

Raya Group Limited

ABN 89 122 203 196

Annual Reports

Term 2 Licence Year 1

Geothermal Exploration Licence 281

and

Term 1 Licence Year 3

Geothermal Exploration Licence 502

14 November 2012 – 13 November 2013

CONTENTS		Page No.
1	Introduction	3
2	Permit Summary	4
3	Regulated Activities	6
4	Non-regulated Activities	6
5	Compliance Issues	7
6	Expenditure Statement	9
APPENDIX 1	Expenditure Statement	10

1. Introduction

Geothermal Exploration Licence (GEL) 281 was acquired by Panax Geothermal Ltd since renamed Raya Group Limited ("Raya") on 5 December 2008 when Panax acquired 100% of the issued capital of Osiris Energy Ltd.

On the 13th November 2012, a one third relinquishment of GEL 281 was undertaken and the tenement was renewed for 5 years effective from 14th November 2012.

The year being reported on is Year 1 of the renewal term. The licence is located in the Cooper Basin of South Australia (see Figure 1).

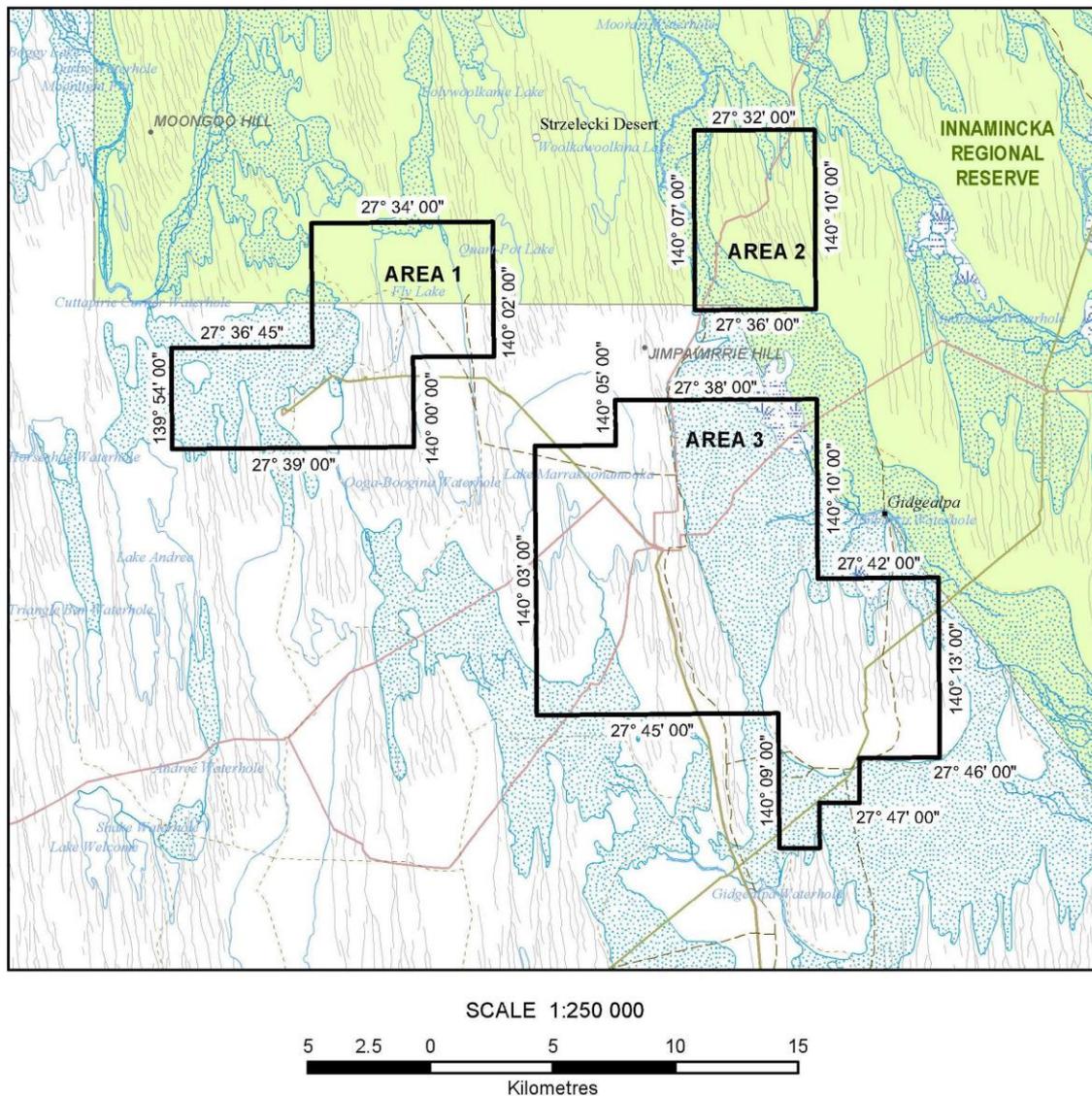


Figure 1. Raya's GEL 281 in the Cooper Basin of South Australia. The GEL is in three parts.

