



**PEL 91  
Cooper/Eromanga Basin  
South Australia**

**Annual Report  
Permit Year 2**

**8th January 2003 to 7th January 2004**

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## 1 Introduction

Petroleum Exploration Licence No. 91 is situated on the western margin of the Cooper/Eromanga Basin, South Australia. The second year of the licence covers the period 8th January 2003 to 7th January 2004.

This report details the work performed by the Joint Venture during this second year of the licence, in accordance with the requirements of Section 33 of the Petroleum Regulations 2002.

## 2 Permit Summary

The working interests in PEL 91 at the end of this reporting period were:

<b>Beach Petroleum Ltd (Operator)</b>	<b>40%</b>
<b>Great Artesian Oil and Gas Ltd</b>	<b>60%</b>

The original work commitments for PEL 91 are summarised as follows:

<b>Licence Year</b>	<b>Minimum Work Program</b>	<b>Actual Work</b>
Year 1 (8/01/02-7/01/03)	Geological and Geophysical studies	215km 2D seismic 450km reprocess seismic
Year 2 (8/01/03-7/01/04)	One well; 250km 2D seismic	One well ; 6km seismic*
Year 3 (8/01/04-7/01/05)	<i>(Two wells)**</i> 180km 2D seismic; 300km reprocessed seismic	
Year 4 (8/01/05-7/01/06)	Two wells	
Year 5 (8/01/06-7/01/07)	One well, plus seismic	

\* At the end of Year 2, a deficit of 29 km of new seismic acquisition was offset by 450km of reprocessed seismic.

\*\*On 5/12/03, the JV formally submitted a request for a work program variation to address the lack of drillable prospects generated from the Year 1 seismic program. The proposed variation consists of the acquisition of at least 180 km of new seismic and the reprocessing of approximately 300km of existing seismic. The Minister approved the variation in a letter dated 19/01/04.

### **3 Exploration Activity**

#### **1.1 Drilling.**

One exploration well (Carrickalinga-1) was drilled during the permit term. The well spudded on 4/08/03 and drilled to a total depth of 2716metres. Carrickalinga-1 intersected an Eromanga section overlying a Cooper Basin Early Permian interval. Two DST's (the first was misrun) were conducted in response to gas and fluorescence shows within the Patchawarra Formation, but the interval produced only a minor gas flow and just over a barrel of mud-cut oil. The well was plugged and abandoned after logging, and the rig released on 29/08/03. A Well Completion Report for Carrickalinga-1 is in preparation.

The result of Carrickalinga-1 indicates that oil is (or has been) present within the Patchawarra sequence, consistent with pre-drill charge expectations. The potential for oil migration westward and upward from the Carrickalinga location is likely to be pursued in further regional analysis.

#### **1.2 Seismic Data Acquisition**

A single seismic line (6km) was acquired over the Carrickalinga location during 2003 in order to better image the lower Patchawarra interval and provide a better tie to the regional seismic grid.

#### **1.3 Seismic Data Processing/ Reprocessing**

No existing seismic data was re-processed during 2003.

#### **1.4 Geological and Geophysical Studies.**

Technical studies during this second permit term were chiefly directed toward the drilling of Carrickalinga-1, the implications of the well result (including the acquisition of additional seismic), and initial planning for the Year 3 seismic program.

## 4 Administration

### 4.1 Regulatory Compliance

A Compliance Report is attached which details the operator's compliance with the 2000 Petroleum Act, its Regulations, the terms and conditions of the Licence, and the agreed Statements of Environmental Objectives governing field operations undertaken during the permit term.

### 4.2 Data submissions.

A list of the items submitted during the report period is contained in the table below.

**Table 1**  
**PEL 91**  
**Annual Report**  
**Licence Year 2**  
**8th January 2003 to 7<sup>th</sup> January 2004**

#### **List of Reports Generated**

<b><u>Title</u></b>	<b>Date Submitted to PIRSA</b>
Environmental Monitoring Report for Strombus Seismic Survey PEL 91	29-Jan-03
Strombus Seismic Survey Final Operations Report PEL 91	9-Sept-03
Carrickalinga-1 Well Proposal	17-Jun-03
Carrickalinga-1 Drilling Program	17-Jun-03

### 4.3 Planned Exploration Program for Year 3

No exploration well is currently planned for 2004.

The seismic program planned for mid 2004 consists of 209 km of new 2D seismic data (estimated cost of \$264,000), and 300km of seismic reprocessing. The program is designed to address a number of poorly defined leads, and to progress some to a drillable status.

## **5 Expenditure statement**

A licence expenditure summary for the period 8th January 2003 to 7<sup>th</sup> January 2004 is presented as Table 2.

Commercial in confidence

**ANNUAL**  
**COMPLIANCE**  
**REPORT**

**FOR**

***PEL 91 - YEAR 2***

***( JANUARY 2003 - DECEMBER 2003 )***

**COOPER BASIN, SOUTH AUSTRALIA**



## **Introduction**

Pursuant to Regulation 33 (2) of the 2000 Petroleum Act, Beach Petroleum, as operator of PEL 91 in the Cooper Basin, South Australia, herewith submits its report on compliance with :

- the Petroleum Act,
- its Regulations,
- the PEL License conditions, and
- the various Statements of Environmental Objectives to which Beach Petroleum was committed in conducting its work commitments for Year 1 of the Licence.

A table is attached summarizing the instances during Year 2 of the Permit where Beach Petroleum did not comply either with the Regulations of the Act or with the requirements of the relevant SEO under which it conducted its operations.

Further details of the circumstances surrounding the non-compliances are outlined below.

## **Petroleum Act and PEL Licence Conditions**

There were no instances of non-compliance with the 2000 Petroleum Act during Year 2 of PEL 91.

The Carrickalinga-1 well was drilled during Year 2 to satisfy the original work commitments for the Licence.

The seismic commitments for Year 2 required the acquisition of 250 kilometres of new 2D seismic data. In fact, only 6 kms were recorded, but agreement was reached with PIRSA that the shortfall of 244 kilometres of new seismic data would be compensated by the excess of seismic work undertaken in Year 1, which included the recording of 215 kilometres of new data , plus the reprocessing of 450 kilometres of archive data.

## **Regulations of the 2000 Petroleum Act**

- **Drilling**

There were no instances of non-compliance with the Regulations during the drilling operations of the Carrickalinga-1 well. All reports associated with this well are due to be submitted in Year 3 of the Licence.

