

# PETRATHERM LIMITED



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**REPORT FOR THE QUARTER  
ENDING 30 SEPTEMBER 2006**

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# HIGHLIGHTS

## 1. Corporate

- The Company completed the independent and comprehensive pre-feasibility study and economic model for the Paralana Geothermal Energy Project in South Australia. Concurrently, the Company revised its Strategic Business Plan, conducted a detailed competitor analysis and developed a clear commercialisation path for the Paralana Project
- Geothermal exploration and development Joint Venture opportunities are being explored, with discussions underway, and progressing well, with a number of interested third parties
- An Office Administrator, Ms. Tania Littlely, was appointed from July to coordinate the expanding activities of the Company.
- Petratherm relocated to at 105-106 Greenhill Road, Unley in Adelaide SA, to accommodate the growing needs of the Company.
- The Annual Financial Report and Statements were compiled in preparation for the AGM, to be held on 29 November 2006.
- At the end of the quarter the Company held \$1,572,000 in cash and net receivables.

## 2. Operations

- Following the very successful phase 2 drilling campaign at the Paralana geothermal test well, temperature measurements taken from the well at the end of August confirmed the Paralana Thermal Province as one of Australia's leading geothermal resources.
- Independent economic modelling studies indicate the Paralana resource could potentially support both small scale (7.5 MW to 30 MW) and large-scale base-load power (260 to 520 MW) generation, in the short and long term, respectively.
- Planning and preparatory work is under way for the drilling of the first deep - around 3.5 to 4.0 kilometres - production well at Paralana. This is the first step to establishing the underground heat exchanger within the insulating rock, i.e. Petratherm's HEWI Model (refer Operations Review).

# REVIEW OF OPERATIONS

## Corporate Activities

At the end of the quarter, the Company held \$1,572,000 in cash and net receivables. The net expenditure of \$982,000 during the quarter was primarily (\$804,000) associated with our exploration and evaluation program and in particular the successful Phase 2 drilling campaign at the Paralana Geothermal Test well (refer Operations Review).

The Company also completed the pre-feasibility study and economic model of the Paralana Geothermal Energy Project. That work, undertaken by independent consultants Ultra Systems Technology (UST), also incorporated independent reports from international specialist engineering consultants, GHD, and the local SA electricity transmission network company, ElectraNet Pty Ltd.

The Company reviewed and revised its Strategic Business Plan and in particular conducted a detailed competitor analysis and developed a clear and comprehensive commercialization path for the Paralana Geothermal Energy project. Importantly, those recent studies and assessments have confirmed Petratherm's expectations that, through its high quality projects, it is very well positioned to succeed in obtaining considerable market share in the face of competition from other geothermal energy projects and indeed alternate sources of power.

Joint Venture discussions with a number of interested third parties for the Paralana Geothermal Energy Project progressed considerably during the quarter, with the availability of the aforementioned, independent UST pre-feasibility study, economic competitor analysis and commercialisation plan.

An Office Administrator, Ms. Tania Littlely was appointed from July to coordinate the expanding activities of the Company. Tania is the newest member of the Company's five member staff and has commenced at an exciting juncture in the next phase of development of the Petratherm business, that includes considerable development at Paralana and expansion of the Company's project/tenement portfolio in SA and potentially other parts of Australia and overseas.

Late in September, Petratherm relocated into larger offices at 105-106 Greenhill Road, Unley in Adelaide, SA, to accommodate the growing needs of the Company.

