Geothermal Resources Ltd

ABN 45 115 281 144

ANNUAL REPORT

GEOTHERMAL EXPLORATION LICENCES 249 AND 250

FOR THE PERIOD ENDING

31 OCTOBER 2008

February 2009

TABLE of CONTENTS

LIST of TABLES

LIST of FIGURES

1. Introduction

GELs 249 and 250 were granted to Geothermal Resources Limited on 1 November 2006.

An overall or 'grouped' exploration approach to these two GELs has been accepted by PIRSA.

In the first year of tenure a data review was undertaken. This work confirmed the original geological concept of buried granite bodies being progressively buried under the northern margin of the Otway Basin. Temperature gradient modelling, based on the work of Beardsmore and Matthews (2007), indicated a comparatively high geothermal gradient in the region of these GELs.

This is the second year of tenure and the minimum work commitment was to carry out thermal resource modelling, further data interpretation, and location of optimal drill sites. All of these have been achieved.

From 1st November 2008 a variation in the minimum work requirements for these GELs has been approved by Dr. Barry Goldstein, Director Petroleum, Minerals and Energy Resources, PIRSA. The changed work requirements are presented in Table 1 of this document. Further, a change in the grouping of Geothermal Resources Otway basin GELs was also approved. Specifically, all of Geothermal Resources Otway basin GELs will be grouped as one; namely, GELs: 214, 215, 216, 217, 249 and 250.

2. Work Completed

In accordance with the proposed work program in Table 1, Geothermal Resources has updated its GIS data base by purchasing from PIRSA all available seismic data for the Otway basin, along with all open file Well Completion Reports. Interpretation of this data continued to confirm the original premises on which the GELs were applied for and greatly assisted with the preliminary siting of several drill holes to a planned depth of 500 metres.

The acquisition and reinterpretation of seismic data for the whole of the Otway basin has been particularly helpful. Specifically, the transformation of the raw 2 dimensional seismic data into 3 dimensions has enabled Geothermal Resources to more accurately map: depth to basement/granite, location of the Pretty Hill Formation, and the complex fracture system. Geothermal Resources is now working with two viable models for a geothermal power source in the Otway Basin; namely, the traditional 'hot dry rock' model, and now the 'hot aquifer' model. The 'hot dry rock' model requires basement granite at greater than 3 km depth, covered by thermally insulating sediments. The 'hot aquifer model' involves porous, wet, sandstones at depths of 3 to 4 km such that they, and the water within, have been heated to around 150° C by the even more deeply buried granites. For each model, vertical fault regimes are to be avoided to minimize the likelihood of vertical dissipation of heat.

Reinterpretation of the seismic data linked to the stratigraphy, combined with gravity and aeromagnetic modelling has helped to select zones within these GELs that fit key requirements of the models.

Well Completion Report data has also proven to be particularly useful. First, the bottom of hole temperatures, when combined with the Bureau of Meteorology surface temperatures have enabled the modelling of thermal gradients. Second, a three dimensional model of sediments with the required porosity and permeability, such as the Pretty Hill Formation, is being developed. Thirdly and finally, depths of Tertiary aquifers that are likely to affect shallow temperature data (500 metres or less) have been assessed.

The initial 500m drillholes will aim to go beyond the deepest Tertiary aquifers in the Dilwyn Formation and penetrate into the underlying Cretaceous sediments as far as possible in order to achieve reliable bottom of hole temperature measurements that are truly representative of the geothermal gradient in the region.

Drilling though these aquifers requires considerable expertise. The consequences of having drilling problems are extreme cost blow outs and unsuccessful holes, as has been the experience of other geothermal explorers in the region. Some considerable effort and time has been expended in interviewing and selecting the best drilling contractor and in formulating a suitable casing approach for the 500 metre holes. As a result, Thompson Drilling have now been contracted to drill the series of 500 metre holes, starting in the second half of 2009.

Now that the hole sites, drilling contractor and timing are largely fixed, work has begun on preparation of an Activity Notification document for submission to PIRSA, which is the next major pre-drilling task.

Extensive experimentation with various digital temperature probes for use in the shallow holes has been conducted. Water pressure at a depth of 500 metres is fifty one times atmospheric pressure, which means the temperature probe must be housed within a strong casing. Trials with four different types of temperature probe and three different housing designs have enabled development of a system that reliably and accurately allows measurement and recording of temperatures in drillholes currently to 1800 metres depth and to temperatures of up to 140° Celsius. These successful temperature probe developments were finally achieved and tested in late October 2008, meaning that no further temperature data has been generated for these GELs during the reporting period. Additional borehole temperature measurements, using the new temperature probes, will be achieved in the next year.