- **Seismic**

***Submission of data and Reports from the 2002 ( Permit Year 1 )  
Strombus Survey***

The Strombus seismic survey was conducted in PEL 91 during **Year 1** of the Licence. Recording of the lines in PEL 91 finished on October 18<sup>th</sup>, 2002.

Regulation 35 requires that, for any seismic survey, an **Operations Report** is to be submitted to PIRSA within six months of the completion of recording, and that this Report includes a report on the processing of the data.

The Strombus Survey was recorded concurrently with the Nautilus Survey, and for reasons of efficiency, the data from both surveys was processed together. The combined processing exercise was quite substantial with the result that it took some 10 months to complete.

Preparation of the Processing Report required a further month, and the complete Operations Report, together with the required support data, was submitted to PIRSA on September 10<sup>th</sup>, 2003.

During this period, Beach applied for, and was granted, two extensions to the date for submitting the Operations Report. The final date approved by PIRSA for submitting the Report was September 30<sup>th</sup>, 2003.

As the Operations Report was submitted prior to the final approved submission date, Beach complied with the Regulations in this regard.

Regulation 36 requires that the **Interpretation Report** for the Strombus Survey must be submitted by mid February, 2004, six months after completion of the processing of the data. Beach will be seeking a two month extension to the submission date for the Interpretation Report for the Strombus Survey, to allow time for a more comprehensive interpretation of the data.

***Submission of data and Reports relating to Data Reprocessing  
Commitments in Year 1***

Reprocessing of archive seismic data from PEL 91 was carried out in conjunction with the processing of the new data from the 2002 Strombus Survey. A total of 429 kilometres of archive data from PEL 91 was reprocessed in Year 1.

The reprocessed data was submitted to PIRSA with the data from the 2002 Strombus survey on 10<sup>th</sup> September, 2003. Information on the techniques applied during the reprocessing of the data was documented in the Processing

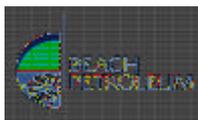
*Compliance Report for PEL 91 – Year 2*

Report for the Strombus Survey submitted to PIRSA at the same time ( as part of the Operations Report ).

***Field Operations for the 2003 2D Albus Seismic Survey***

As part of the Albus 2D Seismic Survey, 6 kilometers of seismic data were recorded in PEL 91, finishing on 30<sup>th</sup> September, 2003.

Recording of this survey finished only three months prior to the end of Permit Year 2. The attached Geophysical Reports Checklist shows that all of the various data sets and Reports for the Albus Survey are not required to be submitted to PIRSA until Permit Year 3.



## Record of Non - Compliance with Regulations

**Permit :** PEL 91      **Year 2 :**      **8 January 2003 - 7th January 2004**

<b>Drilling</b>			
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**SEO Non Compliance :**

Field Operation	Date	Description of Incident	Resolution
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*No incidents of Non - Compliance arising from the drilling operations at Carrickalinga-1.*

**Report Non Compliance :**

Name of Report	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
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*No incidents of Non - Compliance*

*Note : Well Completion Report for Carrickalinga -1 was not required to be submitted to PIRSA until after the end of Year 2 of the Licence.*

**Data Submission Non Compliance :**

Data Type	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
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*No incidents of Non - Compliance*

<b>Seismic</b>			
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**SEO Non Compliance :**

Field Operation	Date	Incident Date & Description	Resolution
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*No incidents of Non - Compliance arising from the field operations of the 2003 Albus Seismic Survey in PEL 91.*

**Report Non Compliance :**

Name of Report	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
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2002 Strombus Seismic Survey - Environmental Report	22-Nov-02	28-Jan-03	Time frame for submission of Environmental Report not clearly defined in Cooper Basin Seismic SEO.	Time frame for submission of Environmental Report has been clarified after discussions with PIRSA.
2002 Strombus Seismic Survey - Final Operations Report	19-Apr-03	10-Sep-03		Beach obtained extensions to the date for submitting the Operations Report. The Report was submitted prior to the date specified by the last extension.
2002 Strombus Seismic Survey - Interpretation Report	14-Feb-04			

**Data Submission Non Compliance :**

Data Type	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
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2002 Strombus Seismic Survey - Field Data, Field statics, Observer's Logs, Nav data	19-Apr-03	10-Sep-03		Beach obtained extensions to the date for submitting the Operations Report. The Report was submitted prior to the date specified by the last extension.
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## CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS

Permit : PEL 91 Year 2 : 8 January 2003 - 7 January 2004

Well Name : Carrickalinga -1

Commenced Drilling Operations : 4th August 2003

Completed Drilling Operations : 29th August 2003

REPORT / DATA SET	Format	Person / agency to whom information is to be provided.	Period allowed for Submitting data.	DATE	DATE	Beach officer responsible for compliance	Comments
				DUE	SUBMITTED		
Notification of proposed drilling activity including demonstration of the suitability of an existing SEO.		PIRSA / Mike Malavazos	35 days prior to proposed start date	29-Jun-03	17-Jun-03	Exploration Manager	Approval granted on 20 June 2003
Notification of proposed commencement of earthworks – preparation of access tracks and well leases		PIRSA / Tony Wright	2 days prior to proposed start date			Exploration Manager	Approval granted on 20 June 2004
Notification to landowner (s)		Pastoral Lessee;	21 days prior to proposed start date	13-Jul-03	21-Feb-03	Exploration Manager	
		National Parks;	21 days prior to proposed start date	Not Required		Exploration Manager	
		Native Title Claimant(s);	21 days prior to proposed start date	13-Jul-03	27-Feb-03	Exploration Manager	Ngayana Dieri Karna & ALRM
		other PEL or PL licensees as appropriate.	21 days prior to proposed start date	Not Required		Exploration Manager	

## CHECKLIST FOR SUBMISSION OF DRILLING REPORTS TO PIRSA

Permit : PEL 91      Year 2 :      8 January 2003 - 7 January 2004

Well Name : Carrickalinga -1      Commenced Drilling Operations : 4th August 2003      Completed Drilling Operations : 29th August 2003

