

Panax Geothermal Limited
*(renamed **Raya Group Limited** from 6 May 2013)*
ABN 89 122 203 196

Annual Report

24 July 2012 – 23 July 2013

*Geothermal Exploration Licence
GEL 223 – Term 2 Licence Year 1*

CONTENTS

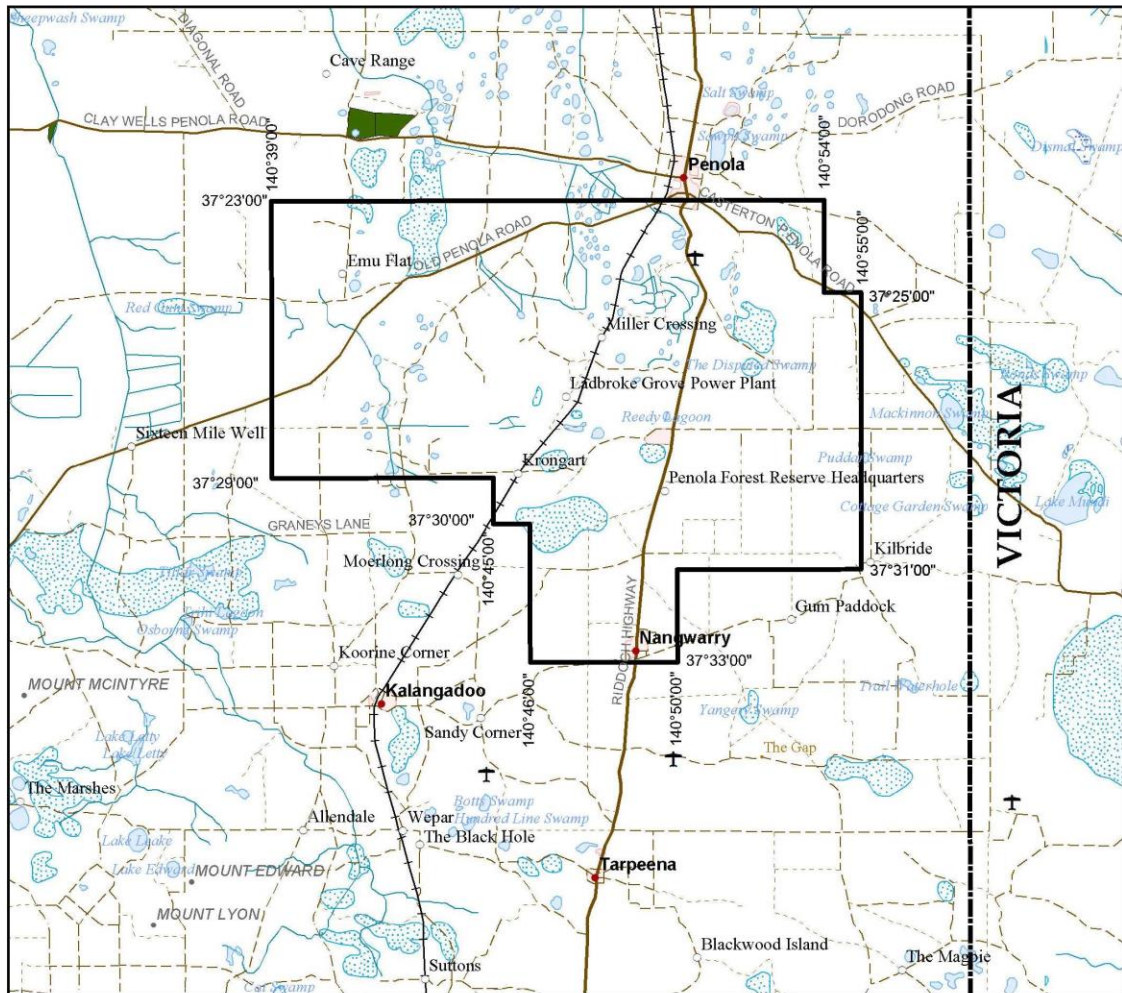
Page No.