## **Operations Review**

### **Paralana Project (GELs 156, 178, 180)**

#### **Geothermal Test Well**

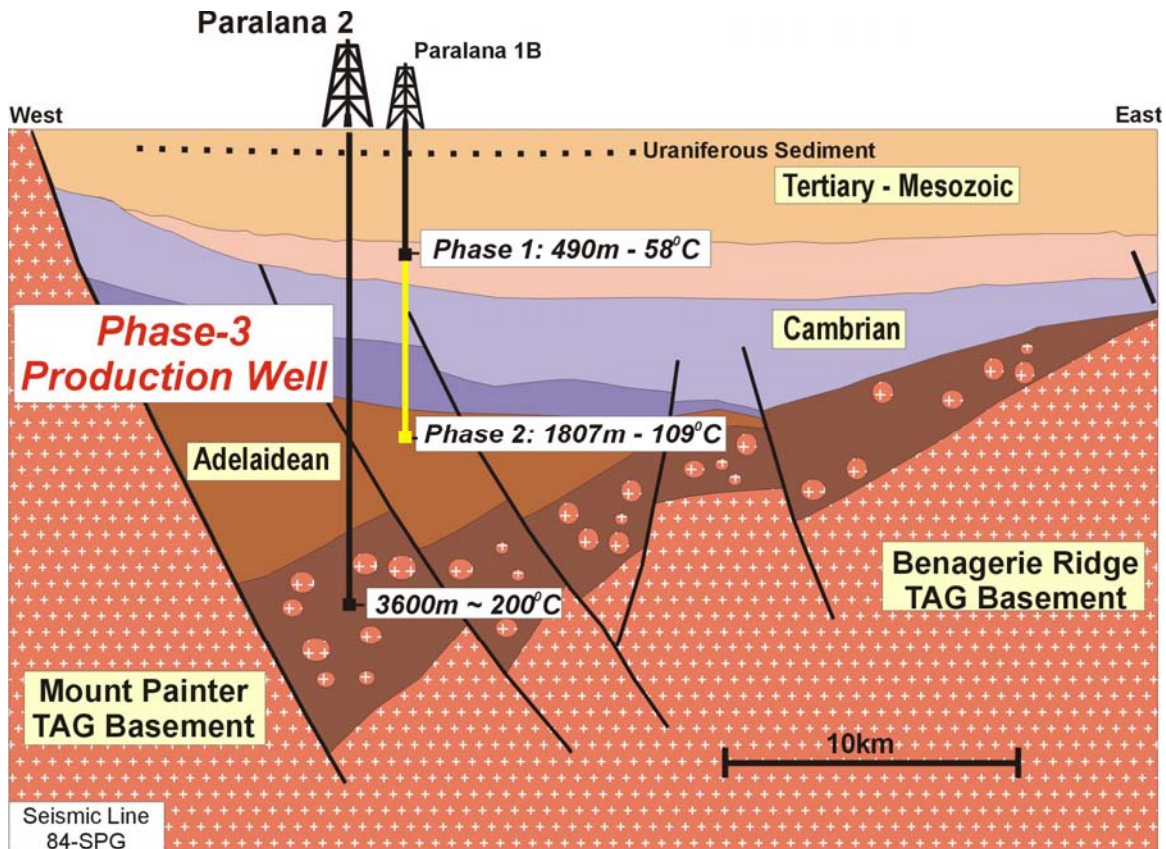
Temperature measurements taken late in August from the Paralana Geothermal Test Well indicate that there is potential for establishing an economic geothermal resource. A bottom-hole temperature of 109°C was recorded at 1,807 metres.

The average geothermal gradient for the entire hole is 50°C per kilometre. Petratherm's benchmark for economically viable electricity generation is a temperature of 200°C, or more, at a depth of 3.5 to 4 kilometres.

The temperature gradient in the deepest 200 metres of the current well (Paralana 1B) is the same as the average temperature gradient from the surface to 1807 metres, i.e. 50°C per kilometre. Continuation of the measured average geothermal gradient of 50°C per kilometre suggests that a temperature of 200°C should be attained at approximately 3.6 kilometres.

This result is amongst the best recorded in Australia and have not only confirmed the large heat resource at Paralana but vindicated Petratherm's unique Exploration Model which aims to identify shallow geothermal resources close to market.

Figure 1 below shows the measured and expected temperatures following each stage of drilling. Phases 1 and 2 are now complete and the Paralana Geothermal Test Well will become a seismic monitoring well for future reservoir development.



**Figure 1** Geological cross section of the Paralana Project Area, outlining the recent and future development program.

### **Paralana Pre-Feasibility Study**

A comprehensive economic pre-feasibility study has been undertaken for the Paralana Geothermal Energy Project by independent contracting firm Ultra Systems Technology Pty Ltd (UST). The UST report and economic model, summarises the work of a number of other expert consultant reports and includes all key assumptions that underpin the economic assessment. Other key contributors were :

- GHD, an international engineering firm providing an independent report on the geothermal generation plant, capital and operating costs, plant availability and efficiencies, production and injection well layout, and gross and net energy production after taking into account pumping loads.
- ElectraNet Pty Ltd, the local SA electricity transmission network service provider (owner), providing an estimate of various connection costs (capital and operating), transmission losses and marginal loss factors for the development associated with both the local and large-scale aspects of the commercialisation plan

The pre-feasibility study undertaken by UST includes a detailed list of key assumptions and a financial model that can be used to assess Petratherm's current and proposed projects and also competitor projects. The UST study and financial model have provided key insights into the economic drivers that underpin geothermal energy projects and that work will be utilised in the future development program for Paralana. Findings from this work indicate the Company is very well positioned to succeed in obtaining considerable market share in the face of competition from other geothermal projects and indeed alternative sources of power.

