).

Geological Maps

- 1:250 000 standard scale
TARCOOLA (SH53-10) - S.J. Daly
- 1: 50 000 standard scale
Echunga (6627- 1) - A.P. Belperio

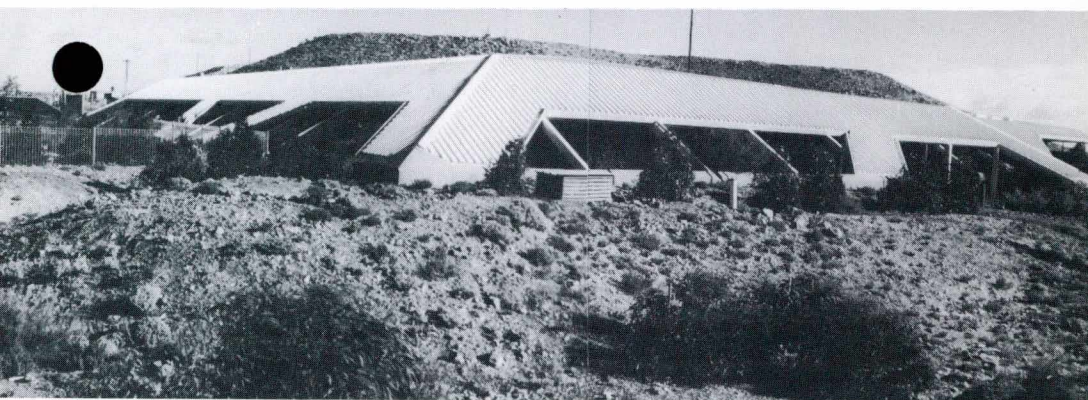
Postcards

A series of nineteen coloured postcards depicting opal in SA (six cards), mineral specimens of SA (six cards), Moonta-Wallaroo Mines (six cards), and geological provinces of SA (one card) has been released by SADME. These are available at a cost of \$2.00 for each group of six cards, and 30 cents for the single card on geological provinces.

Selected Unpublished Reports

<u>Report No.</u>	<u>Author</u>	<u>Title</u>
84/70	Beal, J.C.	A preliminary geological assessment of the proposed South Para-Warren reservoirs pumped storage scheme.
85/18	Horn, C.M. and Fradd, W.P.	Appraisal of gold tailings at the Tarcoola State Battery and Cyanide Works.
85/30	Parker, A.J.	Tectonic development and metallogeny of the Kanmantoo Trough in South Australia.
85/34	Gerdes, R.A.	Otway Basin regional magnetic potential field study.
85/35	Farrand, M.G.	Stratigraphic classification of sediments from inliers in the Curdimurka area.
85/36	Read, R.E.	Stuart Highway, supplementary drilling for construction water south of Marla.
85/38	Robertson, S.	MC 751, MC 907, Teatree barite deposit geological investigations 1978-80.

- 85/40 Alley, N.F. Palynology and age of selected samples from boreholes southeast of Lake Eyre.
- 85/41 Horn, C.M. and Fradd, W.P. Appraisal of gold tailings at Tarcoola Blocks Mine. ML 4844, ML 4667.
- 85/43 Wildy, R.L. and Barnes, L.C. The opal industry in South Australia. Report No. 7. The 1984 survey of mining equipment and calculation of value of opal produced.
- 85/44 Alley, N.F. Age of palynofloras from the Algebuckina Sandstone from Afmeco CUR 5 ABMINGA Well, western Eromanga Basin.
- 85/48 Barnett, S.R. Murray Mallee town water supplies - a review to August 1985.
- 85/52 Alley, N.F. Palynological examination of samples from outcrop in the vicinity of Lake Eyre South.
- 85/54 Belperio, A.P. Site investigation in the vicinity of the Dean Rifle Range, Port Adelaide Estuary.
- 85/55 Alley, N.F. Preliminary report on the palynostratigraphy of SADME Toodla No. 1 Well, southwestern Eromanga Basin.
- 85/60 Farrand, M.G. Petrography of some building materials from the Murray Basin near Morgan, South Australia.
- 85/64 Selby, J. Storage and retrieval of drillhole information - a review.
- 85/65 Gillett, S. A bibliography of continental drift and plate tectonics relating to the Australasian region.