REPORT / DATA SET	Format	Person / agency to whom information is to be provided.	Period allowed for Submitting data.	DATE	DATE	Beach officer responsible for compliance	Comments
				DUE	SUBMITTED		
Daily Drilling Reports		PIRSA	Within 12 hrs of report period.	During Drilling Operations	During Drilling Operations	Exploration Manager	
Wireline logs		PIRSA	Within 1 month of acquisition of data.	27-Sep-03	29-Sep-03	Exploration Manager	Transmittal No. 03 - 0082 and 03 - 0083
Mud logging data		PIRSA	Included with Daily Drilling Reports, then subsequently with the Well Completion Report.	During Drilling Operations	During Drilling Operations	Exploration Manager	
Well samples		PIRSA	Within 6 months of rig release.	29-Feb-04	Not due until Year 3	Exploration Manager	
Well Completion Reports	Refer Note below	PIRSA	Within 6 months of rig release.	29-Feb-04	Not due until Year 3	Exploration Manager	10 days late
Reportable Incidents.		PIRSA	Serious incidents must be reported immediately ( within 24 hrs ), with a written report following within 3 months.	No Reportable Incidents		Exploration Manager	
<i>Note : Well Completion Reports contain Borehole Deviation data ; Surveyed Location of well ; and other technical reports associated with the well.</i>							

**CHECKLIST FOR SUBMITTING GEOPHYSICAL DATA AND REPORTS TO PIRSA**

Permit : PEL 91 Year 2: 8 January 2003 - 7 January 2004

PAGE 1

Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments	
<b>Survey Name : 2002 Strombus 2D Seismic Survey</b>								
<b>Completed Recording 18th October 2002</b>								
Geophysical Progress Reports		Word or PDF		<a href="mailto:cockshell.david@saugov.sa.gov.au">email or fax : cockshell.david@saugov.sa.gov.au</a>	Periodic basis determined after consultation with Minister			
Geophysical Operations Reports - recording and processing		Hardcopy, PDF	10-Sep-03	1 x hardcopy report plus .pdf file on CD-ROM	Within 6 months of completion of recording data	18-Apr-03	Cover letter - Beach reference no. 801 / 03	
Geophysical Data - Seismic	Seismic Processed Data		10-Sep-03	Exabyte Tape : No. 723MS005E	Same time as associated Operations Reports	18-Apr-03	Transmittal Note : 03_0073	
Geophysical Data - Seismic	Seismic Field Data		10-Sep-03	2 boxes of 3480E tapes		18-Apr-03	Transmittal Note : 03_0074	
Geophysical Data - Seismic	Obs Logs	GDA 94	10-Sep-03	CD-ROM		18-Apr-03	Cover letter - Beach reference no. 801 / 03	
Geophysical Data - Seismic	Nav data including elevations & bathymetry	GDA 94	10-Sep-03	CD-ROM		18-Apr-03		
Geophysical Data - Seismic	Field statics		10-Sep-03	CD-ROM		18-Apr-03		
Geophysical Data - Seismic	Processed 2D seismic sections	CGM+	10-Sep-03	Exabyte Tape : No. 723CG010E			18-Apr-03	Transmittal Note : 03_0073
Geophysical Interpretation Report		Hardcopy, PDF		Completion date for processing was mid August 2003. Hence due date for Interp Report is mid Feb 2004.		Within 6 months of completion of processing data	mid - Feb 2004	Not Required until Year 3 of Licence
Geophysical Data - Seismic	Processed 3D data vols and velocities					N / A	No 3D surveys recorded during Permit Year	
Geophysical Data - Seismic	Processed 3D time slices (if they have been produced)					N / A	No 3D surveys recorded during Permit Year	
Geophysical Data	Any other field acquisition data!!!!					N / A		
<b>Year 1 Reprocessing - 390 kms</b>								
Geophysical Operations Report - reprocessing	Description of techniques applied for reprocessing	Hardcopy, PDF	10-Sep-03	1 x hardcopy report plus .pdf file on CD-ROM	Within 2 months of completion of reprocessing data	19-Apr-03	Reprocessing of historical seismic data was undertaken in conjunction with the processing of the new data from the 2002 Strombus survey. Reports and file listings relating to the reprocessing were included with the Operations report for the Strombus Survey.	
Geophysical Data - Seismic	Reprocessing - transcribed copy of field data		10-Sep-03	Exabyte Tape : No. 723MS005E	Same time as associated Operations Reports	19-Apr-03		
Geophysical Data - Seismic	Reprocessing - Sections of reprocessed data	CGM +	10-Sep-03	Exabyte Tape : No. 723MS005E		19-Apr-03		
Geophysical Data - Seismic	Reprocessing - field tape transcription log		10-Sep-03	1 x hardcopy report plus .pdf file on CD-ROM		19-Apr-03		
Geophysical Data - Seismic	Reprocessing - tape & file listing of field data that has been copied & reprocessed	Ops Report - Archive Listing	10-Sep-03	1 x hardcopy report plus .pdf file on CD-ROM		19-Apr-03		
Geophysical Interpretation Reports		Hardcopy, PDF		Completion date for processing was mid August 2003. Hence due date for Interp Report is mid Feb 2004.	Within 6 months of completion of reprocessing data	mid - Feb 2004	Not Required until Year 3 of Licence	

**CHECKLIST FOR SUBMITTING GEOPHYSICAL DATA AND REPORTS TO PIRSA**

Permit : PEL 91      Year 2 :      8 January 2003 - 7 January 2004

PAGE 2

Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments
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**Survey Name : 2003 Albus 2D Seismic Survey**

**Completed Recording on 30th September 2003**

**Survey Time : 1 day**

Geophysical Progress Reports		Word or PDF		<a href="mailto:cockshell.david@saugov.sa.gov.au">email or fax : cockshell.david@saugov.sa.gov.au</a>	Periodic basis determined after consultation with Minister		
Geophysical Operations Reports - recording and processing		Hardcopy, PDF			Within 6 months of completion of recording data	1-Apr-04	<b><i>No Data or Reports for the Albus Survey are required to be submitted until after the end of Permit Year 2</i></b>
Geophysical Data - Seismic	Seismic Field Data				Same time as associated Operations Reports	1-Apr-04	
Geophysical Data - Seismic	Obs Logs	GDA 94				1-Apr-04	
Geophysical Data - Seismic	Nav data including elevations & bathymetry	GDA 94				1-Apr-04	
Geophysical Data - Seismic	Field statics					1-Apr-04	
Geophysical Data - Seismic	Processed 2D seismic sections	CGM+				1-Apr-04	
Geophysical Interpretation Report		Hardcopy, PDF					Processing expected to be completed in Feb 2004

## Statements of Environmental Objectives.

### **A ) Drilling Operations**

Government approval for Beach to drill the **Carrickalinga-1** well in PEL 91 was conditional on Beach committing to achieving the objectives defined in the “Statement of Environmental Objectives for Drilling and Well Operations in the Cooper / Eromanga Basins – South Australia ( August, 2000 )”.