### **Paralana - Future Development Program**

The Company is well advanced in its preparations to develop a fluid circulation system at Paralana, which is the next milestone in the commercialisation plan. The Board of Petratherm has approved planning of two new deep wells (3.6 - 4kms, i.e. Phase 3) to establish the expected thermal resource, undertake circulation tests and establish an underground heat exchanger. Contract negotiations to manage this phase of work and procurement of a suitable drill rig are progressing well.

Petratherm has developed a unique strategy to lower risks and costs of both drilling and circulation processes by engineering the underground heat exchanger within the insulating rocks above the high heat producing granites (the HEWI model). Development of the HEWI model will involve drilling of both an injector and producer wells and the establishment of a robust heat exchanger (connecting fluid pathway) between the wells (Figure 2). The drilling and circulation work will be a precursor to constructing an electricity generation plant (of around 7.5 MW) to supply local demand.

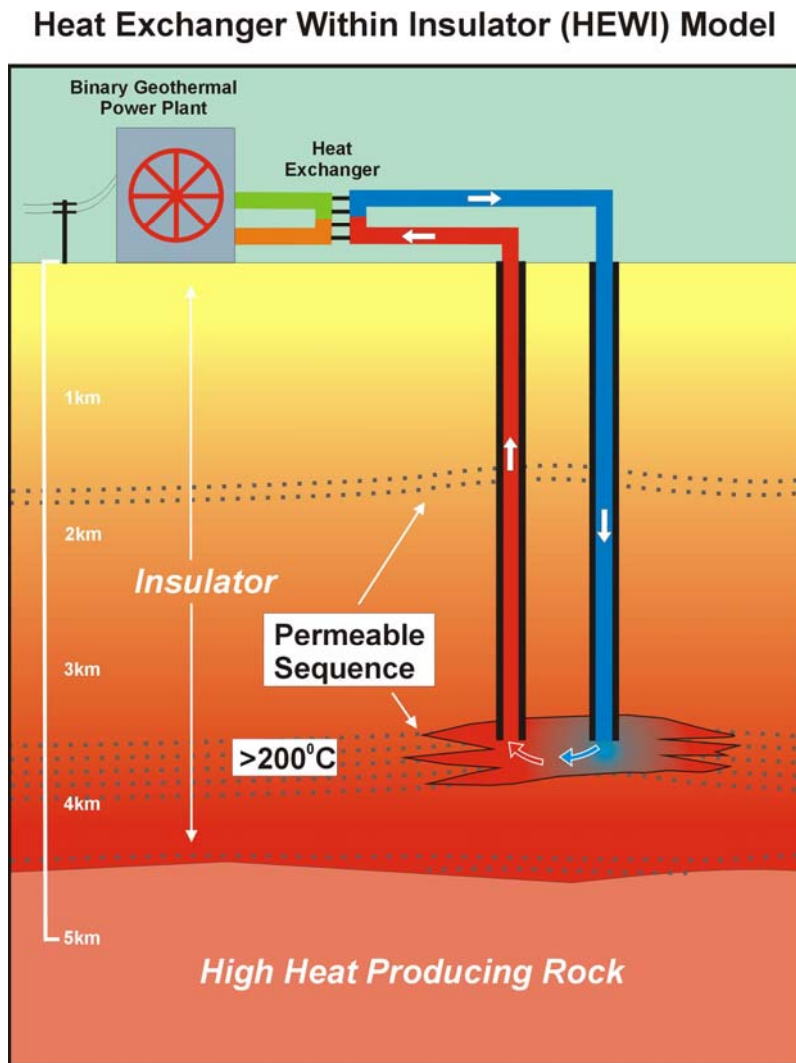
### **HEWI MODEL - Explained**

Existing technical difficulties in achieving a robust sub-surface heat exchanger generally relate to the practice of developing the sub-surface heat exchanger (also termed the reservoir or fluid circulation cell) within the heat producing granite rock. Granite is by nature an impermeable and mechanically strong rock. As a result it is inherently difficult for fluid to flow through granite, or to mechanically fracture the rock to develop an effective reservoir artificially. Once established a granite reservoir is also susceptible to chemical reactions (i.e. alteration) which clog fluid pathways and diminish the efficiency of the heat exchanger.

