

***Panax Geothermal Limited***  
ABN 89 122 203 196

Annual Report

*24 July 2011 – 23 July 2012*

*Geothermal Exploration Licences*

*GEL 170 – Suspended*

*GEL 212 – Licence Year 1*

*GEL 223 – Licence Year 5*

*GEL 484 – Licence Year 3*

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- GEL 484

Year 2

## 2 Permit Summary

For the duration of the licence year, licensees for the Geothermal Exploration Licences (GEL's) were:

Licence	Owner/s	Interest
GEL 170	Scopenergy Pty Ltd	100%
GEL 212	Scopenergy Pty Ltd	100%
GEL 223	Osiris Energy Pty Ltd	100%
GEL 484	Osiris Energy Pty Ltd	100%

Both Scopenergy Pty Ltd and Osiris Energy Pty Ltd are 100% owned by Panax Geothermal Ltd.

Key permit changes during the year were:

1. GEL 170 was suspended from 24 July 2011 to 23 July 2012, extending the termination date to 23 July 2016.
2. On 5th July 2011, GEL 212 was renewed for 5 years terminating on 23rd July 2016.

The four Licences, GELs 170, 212, 223 and 484 are referenced as a group of licences with one set of licence obligations, and common anniversary dates. However, these licences differ in which year of their five year licence life cycle they are in.

A relinquishment and renewal application for a new 5 year term for GEL 223 was submitted.

Table 1 reconciles commitments and suspension with the licences' five year terms.

**Table 1. Reconciliation of Licence Years and Work Programme (after suspension)**

Licence dates	Licence Year				Minimum Work Program
	GEL 170	GEL 212	GEL 223	GEL 484	
24 July 2010 – 23 July 2011	Year 1	Year 5	Year 4	Year 2	• Geological and geophysical review
24 July 2011 – 23 July 2012	GEL 170 Suspended	Year 1	Year 5	Year 3	• Geological and geophysical review
24 July 2012 – 23 July 2013	Year 2	Year 2		Year 4	• Geological and geophysical review
24 July 2013 – 23 July 2014	Year 3	Year 3		Year 5	• Geological and geophysical review
24 July 2014 – 23 July 2015	Year 4	Year 4			• Geological and geophysical review
24 July 2015 – 23 July 2016	Year 5	Year 5			• Drill one deep well or re-complete an existing suitable well

The following table displays the minimum work program (after all variations) and the actual work completed up until the end of the current licence period.

**Table 2. Final work program and work completed  
(as of end of current reporting period) by licence year.**

<b>Licence dates</b>	<b>Licence Year</b>	<b>Minimum Work Program</b>	<b>Actual Work Undertaken</b>
24 July 2010 – 23 July 2011	GEL 170 - Year 1 GEL 212 – Year 5 GEL 223 – Year 4 GEL 484 – Year 2	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>
24 July 2011 – 23 July 2012	GEL 170 Suspended GEL 212 – Year 1 GEL 223 – Year 5 GEL 484 – Year 3	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>
24 July 2012 – 23 July 2013	GEL 170 - Year 2 GEL 212 – Year 2 GEL 484 – Year 4	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
24 July 2013 – 23 July 2014	GEL 170 - Year 3 GEL 212 – Year 3 GEL 484 – Year 5	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
24 July 2014 – 23 July 2015	GEL 170 - Year 4 GEL 212 – Year 4	<ul style="list-style-type: none"> <li>• <i>Geological and geophysical review</i></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>
24 July 2015 – 23 July 2016	GEL 170 - Year 5 GEL 212 – Year 5	<ul style="list-style-type: none"> <li>• <i>Drill one deep well or re-complete an existing suitable well</i></li> </ul>	<ul style="list-style-type: none"> <li>•</li> </ul>

### **3 Regulated Activities**

#### **Drilling and Related Activities**

*No regulated activities undertaken in the licence reporting period*

#### **Seismic Data Acquisition**

*No regulated activities undertaken in the licence reporting period*

#### **Seismic Data Processing and Reprocessing**

*No regulated activities undertaken in the licence reporting period.*

#### **Geochemical, Gravity, Magnetic and other surveys**

*No regulated activities undertaken in the licence reporting period.*

#### **Processing, inversion and Interpretation**

*No regulated activities undertaken in the licence reporting period*

#### **Post-survey activities**

*No regulated activities undertaken in the licence reporting period*

#### **Production and Processing**

*No regulated activities undertaken in the licence reporting period*

#### **Pipeline/Flowline Construction and Operation**

*No regulated activities undertaken in the licence reporting period*

#### **Preliminary Survey Activities**

*No regulated activities undertaken in the licence reporting period*

### **4 Non-regulated Activities**

A summary of the work undertaken in the licence period is below. The Chief Geologist undertook the following actions:

- A review of Panax's Limestone Coast acreage was commenced with a view to identifying the best areas from a temperature and permeability point of view to concentrate on for future exploration. Modelling of existing temperature, thermal conductivity, heat flow data, porosity and permeability, water availability and other factors was undertaken with the aim of updating the geothermal prospectivity of our acreage.
- The completion of a study into the heat flow of the region with an aim to understand the reasons for the surface heat flow distribution. This data will allow better understanding of the tectonic, geological and geothermal energy potential of the Otway Basin.
- Programmes have been initiated with key research bodies at the University of Adelaide, and Melbourne. The aim of these was to establish research partnerships whereby the best

minds in research can focus on the results of Salamander 1 and collaborations can be made on the next steps in the region.