The Carrickalinga-1 well did not encounter commercial indications of hydrocarbons and was plugged and abandoned in accordance with the guidelines specified in the SEO.

Rehabilitation of the **Carrickalinga-1** well site will commence when the water remaining in the sump pit has fully evaporated, which is anticipated to be in the second quarter of 2004.

Rehabilitation of the short access track to the Carrickalinga-1 well site will commence around the same period after discussions with the landowner to determine the extent of rehabilitation required.

Subsequent to the end of Year 2 of the permit, the Department of Water Land Biodiversity and Conservation ( DWLBC ) advised PIRSA that Beach’s abandonment program for the Carrickalinga-1 well was in breach of the guidelines specified in the SEO for Cooper Basin Drilling and Well Operations ( PIRSA, August 2000 ). Carrickalinga-1 was drilled in August 2003, prior to the current ( Santos ) Drilling SEO coming into effect.

The breach relates to the number of the cement plugs that were set in the well to prevent cross-flow of groundwater between the formations which have aquifer potential. DWLBC have advised that, in their view, an additional plug should have been installed in the well.

Beach is reviewing its Plug and Abandonment procedures in relation to the current SEO. The review will provide recommendations for changes to Beach’s Drilling Operations Manual ( DOM ).

PIRSA is expecting a report from DWLBC in relation to this non-compliance, and discussions are on-going to establish a resolution to the problem.

Beach is satisfied that all the other objectives required by the SEO were met, and the spreadsheets below summarise the strategies that were employed to achieve this compliance.

**ASSESSMENT OF BEACH PETROLEUM'S PERFORMANCE IN ACHIEVING  
THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

**WELLNAME : CARRICKALINGA-1**

**PEL No. : 91**

**SPUD DATE : AUGUST 2003**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>1. Avoid disturbance to known sites of Aboriginal and European heritage significance.</p>	<p>The aim of this objective is to ensure that any sites of Aboriginal and European heritage significance are identified and protected. Sites can be identified during the planning stages of well site and access track construction or can be discovered during construction activities. To ensure the achievement of this objective personnel must be appropriately trained and experienced in identifying and protecting sites of Aboriginal and European heritage significance at both the planning and construction stages.</p>	<ul style="list-style-type: none"> <li>▪ Proposed well site and access track locations have been scouted by appropriately trained and experienced personnel for sites of Aboriginal and European heritage significance before commencement of construction.</li> <li>▪ Records of scouting are kept and available for auditing.</li> <li>▪ The operator has a mechanism in place to appropriately report and respond appropriately to any sites discovered during construction and operation activities.</li> <li>▪ Any sites identified have been flagged and subsequently avoided.</li> </ul> <p><i>Note:</i> Where a negotiated agreement or determination for heritage clearance is in place, compliance to this agreement or determination takes precedence over the above criteria.</p>	<ul style="list-style-type: none"> <li>▪ Beach have an agreement with the Ngayana Dieri Karna Native Title Claimant group which specifies the requirements for scouting proposed wells and access tracks to identify and avoid areas of heritage value and archaeological significance.</li> <li>▪ A site visit was carried out by a scouting team from the Ngayana Dieri Karna Native Title Claimant group. The proposed drilling location and access route were given heritage clearance.</li> <li>▪ There were no sites identified near the proposed operations areas as having particular cultural significance.</li> </ul>
<p>2. Avoid disturbances which have long term impact on biological or wilderness values of a particular area.</p>	<p>A number of areas which are considered to have high biological or wilderness values are shown in Figure 1. Also included are any activities that are assessed to be of significant risk to the Cooper Creek system.</p>	<ul style="list-style-type: none"> <li>▪ No activities that are assessed to be located in the regions described in the scope above are to be carried out without the prior specific approval of the Minister.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The well is not located in or near the areas of high biological or wilderness values shown in Figure 1 of the SEO. The drilling operations presented no danger of long term impact on the biological or wilderness values of this particular area.</li> </ul>

**ASSESSMENT OF BEACH PETROLEUM'S PERFORMANCE IN ACHIEVING  
THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

**WELLNAME :**      **CARRICKALINGA-1**

**PEL No. :**      **91**

**SPUD DATE :**      **AUGUST 2003**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
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<p>3. Minimise disturbance to native vegetation and wildlife habitat.</p>	<p>Well site and access track construction has been shown to have an insignificant impact on native vegetation and wildlife habitat by a number of studies<sup>1</sup>. This is due to the small and confined area impacted on by the well site and access track. Nevertheless, due to the significance of native vegetation and fauna it is important to monitor the achievement of this objective.</p> <p>The aim of this objective is to also maximise the potential for revegetation success.</p>	<ul style="list-style-type: none"> <li>▪ Proposed well site and access track locations have been scouted by appropriately trained and experienced personnel for native vegetation and wildlife habitats.</li> <li>▪ Vegetation clearance has been minimised and has taken into account the conservation needs of particular species.</li> <li>▪ Records of vegetation clearance are kept and available for auditing.</li> <li>▪ The attainment of either 0, +1 or +2 GAS criteria for "Re-establish natural vegetation on abandoned wellsites and access tracks" objective listed in Appendix 2.</li> <li>▪ Hazardous material stored, used and disposed of in accordance with relevant</li> </ul>	<ul style="list-style-type: none"> <li>▪ Only 500 metres of new access track was required. Very little further clearing was required. The wellsite area contained only sparse grassy vegetation. No significant trees or shrubs needed to be cleared</li> <li>▪ The well site and access track will be rehabilitated and restored in accordance with the guidelines set down in PIRSA's <i>Field Guide for the Environmental Assessment of Abandoned Petroleum Wellsites in the Cooper Basin, South Australia</i>, to attain the highest feasible GAS rating.</li> <li>▪ Beach's Rig Site Representative reported no instances of the spillage of hazardous chemicals during Drilling Operations..</li> </ul>
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<sup>1</sup> Leigh, J.H. and Briggs, J.D (Eds), 1994. *Threatened Australian Plants: Overview and Case Studies*. Australian National Parks and Wildlife Service, Canberra;  
 Garnett, S., 1992a. *The Action Plan for Australian Birds of Australia*, Australian National Parks and Wildlife Service. Endangered Species Program, Project 121.  
 Garnett, S. (Ed.), 1992b. *Threatened and Extinct Birds of Australia*. Royal Australian Ornithologists Union. Report, 82.  
 Wager, R. and Jackson, P., 1993. *The Action Plan for Australian Fresh Water Fishes*. Australian Nature Conservation Agency. Endangered Species Program, Project 147.  
 Lee, A.K., 1995. *The Action Plan for Australian Rodents*. Australian Nature Conservation Agency. Endangered Species Program, Project 130.  
 Kennedy, M., 1992. *Australian Endangered Marsupials and Monotremes: An Action Plan for their Conservation*. IVCN, Gland, Switzerland.