3. Reporting Against Requirements of the Petroleum Act 2000

(a) Summary of regulated activities conducted under the licence during the year

Geothermal Resources did not embark on any regulated activities under the Petroleum Act 2000 in GELs 249 and 250 during the period.

(b) Report for the year on compliance with the Act, these regulations, the licence and any relevant statement of environmental objectives

As no regulated activities were undertaken much of the regulations have no bearing on this Annual Report. The proposed temperature logging work program was not carried out as a consequence of probe and barrel problems.

All obligations were complied with, other than the late submissions for the annual report. The annual report was not submitted within 2 months after the end of the licence year as required by Regulation 33.

(c) Actions to rectify non-compliance with obligations imposed by the Act, these regulations or the licence, and to minimise the likelihood of the recurrence of any such non-compliance

A new staff member has been appointed.
The new staff member now knows the regulations.

The temperature probe and housing problems have now been solved. Testing, and cross referencing with third party data, has indicated that Geothermal Resources system now works both accurately and precisely. It is likely that a modified program of borehole temperature logging will be implemented by Geothermal Resources in Year 3.

(d) A summary of any management system audits undertaken during the relevant licence year, including information on any failure or deficiency identified by the audit and any corrective action that has, or will be, taken

Not applicable.

(e) List all reports and data relevant to the operation of the Act during the relevant licence year

None.

(f) Report of incidents reportable to the Minister under the Act and regulations

None reported.

(g) Report on any reasonably foreseeable threats that reasonably present, or may present, a hazard to facilities or activities under the licence, and a report on any corrective action that has, or will be, taken.

No threats identified.

(h) Operations proposed for the ensuing year

During Year 3 it is proposed to complete temperature logging of as many open holes as possible (with TD exceeding 300 metres). Land access, poor coordinates and cover will mean that some holes will not be able to be logged.

In addition, it is proposed to drill five holes to 500 metres depth for temperature logging, stratigraphic correlation and thermal insulation purposes. These holes have been sited at optimal positions to test the geothermal models. This data should confirm 'hot spots' that are worth following up with deeper drilling.

4. Expenditure for Year 2

Commercial in Confidence

TABLE 1: Proposed Work Programs for GELs 249 & 250

The following programs are nominally for each GEL, but depending on where most encouragement is obtained a proportion of the program may be diverted to other adjacent GELs, as the entire GEL area will be managed as one project. Note that the programs in each year subsequent to Year 1 are subject to continuous review and may be expanded if results are encouraging.

Year of Term of Licence	Minimum Work Requirements	Work Completed
One	• Review of existing geophysical and drilling data; and • 3D modelling to determine subsurface geology and location of possible granite bodies. *Year 1 work program to be conducted anywhere within the boundaries GELs 249 and 250.*	• Extensive review of existing geophysical and drilling data. • 3D Modelling of subsurface geology including granite basement.
Two	• Thermal resource modelling and rock fracture studies; and • Interpretation of all data to determine optimum drill site locations. *Year 2 work program to be conducted anywhere within the boundaries GELs 249 and 250.*	• Selection of 5 optimum drill sites based on seismic, stratigraphic, temperature, and other data considerations.
Three	• 5 shallow drill holes to an aggregate depth of at least 1500 metres (subject to ground conditions) to obtain accurate bottom of hole temperature measurements; and • 3D modelling of variations in regional temperature gradients based on drilling results. *Year 3 work program to be conducted anywhere within the boundaries GELs 214, 215, 216, 217, 249 and 250.*	

Four	• Assessment of Year 3 shallow drilling results and decision on whether to drill further shallow holes or a deeper pilot hole to 1500m depth. *Year 4 work program to be conducted anywhere within the boundaries GELs 214, 215, 216, 217, 249 and 250.*	
Five	• Review of pilot hole results (if drilled) and decision on drilling production wells. *Year 5 work program to be conducted anywhere within the boundaries GELs 214, 215, 216, 217, 249 and 250.*	

