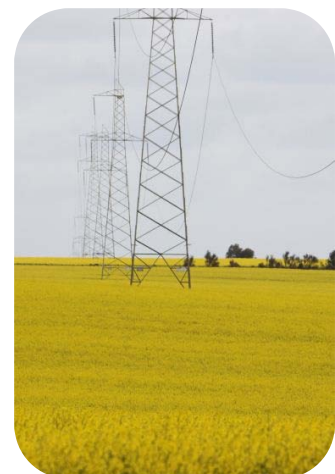




**Annual Report**  
**Licence Year 4**  
**24 January 2010 – 23 January 2011**  
**GEL 227      Barossa Project**  
**South Australia**

**DATED 15/3/2011**



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Date of Submission: 15 March 2011  
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## 1 Introduction

Geothermal Exploration Licences (GELs) 227 & 228 were granted on 05 July 2006, for an initial period of 5 years. Torrens Energy Limited was then granted an additional adjacent licence (GEL 263) on 24 January 2007. A subsequent variation to the anniversary and work program GELs 227 & 228 was requested and authorised, enabling the grouping of GELs 227-228 & 263 to form the 1471 km<sup>2</sup> Barossa project.

Work commitments for GEL 229 were suspended for the period from and including 5 July 2010 to 23 January 2011.

Torrens Energy applied for a consolidation of licences 227, 228, 229 and 263 which was granted on 26 March 2010 and resulted in consolidated license GEL 227 and a work programme variation. Consequently, GELs 228, 229 and 263 were revoked.

The Barossa Project covers an area of 1,963 km<sup>2</sup> between Jamestown and Freeling, South Australia.

This report details the work conducted during Year 4 of the GEL 227, in accordance with Regulation 33 of the *Petroleum and Geothermal Energy Act 2000*.

## 2 Permit Summary

For the duration of the licence year, licensee for Geothermal Exploration Licence 227 was:

- *Torrens Energy* 100%

The current work commitments associated with GEL 227 can be seen in Table 1.

**Table 1 Current work commitments by licence year**

Licence Year	Licence dates	Minimum Work Program
Year 1	24/01/07 – 23/01/08	<ul style="list-style-type: none"><li>• Geological and geophysical review</li></ul>
Year 2	24/01/08 – 23/01/09	<ul style="list-style-type: none"><li>• Geological and geophysical review</li></ul>
Year 3	24/01/09 – 23/01/10	<ul style="list-style-type: none"><li>• Geological and geophysical review</li></ul>
Year 4	24/01/10 – 23/01/11	<ul style="list-style-type: none"><li>• Complete and case 3 fully cored heat flow holes to a depth of 400 to 500 metres for a total depth of 1200 to 1500 metres.</li></ul>
Year 5	24/01/11– 23/01/12	<ul style="list-style-type: none"><li>• Drill test 1 well to a depth of 4,000 to 5,000 metres.</li></ul>

Licence Year 4 concluded on 23 January 2011. The following table displays the minimum work program 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**

Licence Year	Minimum Work Program	Actual Work
Year 4	Complete and case 3 fully cored heat flow holes to a depth of 400 to 500 metres for a total depth of 1200 to 1500 metres.	<ul style="list-style-type: none"> <li>• Drilling of six shallow fully cored heat flow holes</li> </ul>

License suspensions during the reporting year:

- Suspension of work commitments for GEL 229 for a period from and including 5 July 2010 to 23 January 2011
- Revocation of GELs 228, 229 and 263

### 3 Regulated Activities

Pursuant to Regulation 33(2) (a) under the Act, an annual report must include:

*“a summary of the regulated activities conducted under the licence during the [current reporting] year.”*

Regulated activities during the reporting period included the drilling of seven shallow heat flow wells at six different sites for 1,933.7m.

Locations and details of these wells are shown below (FIGURE 1; TABLE 2 to 7).