**ASSESSMENT OF BEACH PETROLEUM'S PERFORMANCE IN ACHIEVING  
THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

**WELLNAME :**      **CARRICKALINGA-1**

**PEL No. :**      **91**

**SPUD DATE :**      **AUGUST 2003**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		legislation on dangerous substances.	<ul style="list-style-type: none"> <li>▪ Topsoil was stockpiled for subsequent respreading when restoration activities are conducted.</li> </ul>
4. Avoid disturbance to rare, vulnerable and endangered flora and fauna species.	Rare, vulnerable and endangered flora and fauna species are defined by Schedule 7, 8 and 9 of the <i>National Parks and Wildlife Act, 1972</i>	<ul style="list-style-type: none"> <li>▪ Proposed well site and access track locations have been scouted for rare, vulnerable and endangered flora and fauna species by appropriately trained and experienced personnel before the commencement of construction.</li> <li>▪ Any sites of rare, vulnerable and endangered flora and fauna have been identified, flagged and subsequently avoided.</li> <li>▪ Records of such scouting are kept and available for auditing.</li> </ul>	<ul style="list-style-type: none"> <li>▪ National Parks and Wildlife flora / fauna databases contain no records of vulnerable or endangered species within 20km of the site and the closest record of a <b>rare</b> species is on a floodplain approximately 10km from the site (database search March 2003).</li> </ul>
5. Prevent the introduction and establishment of exotic weed species.	The major potential source of weed introduction is from vehicles and equipment brought in from other regions of the state or interstate for the various well activities. The most effective way of preventing weed introduction is by thoroughly cleaning vehicles and equipment prior to entering the Cooper–Eromanga Basins.	<ul style="list-style-type: none"> <li>▪ All vehicles and equipment appropriately cleaned prior to entering the Cooper–Eromanga Basins.</li> <li>▪ Cleaning carried out in accordance with specified company procedures and accepted practices.</li> <li>▪ Records of vehicle and equipment cleaning are kept and available for auditing.</li> <li>▪ Detection of exotic weed species as a consequence of industry activities.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All vehicles involved with the drilling operation were already in service in the Cooper Basin prior to commencing work at the Carrickalinga well.</li> </ul>

**ASSESSMENT OF BEACH PETROLEUM'S PERFORMANCE IN ACHIEVING  
THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

**WELLNAME :**      **CARRICKALINGA-1**

**PEL No. :**      **91**

**SPUD DATE :**      **AUGUST 2003**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
6. Minimise impacts to soil.	<p>The main impact to soil is caused by the removal of existing soil and / or the importation of foreign material for the construction of the well sites and access tracks. This creates a visual impact and can also alter the soil characteristics which can, in turn, impact on the effective re-establishment of native species.</p> <p>Another potential impact to soil is soil contamination from accidental spillages of chemicals or hazardous during construction and operation.</p>	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS Criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS Criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> <li>▪ The attainment of either 0, +1 or +2 GAS criteria for "Re-establish natural vegetation on abandoned wellsites and access tracks" objective listed in Appendix 2.</li> <li>▪ Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Clay material was extracted from several borrow pits alongside the station track that was used for the majority of the access route. The clay was used for upgrading that track, and constructing the short new section of the access track.</li> <li>▪ The 500 metre access track into the well site will be rehabilitated unless the landowner request it to be left as a station track.</li> </ul>
7. Avoid initiating erosion on gibber pavements.	<p>It is recognised that the removal of the overlying gibber mantle inevitably leads to severe gully erosion on the gibber plains with a slope greater than 2 degrees in the Cooper Basin<sup>2</sup>. It is therefore important to avoid removal of gibber stones in the construction of well sites and access tracks.</p>	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS Criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS Criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> <li>▪ Gibber mantle on access tracks has not been removed, only rolled to allow vehicle and equipment access.</li> <li>▪ Gibber mantle removal on well sites confined to the mud pit, cellar and turkey's</li> </ul>	<ul style="list-style-type: none"> <li>▪ There are no gibber pavements along the proposed access track or at the Carrickalinga well site.</li> </ul>

<sup>2</sup> Refer to Fatchen and Woodburn in the references section of this Statement of Environmental Objectives.