By comparison, the rocks which make up the overlying insulating sediments tend to have greater naturally occurring porosity and permeability, are mechanically weaker, and more susceptible to induced chemical and mechanical stimulation if enhancement of the reservoir is required. The behaviour of sedimentary reservoir rocks is better understood than that of granites and a range of techniques exist to control reactions and remove products of alteration from sedimentary reservoirs. Thus the long term utility of a

heat exchanger within the insulating sediments is likely to be greater and less costly than an equivalent granite heat exchanger, and more closely approximates the systems successfully used in petroleum reservoirs and conventional geothermal projects.

Extensive research and development undertaken by Petratherm suggests that clear technical advantages are afforded by developing the sub-surface heat exchanger within the overlying insulating sediments, rather than using the current practice of establishing the heat exchanger within the granite (Figure 2). Petratherm refers to this concept as the HEWI model (Heat Exchanger Within Insulator). HEWI provides a unique approach to the problem of engineering a robust sub-surface heat exchanger, through creative adaptation of proven techniques and tools from the petroleum and conventional geothermal industries to this new application.



**Figure 2** Schematic diagram demonstrating the basic concept of an Enhanced Geothermal System using the HEWI Model (Heat Exchanger Within Insulator)

## Paralana Commercialisation Strategy

As part of the Paralana pre-feasibility study work, the Company has been investigating the optimum commercial development (short and long term) path for the Paralana site. Paralana is favourably located just 11 kilometres from the Beverley Uranium Mine. The electricity needs of the mine are significant and are expected to grow substantially should nearby uranium deposits be exploited in the future.

Petratherm plans to develop an initial small scale plant of around 7.5MW to meet the local supply needs and has examined the potential for meeting growing local electricity demand of potentially, up to 30MW.

In addition, Petratherm has commenced examining the potential for supplying large scale, base load power into the National Electricity Market region of South Australia and is targeting two entry points, namely Port Augusta and Olympic Dam. The large scale options, under examination include developments that range between 260MW and 520MW and potentially two high voltage transmission lines (Figure 3).