## **5 Compliance Issues**

### **Licence and Regulatory Compliance**

Other than as referred to below, all material and significant licence, regulatory and SEO requirements have been fulfilled.

### **Regulatory Non-Compliance**

Not applicable.

### **Management System Audits**

Not applicable.

### **Report and Data Submissions**

*A Geothermal Systems Assessment (GSA) was conducted on the Panax acreage. This report was completed by Hot Dry Rocks Pty Ltd, and submitted to Panax in April 2012. The report is attached as Appendix 2, and is commercial in confidence.*

### **Incidents**

*On 3<sup>rd</sup> July 2012 a gas leak on the Salamander 1 wellhead was detected by a representative from DMITRE during a site inspection and second smaller leak was identified by Panax during a subsequent inspection.*

*The following were undertaken:*

- a) Both leaks were plugged;*
- b) The facility was fully inspected; and*
- c) A report outlining the findings of the inspection and an ongoing management plan was submitted following the end of the permit year and subsequently approved by DMITRE.*

*There were no other incidents relating to health, safety, or community related matters.*

### **Threat Prevention**

*There are no foreseeable threats to report in the permit year.*

### **Future Work Program**

*The future work programme for the Otway Basin tenements includes the following:*

- The results and recommendations from the Otway GSA are being reviewed by Panax. We have two additional prospects, identified by the GSA, which can now be the subject of*

*further assessment and they now become assets that Panax can look to potential JV partners for investment in. Principal findings of the GSA were as follows:*

1. Preliminary 1D heat flow modelling suggests that the basin exhibits slightly higher heat flow than expected for similarly aged sedimentary basins.
  2. HDR constructed a single 3D earth model of the entire Panax Otway acreage. Heat flow estimates derived as well as predicted and measured thermal conductivity, and heat generation data were incorporated into this earth model.
  3. Porosity and permeability data sourced from a number of petroleum wells in the Otway Basin suggest five intervals within the Cretaceous section that may act as a suitable host for an HSA project: the Windermere Sandstone Member, Katnook Sandstone, intra-Laira Formations sandstone, Pretty Hill Formation and Deep Crayfish Sub-group sandstone.
  4. The good to excellent reservoir properties reported in many petroleum wells need to be qualified since the trapped hydrocarbons have inhibited groundwater flushing and thus may have preserved porosity and permeability.
  5. HDR incorporated the relative transmissivity and predicted mean temperature of the two groupings of potential HSA reservoirs to create two 'prospectivity' maps. The GSA highlights three regions of interest outside the Penola Trough worthy of further investigation, all lying within GEL 170 (two within the Tantanoola Trough and one in the Rivoli Trough). Temperature and transmissivity predictions in these areas suggest they are the most attractive in terms of power generation potential.
- *A heat flow study was conducted by the Chief Geologist. This work sought to map the heat flow in the Limestone Coast area and explain the surface heat flow pattern in terms of the geology of the region. This work was completed in early 2012, and is currently being reviewed internally.*
  - *Panax is collaborating with the University of Adelaide Australian School of Petroleum (ASP) on a post well review of Salamander reservoir quality. This work commenced in March 2012.*
  - *Also in March 2012, Panax entered into a research partnership with the South Australian Museum to look at diagenesis modelling in water dominated reservoirs. This work also commenced in March 2012.*
  - *Panax has collaborated with the Universities of Adelaide, Monash, Melbourne, CSIRO, Geodynamics and Origin Energy to put in a bid to ARENA. The bid will focus on analysis of Salamander, and will try and address the predictability of flow ahead of drilling in HSA terrains. As at the time of writing of this report the consortium is yet to know whether the bid has been successful.*
  - *Panax intends to make available all data collected to date, as well as the Salamander 1 well itself, to the research community in the soon-to-be-established Geothermal CRC.*
  - *Panax announced in February 2012 that it has established a research partnership with the University of Melbourne as part of the Australian Geophysical Observatory System (AGOS). The scope of works will cover the following (non-regulated) activities:*
    - *The deployment of AGOS borehole seismometers in existing water wells near Salamander 1, and deployment of surface seismometers in this region to monitor background.*

- Logging of retained core samples (from offset wells) at the University of Melbourne using the AGOS multi scanner core logger (density, p-wave velocity, resistivity, magnetic susceptibility and natural gamma) and optical and traditional thermal conductivity.

The University of Adelaide department of Geology and Geophysics has under development deployable MT tools, developed through AuScope NCRIS/AGOS funding, that can be used for surface modelling and monitoring of resistivity-based anomalies.

#### **4 Expenditure Statement**

Please refer to Appendix 1 for the expenditure statement for the current reporting period.

*THE ATTACHED FINANCIAL INFORMATION IS NOT FOR PUBLICATION*