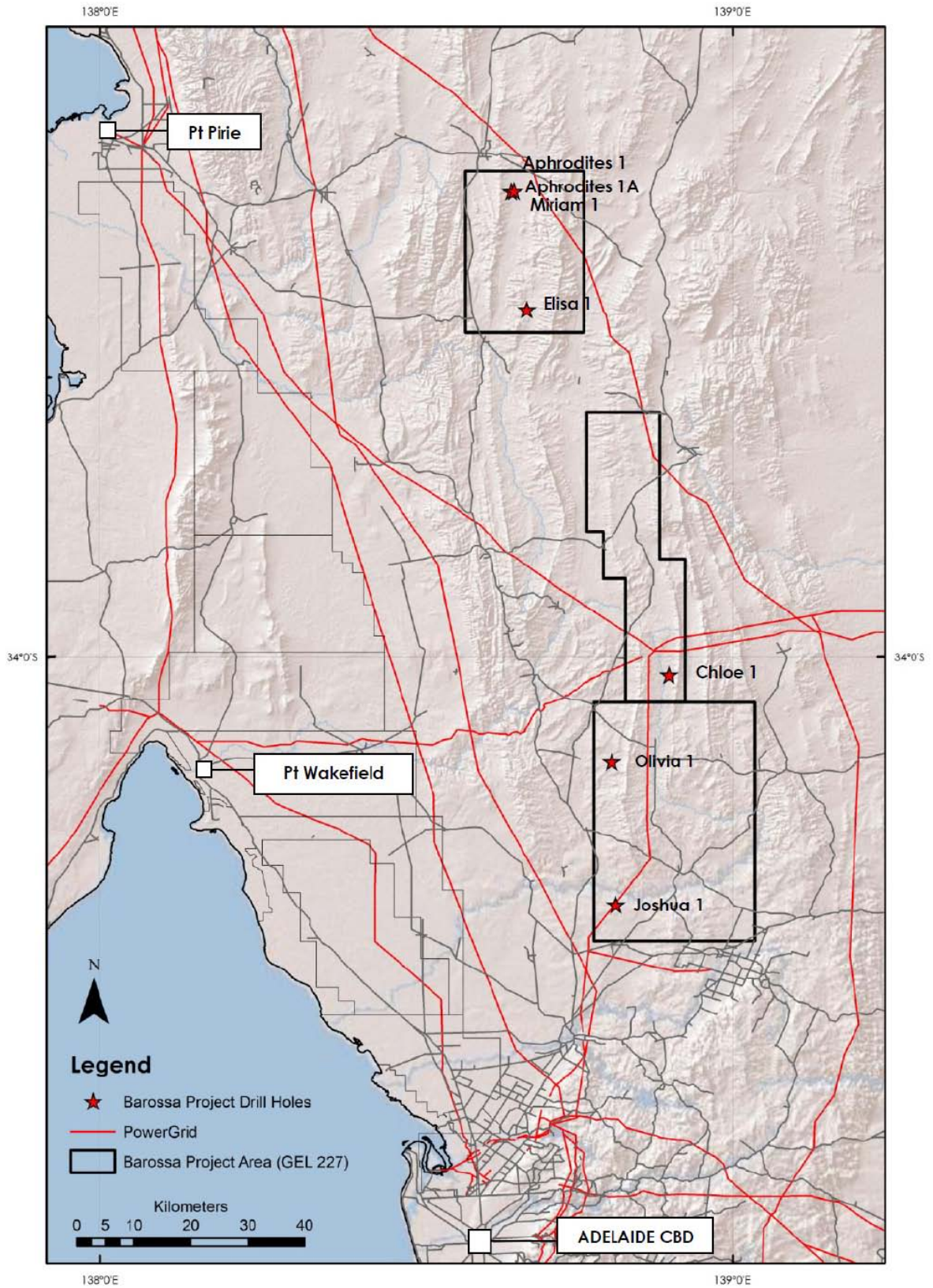


Figure 1: Barossa Project (GEL 227) drill hole locations

Table 2: Summary data for Aphrodites 1

Well name:	Aphrodites 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	12 April 2010	Location (GDA 94):	-33.265438362 138.650253946
Rig release:	16 April 2010	Drilling Company:	Watson Drilling
Depth:	63.4 metres	Rig Type:	Bournedrill 1000

Table 3: Summary data for Aphrodites 1A

Well name:	Aphrodites 1A	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	17 April 2010	Location (GDA 94):	-33.265460371 138.650269328
Rig release:	21 April 2010	Drilling Company:	Watson Drilling
Depth:	93 metres	Rig Type:	Bournedrill 1000

Table 4: Summary data for Elisa 1

Well name:	Elisa 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Cased, open, capped	GEL:	227
Spud date:	22 April 2010	Location (GDA 94):	-33.451756225 138.674527753
Rig release:	7 May 2010	Drilling Company:	Watson Drilling
Depth:	350.1 metres	Rig Type:	Bournedrill 1000