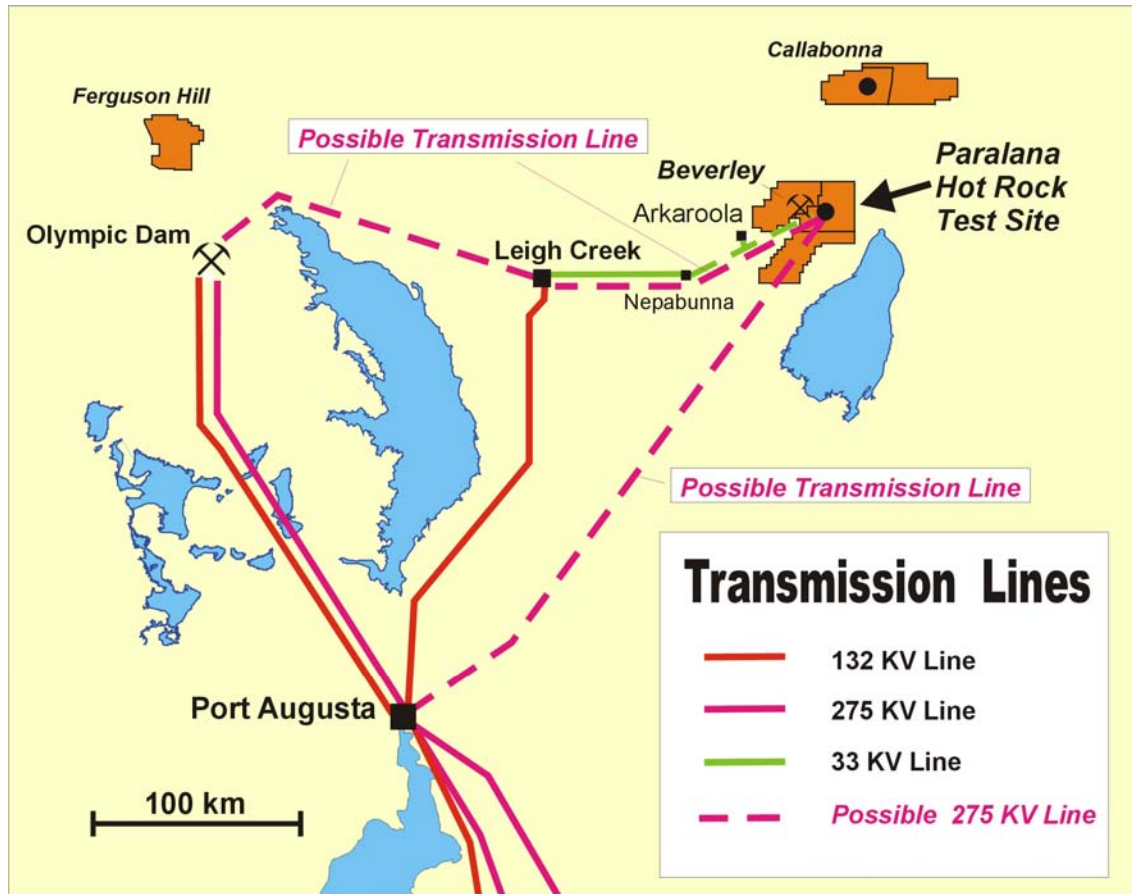


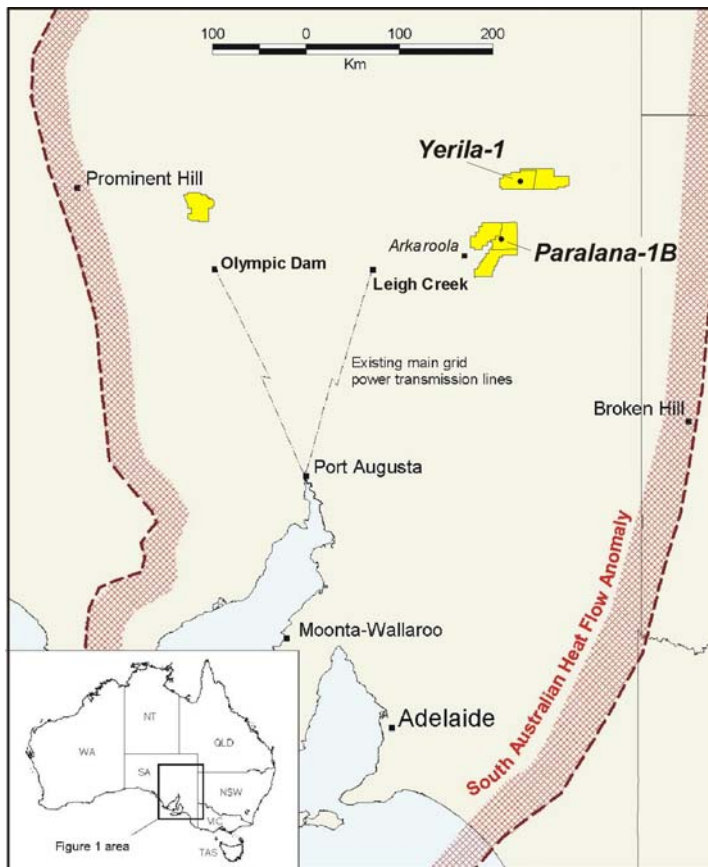
Figure 3 – Large Scale, Base Load Supply Options

## Callabonna Project (GELs 157,180)

The Callabonna geothermal body, defined by the regional gravity low that clearly marks its boundary, spans an area of approximately 1200 square kilometres immediately north-northeast of the outcropping Mt Painter and Mt Babbage Inliers (Figure 4). Petratherm holds two licences covering 1000 square kilometres over the centre of this body.

Geothermal test well, Yerila-1, was spudded in early in August 2005. The hole was drilled to 693.5 metres and a temperature of 64°C was measured at a depth of 675 metres. Correcting for near surface thermal effects in the well bore, the overall thermal gradient determined from the data is at least 68°C per kilometre. Based on this gradient, temperatures in excess of 200°C are possible at a depth of 3.5 - 4 kilometres, consistent with Petratherm's business model.