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		nest areas. <ul style="list-style-type: none"> <li>▪ Gibber mantle removed from such areas is respread and rolled over the disturbed area during restoration.</li> </ul>	
8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.	<p>This objective seeks to protect the water quality and water pressure of aquifers that may potentially be useful as water supplies, and to maintain pressure in sands that may host petroleum accumulations elsewhere.</p> <p>To address this objective, the risks of crossflow between formations known to be permeable and in natural hydraulic isolation from each other, or where there is insufficient information to determine that they are permeable or in hydraulic communication, must be assessed on a case by case basis and procedures implemented to isolate these formations.</p> <p>The following geological formations in the Cooper-Eromanga Basins may contain permeable sands (aquifers) which may be in natural hydraulic isolation from each other (from shallowest to deepest):</p> <ul style="list-style-type: none"> <li>▪ Eyre formation;</li> <li>▪ Winton formation;</li> <li>▪ Mackunda formation;</li> <li>▪ Coorikiana sandstone;</li> <li>▪ Cadna-owie formation;</li> <li>▪ Namur sandstone;</li> <li>▪ Adori sandstone;</li> <li>▪ Hutton sandstone;</li> </ul>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ Casing design (including setting depths) have been carried out in accordance with company defined procedures which satisfy worst case expected loads and environmental conditions determined for the particular well.</li> <li>▪ Casing set in accord with design parameters and company approved procedures.</li> <li>▪ Sufficient isolation between any of the formations listed in the adjacent column – where present – is substantiated (eg through well logs, pressure measurements or casing integrity measurements).</li> <li>▪ For cases where isolation of these formations is not established, sufficient evidence is available to demonstrate that they are in natural hydraulic communication.</li> </ul> <p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>▪ Monitoring programs, carried out in accord with company approved procedure(s), demonstrate no crossflow or fluid migration occurring behind casing.</li> <li>▪ Casing integrity and corrosion monitoring</li> </ul>	<ul style="list-style-type: none"> <li>▪ Cement plugs were placed downhole to isolate any aquifers penetrated below surface casing, and any zones of pressure differential, to ensure no likelihood of crossflow.</li> <li>• Subsequent to the end of Year 2 of the Licence, the Department of Water Land Biodiversity and Conservation ( DWLBC ) advised PIRSA that Beach's abandonment program for the Carrickalinga-1 well was in breach of the guidelines specified in the SEO for Cooper Basin Drilling and Well Operations ( PIRSA, August 2000 ).</li> <li>• DWLBC have advised that, in their view, an additional plug should have been placed in the Carrickalinga-1 well.</li> <li>• Beach is reviewing its Plug and Abandonment procedures in relation to the current SEO ( Santos, November 2003 ). The review will provide recommendations for changes to Beach's Drilling Operations Manual ( DOM ).</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<ul style="list-style-type: none"> <li>▪ Poolowanna formation;</li> <li>▪ Cuddapan formation;</li> <li>▪ Nappamerri Group formations, Walkandi and Peera Peera formations (multiple sands);</li> <li>▪ Toolachee formation (multiple sands);</li> <li>▪ Daralingie formation (multiple sands);</li> <li>▪ Epsilon formation (multiple sands);</li> <li>▪ Patchawarra, Mt Toodna or Purni formations (multiple sands);</li> <li>▪ Tirrawarra sandstone or Sturat Range formation;</li> <li>▪ Merrimelia Boorthanna and Crown Point formations (multiple sands);</li> <li>▪ Basement reservoirs.</li> </ul>	<p>programs, carried out in accordance with company approved procedure(s), show adequate casing condition to satisfy the objective.</p> <p><u>Inactive Wells</u> In the case where a well is suspended for a prolonged period of time:</p> <ul style="list-style-type: none"> <li>▪ Monitoring methods for detecting fluid migration, carried out in accord with company approved procedures for this purpose, are in place and show no fluid migration.</li> </ul> <p><u>Well Abandonment Activities</u></p> <ul style="list-style-type: none"> <li>▪ Plugs set to isolate aquifers through the well bore, designed and set in accord with defined procedures to satisfy worst case expected loads and downhole environmental conditions.</li> <li>▪ Plugs have been set to isolate all aquifers which are present which are not in natural hydraulic communication nor have been isolated by cement behind casing.</li> </ul>	

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>9. Minimise Impact on Surface Water and Drainage Patterns.</p>	<p>Due to the small and confined area impacted on well sites, there should be minimal impact to surface water drainage patterns in the region. The only foreseeable threat to drainage patterns could arise from long and wide access tracks which could divert a portion of the natural water flow. The main threat to the surface water is contamination from spills during times of major flooding. Potential spills can originate from the well while the well is producing or from the mud pits during drilling.</p>	<ul style="list-style-type: none"> <li>▪ Oil well producing operations shut in during periods of flood inundation.</li> <li>▪ Upon completion of drilling, mud pits allowed to dry out and then backfilled level with the surrounding landscape.</li> <li>▪ Access tracks have been designed and located to avoid any diversion of water during flood inundation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Carrickalinga well site is located in a dune field environment, and is approximately 20 kilometres from any significant drainage features.</li> <li>▪ There was no significant rainfall during the period of the drilling operations</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
10. Minimise visual impacts on the natural landscape.	The major impact of well sites and access tracks is their visual impact <sup>3</sup> . Location, construction and restoration practices can significantly reduce the visual impact of well sites and access tracks.	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The wellsite is located in very flat country in a dune corridor hidden from view between two sand dunes.</li> <li>▪ The 500 metre access track to the wellsite turns off a station track which carries very occasional tourist traffic. Tourists require permission from the landowner to use the road. The well site is approx 90 km by road from the nearest public road ( Moomba to Adelaide ).</li> <li>▪ The Carrickalinga-1 well site will be rehabilitated and restored in accordance with the guidelines set down in PIRSA's <i>Field Guide for the Environmental Assessment of Abandoned Petroleum Wellsites in the Cooper Basin, South Australia</i>.</li> <li>▪ Rehabilitation is expected to commence mid 2004 when the water left in the sump pit has all evaporated.</li> </ul>

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<sup>3</sup> Refer to Fatchen and Woodburn in the references section of this Statement of Environmental Objectives.