Table 5: Summary data for Chloe 1

Well name:	Chloe 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	8 May 2010	Location (GDA 94):	-34.028146461 138.899392902
Rig release:	19 May 2010	Drilling Company:	Watson Drilling
Depth:	334.1 metres	Rig Type:	Bournedrill 1000

Table 6: Summary data for Olivia 1

Well name:	Olivia 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	19 May 2010	Location (GDA 94):	-34.164768669 138.808968987
Rig release:	28 May 2010	Drilling Company:	Watson Drilling
Depth:	351.1 metres	Rig Type:	Bournedrill 1000

Table 7: Summary data for Joshua 1

Well name:	Joshua 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	29 May 2010	Location (GDA 94):	-34.390579059 138.816646431
Rig release:	12 June 2010	Drilling Company:	Watson Drilling
Depth:	400 metres	Rig Type:	Bournedrill 1000

Table 8: Summary data for Miriam 1

Well name:	Miriam 1	Company:	Torrens Energy Ltd
Well category:	Geothermal Exploration Well	Project:	Barossa Project
Well status:	Plugged and abandoned	GEL:	227
Spud date:	12 June 2010	Location (GDA 94):	-33.265393578 138.654628041
Rig release:	24 June 2010	Drilling Company:	Watson Drilling
Depth:	342 metres	Rig Type:	Bournedrill 1000

- a. Seismic Data acquisition  
None undertaken
- b. Seismic Data Processing and Reprocessing  
None undertaken
- c. Geochemical, gravity, Magnetic and other surveys  
None undertaken
- d. Preliminary survey activities  
None undertaken

## 4 Compliance Issues

### ***Licence and Regulatory Compliance***

Pursuant to Regulations 33(2) (b) & (c), an annual report must include:

*"a report for the year on compliance with the Act, these regulations, the licence and any relevant statement of environmental objectives;" and*

*"a statement concerning any action to rectify non compliance with obligations imposed by the Act, these regulations or the licence, and to minimise the likelihood of recurrence of any such non-compliances."*

#### a. Licence and Regulatory Compliance

Torrens Energy were found to be non-compliant in regards to Section 25(1) of the Petroleum and Geothermal Energy Act 2000. During its 2010 Barossa drilling Torrens Energy was found to have not drilled to the depths specified in the work program for GEL 227. Torrens Energy decided not to drill to the specified depths of 400-500m and instead terminate its wells at 350-400m since the same exploration results were believed to be achieved with shallower depths.

Torrens Energy was found to be non-compliant in regards to Section 74(3) (a) of the *Petroleum and Geothermal Energy Act 2000*. Torrens Energy was found to have constructed well lease at the Miriam 1 site in GEL 227 prior to obtaining approval from PIRSA.

Torrens Energy acknowledges the breach of the Act and has had discussions with the relevant employees to ensure that everyone is aware that such occurrences will not be tolerated; that they become familiar with the activity approval process, and that they plan to submit activity notifications with PIRSA in a timely manner to have the approval within the 35 days period, or alternatively to approach PIRSA with a request to fast track approval if justified. Torrens Energy believes that by following common sense and educating its employees such non-compliance will not happen.

Torrens Energy was also found to be non-compliant in regards to Section 41(1) of the *Petroleum and Geothermal Energy Regulations 2000*.

Core and cuttings for some of Torrens' Barossa wells were submitted late to the core library, including: Aphrodites 1 (cuttings only) and core and cuttings for Aphrodites 1A, Elisa 1, Chloe 1 and Olivia 1.

Torrens Energy acknowledges the breach of the Regulations; however delays due to bad weather and access to drill sites prevented the timely submission of core and cuttings. Every effort will be made to avoid delays in the future.

Due to an administrative oversight the submission of the 4<sup>th</sup> Quarter Cased Hole Quarterly Activity Report was late which poses non-compliance in regards to Section 41 of the *Regulations*. Torrens Energy have since reviewed its due date monitoring system, so that regulatory reporting is done on time.

#### b. Compliance with Statement of Environmental Objectives

The activities reported in this Annual Report were conducted under the statement of environmental objectives titled *"SAPEX Limited Statement of Environmental Objectives: Exploratory Coal Seam Drilling"*.