Geothermal Exploration Licence (GEL) 502 was granted to Panax, now Raya, on 10 March 2010. The licence is located in the Cooper Basin of South Australia (see Figure 2). The year being reported on is Year 3.

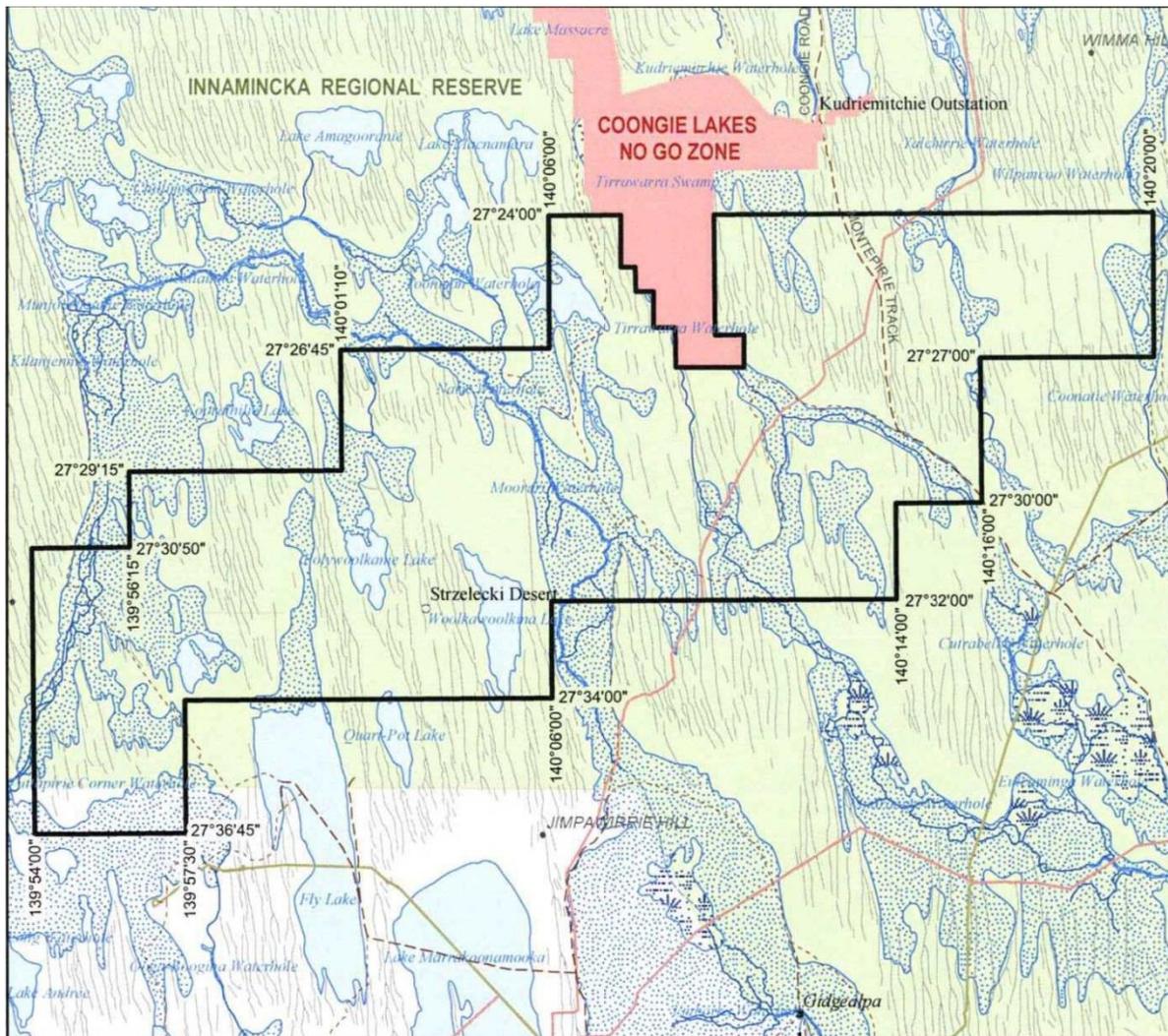


Figure 2: GEL 502 in the Cooper Basin in South Australia

Approval was received from DMITRE on 20 February 2013 to amalgamate the annual reports of GEL 281 and GEL 502.