1	INTRODUCTION	3
2	PERMIT SUMMARY	4
3	REGULATED ACTIVITIES.....	5
	<i>Drilling and Related Activities</i>	5
	<i>Seismic Data Acquisition</i>	5
	<i>Seismic Data Processing and Reprocessing</i>	5
	<i>Geochemical, Gravity, Magnetic and other surveys</i>	5
	<i>Processing, inversion and Interpretation</i>	5
	<i>Post-survey activities</i>	5
	<i>Production and Processing</i>	5
	<i>Pipeline/Flowline Construction and Operation</i>	5
	<i>Preliminary Survey Activities</i>	5
4	NON-REGULATED ACTIVITIES	6
5	COMPLIANCE ISSUES.....	6
	<i>Licence and Regulatory Compliance</i>	6
	<i>Regulatory Non-Compliance</i>	6
	<i>Management System Audits</i>	6
	<i>Incidents</i>	7
	<i>Threat Prevention</i>	7
	<i>Future Work Program</i>	7
6	EXPENDITURE STATEMENT	8
APPENDIX 1	EXPENDITURE STATEMENT	9
APPENDIX 2	SALAMANDER WELL STATUS REPORT	10

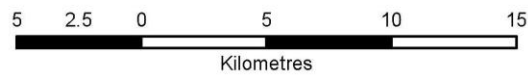
1 Introduction

The map below outlines the location of Geothermal Exploration Licence 223 that is held by Osiris Energy Limited, which is owned by Panax Geothermal Limited and which on 6th May 2013 was renamed the Raya Group Limited.

GEL 223



SCALE 1:250 000



This report details the work conducted on GEL 223 during the year 24th July 2012 to 23 July 2013 in accordance with Regulation 33 of the Petroleum and Geothermal Energy Act/Regulations 2000.

The Licence year which applies is as follows:

- GEL 223 Term 2 Year 1

2 Permit Summary

For the duration of the licence year, the licensee for Geothermal Exploration Licence (GEL) number 223 was:

Licence	Owner/s	Interest
GEL 223	Osiris Energy Limited	100%

Osiris Energy Limited is 100% owned by Panax Geothermal Ltd, which during the year was renamed as the Raya Group Limited.

Key permit changes relevant to the year were:

1. One third of the area of GEL 223 was surrendered; and then
2. GEL 223 was renewed on 24th July 2013.

Any work undertaken in either GEL 223 or the new geothermal tenement GEL 611 (when granted) will count to meeting the other tenements work program, essentially that the two licences would have a common work program. GEL 611 was suspended from 23rd April 2013 to 24 July 2013 so that the two licences would have common anniversary dates.

Table 1 outlines the work program commitments for the licence's five year term.

Table 1. Reconciliation of Licence Years and Work Program

Licence dates	Year	Minimum Work Program
24 July 2012 – 23 July 2013	Year 1	<ul style="list-style-type: none"> • Geological and geophysical studies
24 July 2013 – 23 July 2014	Year 2	<ul style="list-style-type: none"> • Geological and geophysical studies <p><i>(Year 2 work program may be conducted anywhere within the boundaries of GELs 223 and 611)</i></p>
24 July 2014 – 23 July 2015	Year 3	<ul style="list-style-type: none"> • Geological and geophysical studies <p><i>(Year 3 work program may be conducted anywhere within the boundaries of GELs 223 and 611)</i></p>
24 July 2015 – 23 July 2016	Year 4	<ul style="list-style-type: none"> • Drill one well <p><i>(Year 4 work program may be conducted anywhere within the boundaries of GELs 223 and 611)</i></p>
24 July 2016 – 23 July 2017	Year 5	<ul style="list-style-type: none"> • Geological and geophysical studies <p><i>(Year 5 work program may be conducted anywhere within the boundaries of GELs 223 and 611)</i></p>

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. Work program and Work completed
(as of end of current reporting period) by licence year.**

Licence dates	Licence Year	Minimum Work Program	Actual Work Undertaken
24 July 2012 – 23 July 2013	Year 1	<ul style="list-style-type: none"> • Geological and geophysical studies 	<ul style="list-style-type: none"> • Geological and geophysical studies
24 July 2013 – 23 July 2014	Year 2	<ul style="list-style-type: none"> • Geological and geophysical studies 	
24 July 2014 – 23 July 2015	Year 3	<ul style="list-style-type: none"> • Geological and geophysical studies 	
24 July 2015 – 23 July 2016	Year 4	<ul style="list-style-type: none"> • Drill one well 	
24 July 2016 – 23 July 2017	Year 5	<ul style="list-style-type: none"> • Geological and geophysical studies 	

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

Raya Group is a participant in a Study, an ARENA (Australian Renewable Energy Agency) Measure, to develop a better understanding of issues which impact Reservoir quality in geothermal wells in both the Otway and Cooper Basins is being undertaken by the South Australian Centre for Geothermal Energy Research at the University of Adelaide and the CSIRO. The Study is also using Raya Group data and Raya Group provided technical expertise when required.