Objective	Assessment Criteria	Compliant/Non-Compliant	Comments
1. Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance	No impact to sites of Aboriginal or non-indigenous heritage significance without approval under the Aboriginal Heritage Act 1988 and Heritage Places Act 1993.	Compliant	<p>The drill sites were held under freehold property title, extinguishing native title.</p> <p>The aboriginal affairs and reconciliation division heritage sites database was checked and no sites were identified that may be impacted by the operations.</p> <p>The drill sites were located on land used for cropping and grazing that had been operated for many years. Access to drill sites was along existing, well-used roads and the drill sites are located in areas where there has been a high level of recent disturbance.</p>
2. Minimise disturbance to native vegetation and native fauna	<p><u>Well Lease and Access Track Construction and Restoration</u></p> <p>Any sites of rare, vulnerable and endangered flora and fauna have been identified, flagged and subsequently avoided.</p> <p>Significant remnant vegetation has not been cleared without specific consultation with PIRSA, Native Vegetation Council and DEH prior to activity approval.</p> <p>The attainment of 0, +1 or +2 GAS criteria for 'Minimise disturbance to native vegetation' objective for well site construction listed in Appendix 2.</p> <p>The attainment of 0, +1 or +2 GAS criteria for "Re-establish native vegetation on abandoned well sites and access tracks" objective where the re-vegetation of native species is required listed in Appendix 2.</p> <p><u>Drilling and Initial Production Testing</u></p> <p>No fires during drilling activities.</p> <p><u>Fuel and Chemical Storage and Handling</u></p> <p>Refer to Assessment Criteria for Objective 4.</p> <p><u>Waste Management</u></p> <p>Refer to Assessment Criteria for Objective 10.</p>	Compliant	<p>The drill sites were located on land used for cropping and grazing that had been operated for many years. No native vegetation present.</p> <p>One drill site was located in heavily disturbed road reserve with some scattered native grasses. No native vegetation of conservation significance was detected at the drilling site.</p> <p>Access was via existing roads and tracks and across cleared cropping paddocks. There was no unnecessary/unauthorised off-road driving or creation of shortcuts.</p> <p>All but one drill site have been completely rehabilitated since completion of drilling including plugging and backfilling of holes and site rehabilitation.</p> <p>Activities were carried out in accordance with the <i>Fire and Emergency Services Act 2005</i>. Fire prevention equipment, inductions and emergency response plans were in place.</p>
3. Prevent the introduction or spread of weeds and undertake control measures where required	Weeds are not introduced into, or spread in, operational areas as a consequence of activities.	Compliant	<p>The vehicles being used for the operation had been used in adjacent paddocks for some months.</p> <p>Visual inspection did not identify any exotic weeds.</p> <p>The drill site was in working and previously cleared farm land that had been operated for many years. Annual Checks will be conducted to ensure that no</p>



<p>4. Minimise impacts to soil</p>	<p><u>Well site and Access Track Construction</u></p> <p>The attainment of 0, +1 or +2 GAS criteria for 'Minimise impacts to soil' objective listed in Appendix 2.</p> <p>No construction activities are carried out on salt lakes, steep slopes or in areas of boggy coastal soils.</p> <p><u>Drilling and Initial Production Testing</u></p> <p>No soil contamination as a result of drilling activities.</p> <p><u>Fuel and Chemical Storage and Handling</u></p> <p>Soil in areas affected by any spill is removed and/or bioremediated.</p> <p>No soil contamination as a result of fuel and chemical storage and handling.</p> <p><u>Waste Management</u></p> <p>Refer to Assessment Criteria for Objective 10.</p>	<p>Compliant</p>	<p>exotic weed species are located.</p> <p>Existing station tracks were used to access drill sites and unnecessary/unauthorised off-road driving or creation of shortcuts was avoided.</p> <p>The area utilised for drilling was restricted to the smallest practicable.</p> <p>Drill rig was located in polyethylene lined bunded areas. No chemical spills were recorded.</p> <p>All soil removed from the site for sump construction was put back into the sump upon completion of the hole. All but one drill site have undergone complete rehabilitation including plugging and abandoning of the well and site rehabilitation.</p> <p>No soil contamination occurred as a result of waste disposal activities.</p>
<p>5. Minimise loss of reservoir and aquifer pressures and avoid aquifer contamination</p>	<p>No aquifer contamination as a result of drilling, completion or production testing activities.</p> <p><u>Drilling and Completion Activities</u></p> <p>No uncontrolled flow to surface (i.e. blow out).</p> <p>Sufficient barriers exist in casing annulus to prevent cross-flow between separate aquifers or hydrocarbon reservoirs.</p> <p><u>Initial Production Testing and Well Abandonment Activities</u></p> <p>No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by the Department of Water, Land and Biodiversity Conservation.</p>	<p>Compliant</p>	<p>Steel casing was pressure cemented to surface in the mud section to ensure there was no potential for aquifer contamination.</p> <p>No blow outs occurred during drilling.</p>
<p>6. Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources</p>	<p><u>Well Lease and Access Track Construction and Restoration</u></p> <p>Well sites and access tracks are located to maintain pre-existing water flows (i.e. channel contours are maintained on floodplains and at creek crossings).</p> <p>The attainment of 0, +1 or +2 GAS criteria for 'Minimise disturbance to drainage patterns' objective listed in Appendix 2.</p> <p><u>Drilling and Initial Production Testing</u></p> <p>No contamination of surface waters and shallow groundwater resources as a result of drilling activities.</p>	<p>Compliant</p>	<p>No significant drainage patterns at or near drill sites, drilling occurred in flat paddocks. Sumps have been dried and then backfilled level to the ground since completion of drilling.</p>