Raya has requested approval from the Minister for Mineral Resources and Energy to surrender GEL 281 and GEL 502 effective 13 November 2013.

This report details the work conducted on GEL 281 (Term 2 Licence year 1) and GEL 502 (Term 1 Licence year 3) during the period 14th November 2012 to 13th November 2013 in accordance with Section 33 of the Petroleum and Geothermal Energy Regulations 2000.

2. Permit Summary

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

Licence	Owner/s	Interest
GEL 281	Osiris Energy Ltd	100%
GEL 502	Raya Group Ltd	100%

Osiris Energy Ltd is 100% owned by Raya Group Ltd, previously named Panax Geothermal Limited. The name change was noted by DMITRE on 20 June 2013.

Year 2 of GEL 502 had been suspended from 10th March 2011 until 13th November 2011, synchronising the years of both GEL 281 and GEL 502. For both of GELs 281 and 502, in this latest year, any work done in either of GEL 281 or GEL 502 counted towards the work obligation of the other.

The following tables display both the minimum work program and the actual work completed up until the end of the current licence period.

Table 1. Final work program and work completed (as of end of current reporting period) by licence year for GELs 281 and 502.

GEL 281		GEL 502	
Year of Licence	Minimum Work Requirements	Year of Licence	Minimum Work Requirements
		One	Geological and geophysical studies.
		Two	Geological and geophysical studies
One	Geological and geophysical studies (Year 1 work program to be conducted anywhere within the boundaries of GELs 281 and 502)	Three	Geological and geophysical studies (Year 3 work program to be conducted anywhere within the boundaries of GELs 281 and 502)
Two	Geological and geophysical studies (Year 2 work program to be conducted anywhere within the boundaries of GELs 281 and 502)	Four	Geological and geophysical studies (Year 4 work program to be conducted anywhere within the boundaries of GELs 281 and 502)
Three	Drill one deep well and associated testing (Year 3 work program to be conducted anywhere within the boundaries of GELs 281 and 502)	Five	Drill one deep well and associated testing (Year 5 work program to be conducted anywhere within the boundaries of GELs 281 and 502)

Table 2. Work Program and work completed by licence year for GELs 281 and 502

Licence Year GEL281	Licence Year GEL 502	Minimum Work Program	Actual Work
	Year 1	Geological and geophysical studies.	Geological and geophysical studies.
	Year 2	Geological and geophysical studies.	Geological and geophysical studies
Year 1	Year 3	Geological and geophysical studies. (Work program to be conducted anywhere within the boundaries of GELs 281 and 502)	Geological and geophysical studies
Year 2	Year 4	Geological and geophysical studies.	

		(Work program to be conducted anywhere within the boundaries of GELs 281 and 502)	
Year 3	Year 5	Drill one deep well and associated testing. (Work program to be conducted anywhere within the boundaries of GELs 281 and 502)	

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.

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 (Geological and Geophysical Studies)**

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:
 - i. In the Otway Basin from Salamander 1 and nearby petroleum well Ladbroke Grove 1; and
 - ii. 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

No regulatory non-compliance

Management System Audits

As the activities in the period have been desk top studies only no management system audit has been undertaken.

Report and Data Submissions

	Report/Data	Due Date	Date Submitted	Compliant?
1	Annual Report for Year 5 Term 1 GEL 281 and Tear 2 Term 1 GEL 502 - resubmission	13 th January 2013	21 st March 2013	Non-Compliant
1	Year 1 Term 2 Annual Report GEL 281	13th January, 2014	21st November, 2013	Compliant
2	Year 3 Annual Report GEL 502	13th January, 2014	21st November, 2013	Compliant

Incidents

There were no reportable incidents that occurred during the permit year.

Threat Prevention

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

Future Work Program

As discussed above, the Raya Group is a participant in the ARENA Measure in collaboration with the University of Adelaide, CSIRO and DMITRE. This work will continue to be carried out over the next year of the license.

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 AND TECHNICAL INFORMATION IS NOT FOR PUBLICATION

Commercial in confidence