In June 2006, the Company undertook a trial magneto-telluric ground survey over the centre of the Callabonna body. The test work was designed to map the surface of the potential granite heat source at depth. Survey analysis during the September quarter clearly defined the top of the granite body. This data along with the temperature gradient data is now being used to better constrain the thermal model for Callabonna.



**Figure 4 – Petratherm Project Sites**

## **Ferguson Hill (GEL 158)**

Ferguson Hill represents the informally termed Radiogenic Iron Oxide (RIO) model for hot rock geothermal energy. This exploration model has its focus on areas where ancient volcanic and granitic rocks have released hot sub-surface fluids that have permeated through the surrounding rocks and consequently altered their composition. Heat production from RIO bodies can be as much as 50 times greater than those from average granites. Under favourable conditions, temperatures as high as 200°C may be generated at depths of around 3km.

Much of the work conducted at Ferguson Hill has consisted of consolidating and interrogating existing datasets to ensure a comprehensive appraisal of the tenement. Expected future operations will involve implementation of a trial magneto-telluric survey over the area in order to model the subsurface and constrain the depth of the sedimentary cover and basement. This technique has recently been successfully used at Petratherm's Paralana and Callabonna tenements, and can provide valuable information useful for selecting final drilling targets.

## **Other Project Developments**

During the quarter the Company continued to assess the potential to expand its Project portfolio in South Australia, Victoria and Queensland. In addition, overseas project opportunities, where the geology and renewable energy policies are conducive to commercial geothermal energy projects, remain under examination.

**APPENDIX 5B**  
**Mining exploration entity quarterly report**

**PETRATHERM LTD**

**ABN 17 106 806 884**

Quarter ended

30-Sep-06

**Consolidated statement of cash flows**

	Current quarter	Year to date (3 months)
	\$A'000	\$A'000
<b>Cash flows related to operating activities</b>		
1.1 Receipts from product sales and related debtors	-	-
1.2 Payments for (a) exploration and evaluation	(804)	(804)
(b) development		
(c) production		
(d) administration	(182)	(182)
1.3 Dividends received		
1.4 Interest and other items of a similar nature received	7	7
1.5 Interest and other costs of finance paid		
1.6 Income taxes paid		
1.7 Other - PACE Funds Received	-	-
1.7 Other - Rebates		
<b>Net Operating Cash Flows</b>	<b>(979)</b>	<b>(979)</b>
<b>Cash flows related to investing activities</b>		
1.8 Payment for purchases of: (a) prospects	-	-
(b) equity investments	-	-
(c) other fixed assets	(3)	(3)
1.9 Proceeds from sale of: (a) prospects	-	-
(b) equity investments	-	-
(c) other fixed assets	-	-
1.10 Loans to other entities	-	-
1.11 Loans repaid by other entities	-	-
1.12 Other (provide details if material)	-	-
<b>Net Investing cash flows</b>	<b>(3)</b>	<b>(3)</b>
1.13 Total operating and investing cash flows (carried forward)	<b>(982)</b>	<b>(982)</b>

1.13 Total operating and investing cash flows (brought forward)	(982)	(982)
<b>Cash flows related to financing activities</b>		
1.14 Proceeds from issues of shares, options, etc	-	-
1.15 Proceeds from sale of forfeited shares	-	-
1.16 Proceeds from borrowings	-	-
1.17 Repayment of borrowings	-	-
1.18 Dividends paid	-	-
1.19 Other (Share issue costs)	-	-
<b>Net financing cash flows</b>	0	0
<b>Net increase (decrease) in cash held</b>	(982)	(982)
1.20 Cash at beginning of quarter / year to date	2,554	2,554
1.21 Exchange rate adjustments to item 1.20	-	-
1.22 <b>Cash at end of quarter</b>	1,572	1,572
<b>Payments to directors of the entity and associates of the directors</b>		
<b>Payments to related entities of the entity and associates of the related entities</b>	Current quarter \$A'000	
1.23 Aggregate amount of payments to the parties included in item 1.2	35	
1.24 Aggregate amount of loans to the parties included in item 1.10	-	
1.25 Explanation necessary for an understanding of the transactions		
Directors' fees, superannuation for the Quarter		
<b>Non-cash financing and investing activities</b>		
2.1 Details of financing and investing transactions which have had a material effect on consolidated assets and liabilities but did not involve cash flows		
Nil		

2.2 Details of outlays made by other entities to establish or increase their share in projects in which the reporting entity has an interest

Nil
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**Financing facilities available**

3.1 Loan facilities

3.2 Credit standby arrangements

Amount available \$A'000	Amount used \$A'000
-	-
-	-

**Estimated cash outflows for next quarter**

4.1 Exploration and evaluation

4.2 Development

Total

\$A'000
202
-
202

**Reconciliation of cash**

Reconciliation of cash at the end of the quarter (as shown in the consolidated statement of cash flows) to the related items in the accounts is as follows.