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>11. Minimise risks to the safety of the public and other third parties.</p>	<p>The criteria for assessing the achievement of this objective have been developed on the basis of the current understanding of the risks of wells to third party safety.</p> <p>The key to achieving the third party safety objective in relation to both downhole abandonment and surface well site restoration is to ensure that the visual prominence of the abandoned well site and its access track(s) is minimised to the extent where it is difficult for third parties to detect and therefore access these sites. Also, in the case where a third party encounters an abandoned well site, adequate signage of the well location needs to be displayed to hinder any third party interference with the abandoned well bore. Similarly, the backfilling of the well cellar and the removal of rubbish from the restored well site needs to be carried out to further facilitate third party safety.</p>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ Casing design (including setting depths) carried out in accordance with company approved procedures to satisfy worst case expected loads and environmental conditions determined for the specific geology intercepted by the well.</li> <li>▪ Casing set in accord with design parameters and company approved procedures.</li> <li>▪ Blow out prevention precautions in place and operational in accordance with defined procedures and appropriate to the expected loads and downhole environmental conditions.</li> </ul> <p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>▪ Adequate signage and precautions taken for warning third parties of the potential danger and to keep away from producing or suspended wells.</li> <li>▪ Casing integrity and corrosion monitoring programs, carried out in accord with the company approved procedure(s), show adequate casing condition to satisfy the objective.</li> <li>▪ Effective emergency response plan and procedures are in place in the event of a blow out.</li> <li>▪ Hazardous material stored, used and</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no incidents during the drilling operations where the safety of the public or third parties was in question.</li> <li>▪ The Carrickalinga 1 well was plugged and abandoned in accordance with the requirements of the Cooper Basin Drilling Operations SEO. Plugs were inserted to isolate potential aquifers penetrated below surface casing as required by the SEO for downhole abandonment.</li> <li>▪ An Emergency Response Plan was in place during the drilling operations of the Carrickalinga-1 well.</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<p>disposed of in accordance with relevant legislation on dangerous substances for occupational, health and safety.</p> <p><u>Well Abandonment Activities</u></p> <ul style="list-style-type: none"> <li>▪ Downhole abandonment of a well is carried out in accord with company approved procedures to satisfy worst case expected loads and downhole environmental conditions.</li> </ul> <p><u>Well Site Restoration Activities</u></p> <ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> <li>▪ The attainment of 0 GAS criteria for "Site left in a Clean, Tidy and Safe Condition after Final Cleanup" objective listed in Appendix 2.</li> </ul> <p>The undertaking of a risk assessment study to assess the threats to third party safety from drilling, well completion, well production, downhole abandonment and from inactive and abandoned wells.</p>	

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12. Minimise the impact on the environment of waste handling and disposal.	Waste refers to all wastes with the exception of the Listed Wastes in Schedule 1 Part B of the <i>Environment Protection Act 1993</i> .	<ul style="list-style-type: none"> <li>▪ The attainment of 0 GAS criteria for "Site left in a Clean, Tidy and Safe Condition after Final Cleanup" objective listed in Appendix 2.</li> <li>▪ All wastes generated on a well site (except sewage) to be disposed at an EPA licensed facility.</li> <li>▪ Records show that sewage at drilling camps was stored and disposed of in a manner which posed no risk to the human health and hygiene.</li> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ All hard waste was removed from the Carrickalinga-1 well site in accordance with Beach Petroleum's policy set out in the company's Drilling Operations Manual.</li> <li>▪ Putrescible waste was disposed of in the mud pit prior to backfilling.</li> </ul>
13. Avoid adverse impacts on livestock.	The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.	<ul style="list-style-type: none"> <li>▪ In the likely presence of livestock, the mud pits and/or flare pits and moving beam pumps are fenced off.</li> <li>▪ In the case of a producing well, the well cellar, rat hole and mouse hole are made safe for livestock either through appropriate covering or fencing.</li> <li>▪ In the case of an abandoned restored well site, the cellar has been backfilled to a level with the surrounding landscape.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The Carrickalinga well site was sufficiently distant from any cattle watering point that any threat to the cattle's safety was insignificant, particularly when combined with the low density of cattle in the area.</li> </ul>
14. Avoid spills of oil or hazardous material <b>outside</b> of impermeable sumps or other areas designed to contain such spills.	<p>The main potential for spills to occur is around the well head. Spills that occur around the well head can normally be contained within the cellar and/or confined to the pad area of the well site.</p> <p>As specified under objective 9, any threat to</p>	<ul style="list-style-type: none"> <li>▪ Cumulative number and volume of spills at any point in time during the year is less than the cumulative spills for the same period from the previous year and a general declining trend in number and volume of spills over the long term.</li> <li>▪ No spills which pose a significant threat to</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no periods of local flood inundation during the drilling operations at Carrickalinga-1.</li> <li>▪ There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>surface waters are avoided as a result of ceasing oil production during periods of inundation. Similarly, it has been found that in the Cooper Basin, threats to ground water as a result of surface spills are avoided as a result of a) the depth of the underground aquifers; and b) the entrapment of any contamination in the first 1 to 2 meters of soil. The major threat of spills is the threat to soil and vegetation directly impacted on by the spill. Therefore, the achievement of this objective also consequently contributes to the achievement of objectives 3 and 6 in relation to minimising the impacts on natural vegetation and soil respectively.</p> <p>As spills in the Cooper Basin will tend to be contained by the soil within the area of the spill, any wide scoping environmental threat is considered very unlikely. However, the focus of assessing this objective will primarily be on reducing the number of spills over time. Avoidance of spills will be paramount in areas where the spill can be potentially spread beyond the immediate confines of the spill area into sensitive environments such as creeks and wetlands.</p>	<p>the Cooper Creek system.</p>	<ul style="list-style-type: none"> <li>▪ The location of the Carrickalinga-1 well was sufficiently far removed ( approx. 20 km ) from the nearest significant drainage system, the main tributary of the Cooper Creek that flood inundation was considered unlikely.</li> </ul>

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<p>15. In the event of an oil spill, minimise the impacts on fauna, flora, soil, livestock and surface and ground water.</p>	<p>In the case of an oil spill, it has been shown that in the Cooper Basin active bio-remediation of the contaminated soil is an effective way for remediating the site to an acceptable level which leaves no environmental adverse effect<sup>4</sup>.</p>	<ul style="list-style-type: none"> <li>▪ In the event of an oil spill, contingency plan implemented after the spill event.</li> <li>▪ Results of emergency response procedures carried out in accord with Regulation 31 show that oil spill contingency plan in place in the event of a spill is adequate and any necessary remedial action needed to the plan is undertaken promptly by the licensee.</li> <li>▪ Bio-remediation is undertaken on the affected soil, either on site or offsite.</li> <li>▪ All oil spill bio-remediation meets end point assessment criteria developed specifically for the relevant environment (eg Santos Oil Spill Remediation End Point Criteria project, to be completed by December 2000).</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> </ul>

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<sup>4</sup> Megalos, N.P. 1994, *Bioremediation of Oil Contaminated Soil*, South Australian Department of Mines and Energy, Report Book No. 94/4

## **B ) Seismic Operations**

### ***New Field Operations***

Seismic field operations for Year 2 of PEL 91 consisted of recording just one short line ( 6 kms ) which was completed in a single day ( 30<sup>th</sup> September 2003 ).

This line was part of the Albus 2D survey which included lines in several of Beach's Cooper Basin permits.