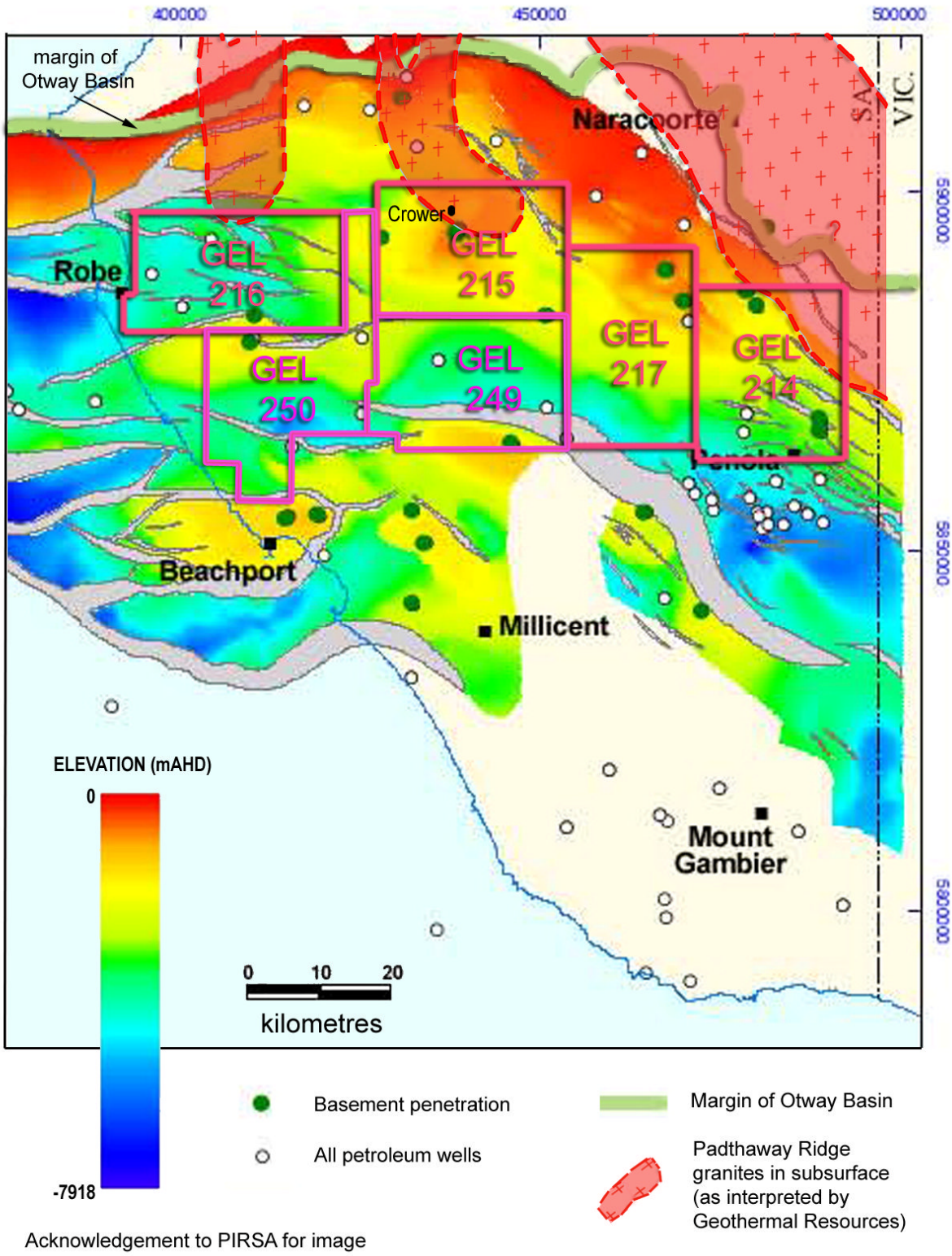

Figure 1. Location and geological interpretation of GELs 249 and 250

Geothermal Resources Ltd ABN 45 115 281 144
63 Conyngham Street
Glenside, South Australia 5065
Ph : 61 8 8338 9292
Fax : 61 8 8338 9293

3 December 2008

TABLE 2

EXPENDITURE AND ACTIVITIES REPORT
GEL's 249 & 250

For twelve months ending : 31 October 2008
Operator : Geothermal Resources Ltd

Summary of Activities	Expenditure
Licence fees	**5,630**
Research of open file reports	**9,240**
Computer data base GIS compilation	**10,206**
Interp of geophysical data, including seismic traverses	**25,678**
Assessment and engagement of drilling contractors	**2,280**
Temperature probe testing	**5,335**
Preparation of Activity Notification document	**480**
Aboriginal heritage site clearance survey	
Reporting, Administration, Office Support, Communications	**2,721**
TOTAL EXPENDITURE FOR THE PERIOD :	**61,570**