	<p><u>Fuel and Chemical Storage and Handling</u></p> <p>No contamination of surface waters and shallow groundwater resources as a result of fuel or chemical storage and handling.</p> <p><u>Waste Management</u></p> <p>Refer to Assessment Criteria for Objective 10.</p>		
7. Minimise risks to the safety of the public, employees and other third parties	No injuries to the public or third parties as a result of drilling, completion and initial production testing activities.	Compliant	All relevant landowners/managers were contacted prior to activities. No injuries to any party occurred during the drilling of Torrens Energy's wells.
8. Minimise disturbance to stakeholders and associated infrastructure.	<p>No adverse impact (outside agreed disturbance/compensation areas) on livestock or crops as a result of activities.</p> <p>No reasonable concerns raised by stakeholders are left unresolved</p>	Compliant	Landowners/managers were consulted prior to activities; there were no adverse impacts on livestock as a result of activities. There were no adverse impacts on the community or other land users.
9. Minimise visual impact.	The attainment of 0, +1 or +2 GAS criteria for 'Minimise visual impact' objective for well site restoration listed in Appendix 2.	Compliant	<p>The area utilised for drilling was restricted to the smallest practicable.</p> <p>Since completion of drilling all but one drill site have undergone full rehabilitation including plugging of the well and rehabilitation of the drill site.</p>
10. Minimise the impact on the environment of waste storage, handling and disposal.	<p>No soil, surface water or ground water contamination as a result of waste storage and disposal.</p> <p>All wastes have been disposed of at an EPA licensed facility with the exception of drilling fluids, drill cuttings and other fluids disposed during well clean-up.</p> <p>The attainment of 0, +1 or +2 GAS criteria for 'Site to be left in a clean, tidy and safe condition' objective for well site restoration listed in Appendix 2.</p>	Compliant	<p>All rubbish has been cleaned up during and upon completion of activities.</p> <p>Drill sites have been rehabilitated as near as possible to their undisturbed state.</p>
11. Remediate and rehabilitate operational areas to agreed standards.	<p><u>Well Lease and Access Track Restoration</u></p> <p>The attainment of 0, +1 or +2 GAS criteria for 'Minimise visual impact', 'Re-establish native vegetation on abandoned well sites and access tracks' where the revegetation of native species is required and 'Site to be left in a clean, tidy and safe condition' objectives listed in Appendix 2</p>	Compliant	<p>All but one drill site have been rehabilitated and remediated according to the industry and SEO standards.</p> <p>The wells were plugged backfilled and plugged by means of pressure-cementing from bottom of hole to surface.</p> <p>Drill sumps have been backfilled and drill pads fully rehabilitated.</p> <p>One well remains open and capped to this day due to landowners request to keep well as water bore. Compliance work for transfer of well from Torrens Energy to landowner is ongoing. Sumps at this particular drill site (Elisa 1) have been backfilled and the drill pad has been rehabilitated.</p>

## 5 Management System Audits

Pursuant to Regulation 33(2) (d) under the Act, an annual report must include:

*"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 actions that has, or will be taken".*

There were no management systems audits undertaken during the reporting year.