This ARENA Measure entitled Reservoir Quality in Sedimentary Geothermal Resources aims to analyse why the two geothermal wells drilled in Hot Sedimentary Aquifers (HSA) reservoirs in the Cooper Basin and the Otway Basin respectively achieved fluid flow rates which were significantly lower than expected. As the Study is also analysing the results of other wells in the two Basins, the results of the Study will have relevance for all the geothermal tenement areas in both the Cooper and Otway Basins.

The following work involving literature review and preliminary analysis of target formations has been completed by the Study team with the involvement of Raya Group technical experts as required:

- i) Evaluation of the diagenetic history of the Pretty Hill Formation in the Otway Basin which is intersected by the Salamander -1 well and the Hutton Sandstone in the Cooper Basin which is intersected by the Celsius-1 well;
- ii) Preliminary analysis of the drill cuttings and core samples, including thin sections:
 - a. In the Otway Basin from Salamander 1 and nearby petroleum well Ladbrooke Grove 1; and
 - b. In the Cooper Basin and Eromanga Basins from Celsius 1 and sampling description of nearby wells;
- iii) Analysis of the petrophysical properties of Hutton Sandstone and Pretty Hill Formation including X-ray tomography and focused ion beam techniques to map pores and pore connectivity;
- iv) Mathematical analysis of production data from Salamander 1;
- v) Porosity, permeability and SEM analysis of samples; and
- vi) Analysis in the lab of various parameters that effect formation damage and fines migration during reservoir production.

A Confidential Report on the work completed was issued to the Study participants on 28 June 2013 and a copy of this has been forwarded to DMITRE.

In addition to the work undertaken there have been a number of formal and informal workshops held to both formulate approaches and progress issues.

5 Compliance Issues

Licence and Regulatory Compliance

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

	Report/Data	Due Date	Date Submitted	Compliant?
1	Year 1 Annual Report GEL 223	23rd September, 2013	5th November, 2013	Non Compliant (late submission)
2	Well Management Plan for: the On-going Maintenance and Monitoring of Salamander – 1, GEL 223, South Australia	25th July 2012		
3	Wellhead Service Report – Salamander 1	29th July 2012		
4	Salamander 1 – email pursuant to the Well Management Plan	Regular pressure readings reports		

Incidents

There were no new 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 Work Program for the Arena Measure is continuing during the current year and is expected to include the following:

Laboratory experimental work

Future plans will include the following lab studies (these plans may be altered subject to the outcomes of the experimental studies):

- Velocity-, salinity- and pH-induced fines migration and consecutive permeability decline for two cores of Ladbroke Grove 1 sandstones (2557.12 and 2572.29 m);
- Velocity-, salinity- and pH-induced fines migration for cuttings of Ladbroke Grove 1 sandstones (2557.12 and 2572.29 m);
- Velocity-, salinity- and pH-induced fines migration for cuttings from Salamander 1 sandstones (2903-2906, 3026-3029 and 3152-3155 m);
- Zeta-potential measurements of particles released from cores and cuttings during fines mobilisation tests (these data will be used by Prof. Pavel Bedrikovetsky and Dr. Zhenjiang You in mathematical modelling of the total interaction potential between clay particles and sand matrix via Derjaguin-Landau-Verwey-Overbeek (DLVO) theory);
- Complete identification of composition and nature of fine particles in the supplied sandstone samples via SEM-EDAX, XRD and thin-section photomicrography.
- Similar work to be completed on Celsius 1 cuttings and adjacent well cores.

Mathematical modelling work

Generalization of the mathematical model for fines migration will be carried out as follows:

- Divide the reservoir domain into two zones: one is the Damaged Zone and the other is the Undamaged Zone;

- In the Damaged Zone, the fluid is considered incompressible and the rate is constant. The governing equations for the suspended and retained fines concentration as well as the pressure are solved;
- In the Undamaged Zone, no fines migration occurs. The compressible fluid flow is simulated and the pressure diffusivity equation is solved.

6 Expenditure Statement

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

THE ATTACHED FINANCIAL INFORMATION IS NOT FOR PUBLICATION