Coober Pedy Hospital.



Northerly view of ICI Quarry, Penrice.



Crusher bin, ICI Quarry, Penrice.



The Spencer Gulf Centre Fire Pistol Club has found a novel use for black jade from Cowell. This .44 magnum presentation revolver with a black jade handle, fashioned by Lyn Smith of Buckleboo, is valued at over \$3 000.

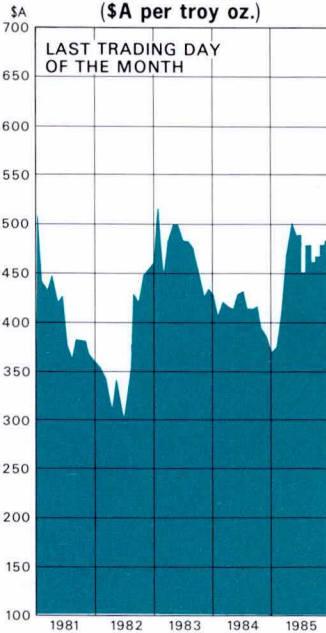
AUSTRALIAN LEAD PRICE
(\$A per tonne)



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



*Mr Ron Payne, Hon. Minister of Mines and Energy,
inspecting split slate, Mintaro Slate Quarry.*

PEOPLE IN THE INDUSTRY

HUGH BLISSETT has retired from the Regional Geology Branch SADME after twenty-two years service.

MALCOLM MESSENGER, formerly Director Energy SADME, has been appointed Chief Executive Officer, Pipelines Authority of South Australia.

HIS EXCELLENCY M. BERNARD FOLLIN, Ambassador of France, together with CHRISTIANE CASTAGNET-MELCHIOR, Consul-Commercial, visited Adelaide 9-11 October.

TIM O'LOUGHLIN, previously with Mobil Oil Australia Ltd in Melbourne, has commenced duties as Manager, Corporate and Government Affairs, Santos Ltd.

MIKE HANNELL, formerly General Manager, Petroleum Refineries (Australia) Pty Ltd, has transferred to Victoria to take up the position of General Manager of the PRA Altona Refinery. His successor is RUSSELL GILLESPIE.

GORDON DUNBAR has transferred from the Adelaide office of BP Minerals Australia to Perth where he is Manager WA Exploration for BP.

BOB DALGARNO has terminated employment with BP Minerals Australia and is operating as a Consulting Geologist, based in Beaumont, SA.

DAVID SHETLIFFE, Associate Director Strategic Management Group, Coopers & Lybrand WD Scott, has resigned to take appointment as Director of the Riverland Development Council.

FRASER AINSWORTH, Managing Director of Delhi Petroleum Pty Ltd, has been elected President of the South Australian Chamber of Mines Inc.

DAVID TENNENT, President AIMM, delivered his Presidential Address to the Adelaide Branch Annual General Meeting 28 November entitled 'Bridging the technological credibility gap'.

JOHN FENTON (State Mining Engineer), BRYAN JENKINS (Kinhill Stearns, Radiation and Environmental Consultant to RMS), MARK SONTER (Radiation Superintendent for RMS) and PHIL CROUCH (SA Health Commission) studied aspects of radiation monitoring and assessment in USA, Canada, France and UK in November.

BHP STEEL INTERNATIONAL GROUP has celebrated the Company's Centenary.

FARGHER MAUNSELL, Consulting Engineers & Planners (PHIL FARGHER, Director) have relinquished that trading name to assume that of MAUNSELL & PARTNERS Pty Ltd and are now located in Flinders Street, Adelaide.

ADELAIDE & WALLAROO FERTILIZERS LTD have moved from the City to join with the Works Offices at Francis Street, Port Adelaide.

SOUTH AUSTRALIAN CHAMBER OF MINES & ENERGY INC. (note change of name to include 'energy') is now located on the corner of King William and Waymouth Streets, Adelaide.

THE HASSELL GROUP are now located in new offices in Hindmarsh Square, Adelaide.

SOUTH AUSTRALIAN OIL AND GAS CORPORATION PTY LTD have relocated to Hindmarsh Square, Adelaide.

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

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

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