## 6 Report and Data Submissions

Pursuant to Regulation 33(2) (e) under the Act, an annual report must include:

*"a list of all reports and data relevant to the operation of the Act generated by the licensee during the licence year".*

<b>Title</b>	<b>Compliance status</b>	<b>Due</b>	<b>Submitted</b>
<b><u>Drilling</u></b>			
Daily Drilling Reports for various drill holes (Aphrodites 1, Aphrodites 1A, Elisa 1, Chloe 1, Olivia 1, Joshua 1, Miriam 1)	Compliant		
Aphrodites 1A Continuous temperature log (taken 10 August 2010)	Compliant	10 Oct 2010	17 Aug 2010
Elisa 1 Continuous temperature log (taken 15 July 2010; 16 November 2010)	Compliant	15 Sept 2010 16 Jan 2011	15 Jul 2010 26 Nov 2010
Olivia 1 Continuous temperature log (taken 23 July 2010; 15 November 2010)	Compliant	23 Oct 2010 15 Jan 2011	29 Jul 2010 26 Nov 2010
Chloe 1 Continuous temperature log (taken 26 July 2010; 15 November 2010)	Compliant	26 Sept 2010 15 Jan 2011	24 Sept 2010 26 Nov 2010
Joshua 1 Continuous temperature log (taken 3 August 2010; 15 November 2010)	Compliant	3 Oct 2010 15 Jan 2011	6 Aug 2010 26 Nov 2010
Miriam 1 Continuous temperature log (taken 9 August 2010; 16 November 2010)	Compliant	9 Oct 2010 16 Jan 2011	17 Aug 2010 26 Nov 2010
<b><u>Quarterly Activity Reports</u></b>			
2009 Q4	Compliant	31 Jan 2010	29 Jan 2010
2010 Q1	Compliant	30 Apr 2010	23 Apr 2010
2010 Q2	Compliant	31 Jul 2010	2 Aug 2010
2010 Q3	Compliant	31 Oct 2010	20 Oct 2010
2010 Q4	Non-compliant	31 Jan 2011	11 Mar 2011
<b><u>Well Completion Reports</u></b>			
Aphrodites 1; Aphrodites 1A (one report)	Compliant	15 Oct 2010	13 Oct 2010
Elisa 1	Non-compliant	7 Nov 2010	1 Dec 2010
Chloe 1	Non-compliant	26 Nov 2010	1 Dec 2010
Olivia 1	Non-compliant	26 Nov 2010	1 Dec 2010
Joshua 1	Compliant	12 Dec 2010	1 Dec 2010
Miriam 1	Compliant	24 Dec 2010	1 Dec 2010

## **7 Incidents**

Pursuant to Regulation 33(2) (f), an annual report must include:

*"in relation to any incidents reported to the Minister under the Act and these Regulations during the relevant licence year –*

- (i) an overall assessment and analysis of the incidents, including the identification and analysis of any trends that have emerged; and*
- (ii) an overall assessment of the effectiveness of any action taken to rectify non-compliance with obligations imposed by the Act, these regulations or the licence, or to minimise the risk of recurrence of any such non-compliance".*

No reportable incidents occurred during Year Four.

## **8 Threat Prevention**

Pursuant to Regulation 33(2) (g) under the Act, an annual report must include:

*"a report on any reasonably foreseeable threats (other than threats previously reported on) that reasonably presents, 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 to activities under the licences have been identified.

## **9 Future Work Program**

Pursuant to Regulation 33(2) (h) under the Act, an annual report must include:

*"unless the relevant licence year is the last year in which the licence is to remain in force – a statement outlining operations proposed for the ensuing year".*

Torrens Energy have applied for relinquishment of GEL 227 on 20 January 2011; exploration results of Torrens' shallow heat flow wells were not encouraging enough to continue exploration on this project.

Ground disturbances have since been remediated and all but one well have been plugged and abandoned. One well (Elisa 1) is currently awaiting transfer from Torrens Energy to the landowner (Eric Sommerville). Compliance work to enable this transfer is ongoing and Torrens will apply to have their liability limited for Elisa 1 under Section 111 of the *Petroleum and Geothermal Energy Act 2000* once all compliance criteria have been met.

## 10 Expenditure Statement

Pursuant to Regulation 33(3) under the Act, an annual report must contain:

*“An annual report must be accompanied by a statement of expenditure on regulated activities conducted under the licence for the relevant licence year, showing expenditure under each of the following headings:*

- (iii) drilling activities;*
- (iv) seismic activities;*
- (v) technical evaluation and analysis;*
- (vi) other surveys;*
- (vii) facility construction and modification;*
- (viii) operating and administration expenses (not already covered under another heading)”.*

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