5.1 Cash on hand and at bank

5.2 Deposits at call

5.3 Bank overdraft

5.4 Other (provide details) - 30 and 60 day term deposits

**Total: cash at end of quarter (item 1.22)**

Current quarter \$A'000	Previous quarter \$A'000
235	354
1,337	2,200
-	-
-	-
1,572	2,554

**Changes in interests in mining tenements**

6.1 Interests in mining tenements relinquished, reduced or lapsed

6.2 Interests in mining tenements acquired or increased

Tenement reference	Nature of interest (note 2)	Interest at beginning of quarter	Interest at end of quarter
	NIL		
	NIL		

**Issued and quoted securities at end of current quarter**

	Total number	Number quoted	Issue price per security (cents)	Amount paid up per security (cents)
7.1 <b>Preference securities</b> <i>(description)</i>				
7.2 Changes during quarter (a) Increases through issues (b) Decreases through returns of capital, buy-backs, redemptions				
7.3 <b>Ordinary securities</b>	43,375,001	25,250,000	Fully Paid	Fully Paid
7.4 Changes during quarter (a) Increases through issues (b) Decreases through returns of capital, buy-backs				
7.5 <b>Convertible debt securities</b> <i>(description)</i>				
7.6 Changes during quarter (a) Increases through issues (b) Decreases through securities matured, converted				
7.7 <b>Options</b> <i>(description and conversion factor)</i>	5,000,000 2,600,000 2,000,000 650,000 40,000 50,000 30,000 40,000 200,000 200,000 50,000 750,000 750,000		<u>Excise Price</u> 20 cents each 20 cents each 20 cents each 20 cents each 32 cents each 32 cents each 40 cents each 40 cents each 32 cents each 37 cents each 32 cents each 32 cents each 37 cents each	<u>Expiry Date</u> 24/03/2009 4/04/2009 26/07/2009 27/07/2009 23/09/2009 15/12/2009 31/12/2010 5/02/2011 21/05/2011 21/05/2011 29/05/2011 30/04/2012 30/04/2013
7.8 Issued during quarter				

7.9 Exercised during quarter				
7.10 Cancelled during quarter				
7.11 <b>Debentures</b> <i>(totals only)</i>				
7.12 <b>Unsecured notes</b> <i>(totals only)</i>				

### Compliance statement

- 1.0 This statement has been prepared under accounting policies which comply with accounting standards as defined in the Corporations Act or other standards acceptable to ASX (see note 4).
- 2.0 This statement does give a true and fair view of the matters disclosed.

*Donald Stephens*

Sign here:..... Date: 26/10/2006  
Company Secretary

Print name: DONALD STEPHENS  
.....

### Notes

- 1.0 The quarterly report provides a basis for informing the market how the entity's activities have been financed for the past quarter and the effect on its cash position. An entity wanting to disclose additional information is encouraged to do so, in a note or notes attached to this report.
- 2.0 The "Nature of interest" (items 6.1 and 6.2) includes options in respect of interests in mining tenements acquired, exercised or lapsed during the reporting period. If the entity is involved in a joint venture agreement and there are conditions precedent which will change its percentage interest in a mining tenement, it should disclose the change of percentage interest and conditions precedent in the list required for items 6.1 and 6.2.
- 3.0 **Issued and quoted securities** The issue price and amount paid up is not required in items 7.1 and 7.3 for fully paid securities.
- 4.0 The definitions in, and provisions of, *AASB 1022: Accounting for Extractive Industries* and *AASB 1026: Statement of Cash Flows* apply to this report.
- 5.0 **Accounting Standards** ASX will accept, for example, the use of International Accounting Standards for foreign entities. If the standards used do not address a topic, the Australian standard on that topic (if any) must be complied with.