Government approval for Beach to undertake the Albus Survey was conditional on Beach committing to the objectives defined in the " Statement of Environmental Objectives for Seismic Operations in the Cooper / Eromanga Basins – South Australia ".

Beach's strategies for achieving each of the SEO objectives for the Albus 2D Survey ( one day of recording in PEL 91 ) are outlined below.

The SEO requires an Environmental Report to be submitted at the completion of each seismic survey. The Environmental Report for the Albus Survey was submitted on 3<sup>rd</sup> December 2003, nine weeks after the end of recording.

<b>SEO Objective 1 :</b>	<b>Ensure that the potential impacts</b> of the proposed seismic operations on biological diversity and cultural requirements of the environment <b>are assessed within a planning process and incorporated into field management procedures.</b>
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**Goal 1.1 : *Identify important or sensitive environmental and cultural components.***

Beach has an Agreement with the Ngayana Dieri Karna ( NDK ) Claimant Group, whose Claim Area covers PEL 91. Prior to the commencement of line preparation, a Work Area Clearance was undertaken by representatives of the NDK under the terms of the Agreement. The scouting party inspected a representative sample of the proposed lines.

A report was prepared by the accompanying anthropologist, documenting the locations where deviations would be required to the proposed seismic lines to avoid sites of cultural significance.

All field crews associated with the seismic program attended an induction on cultural heritage issues for this area, with particular emphasis on identification and avoidance of significant cultural material.

**Goal 1.2 : *Identify threatening processes and activities***

No processes or activities associated with the survey operations were considered to be threatening to the subject environment.

**Goal 1.3 : *Assess any adverse impact on biological diversity likely to arise from the proposed operation on a regional basis.***

The area covered by PEL 91 comprises two land systems : dunefield and floodplain. GAS criteria for assessing adverse impacts on biodiversity for these two land systems are provided in the Statement of Environmental Objectives ( Tables A2.2. and A2.3 ).

The single seismic line recorded in PEL 91 during this Permit Year was located within a grid of previously recorded seismic lines. No adverse impacts have been identified in this region as arising from these previous seismic operations.

**Goal 1.4 : *Ensure that issues raised in the planning process are incorporated into field management procedures.***

All personnel involved in the field operations were briefed at the commencement of the survey operations as to appropriate procedures for environmental management and protection of cultural heritage.

A company representative was present with the line clearing and recording crews throughout the field operations to ensure adherence to the planned field management procedures.

<b>SEO Objective 2 :</b>	<b>Monitor and manage those activities that have</b> , or are likely to have, <b>temporary impacts</b> on biological diversity, cultural components of the environment, groundwater, or other land users, <b>and facilitate rehabilitation</b> so as to minimize such impacts if they occur.
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As defined in the SEO, the goals of this objective are to minimize :

- clearing of native vegetation,
- disturbance to native fauna,
- impacts on soil, surface drainage , visual ambience and other land users,
- the potential for third parties to use survey tracks and sites following completion of operations.

Two sets of GAS criteria are defined in the SEO for assessing the extent of these impacts. One set of criteria relates to assessment carried out at the **completion** of the field operations. The second set relates to assessment carried out when the lines **have been left to rehabilitate** for some period.

At the completion of the Albus 2D survey, an assessment of the impacts was undertaken against the first set of GAS criteria at various locations referred to as Environmental Monitoring Points ( EMPs ). Several of these EMPs are located in a dunefield environment, similar to the local environment of the single line recorded in PEL 91 during Year 2.

The results of the GAS audits are presented in the Environmental Report submitted to PIRSA at the completion of the survey. All GAS scores were in the range of 0 to +1.

<b>SEO Objective 3 :</b>	<b>Avoid undertaking any activities which have, or are likely to have, long-term significant adverse impact(s) on biological diversity, cultural components of the environment, groundwater, or other land uses</b>
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The seismic recording activities undertaken in the Albus 2D survey were similar to many previous seismic surveys undertaken in these dune field and floodplain environments.

The Gas auditing reported in the Environmental Report for this survey showed that line preparation was carried out according to best practice techniques of minimal blading and clearing of vegetation. As a result, the combination of wind action and occasional rainfall will revegetate the lines to the point they will be indiscernible within a few years. There was no indication of any likely long-term adverse impacts.

The technique of weaving the routes of the seismic lines had been practiced extensively, allowing significant tress to be left standing, which will assist the visual impact from the operations to disappear as early as possible.

**Rehabilitation of the seismic lines recorded in Year 1 of the Permit during the 2002 Strombus Survey .**

The Statement of Environment Objectives ( SEO ) for Seismic Operations in the Cooper Basin requires an Environmental Monitoring Report to be submitted to PIRSA following completion of a seismic survey.

Beach submitted an Environmental Monitoring Report for the 2002 ( **Year 1** ) Strombus Survey in PEL 91 on January 28<sup>th</sup>, 2003, three months after recording had been completed. PIRSA subsequently issued a Notice of Non-Compliance, on the basis the Report should have been submitted within five weeks of the end of recording.

Beach was not aware that the Report was required to be submitted within the five week time frame, as in Beach's opinion, this is not specified clearly in the SEO. However, having established that PIRSA requires this time frame, future Environmental Monitoring Reports will be prepared within the five week period.

The Environment Monitoring Report for the Strombus Survey included a description of the location of an Environmental Monitoring Point ( EMP - 07 ) in PEL 91 that is to be used for future monitoring of the progress of natural rehabilitation of the disturbed ground.

Photographs were taken at EMP – 07, which is at the intersection of two seismic lines, immediately after survey operations had been completed. The level of environmental impact at EMP – 07 resulting from the survey operations was also assessed using the GAS ( Goal Attainment Scaling ) system specified in the SEO.

As part of the on going monitoring process, “repeat” photographs were taken at EMP - 07 approximately 12 months after recording operations had finished. Copies of these photographs are attached, along with copies of those taken immediately after recording, for comparison. Natural rehabilitation is proceeding very quickly.

After reviewing the Environmental Monitoring Report for the 2002 Strombus Survey, PIRSA requested that for future seismic surveys, Beach should undertake a greater level of GAS assessment. This requirement was incorporated into the planning of the 2003 Albus Survey, conducted in various Cooper Basin PELs operated by Beach Petroleum.

In April 2003, PIRSA undertook an aerial environmental audit of recent seismic lines in the Cooper Basin, which included a sample of lines from Beach's 2002 seismic program. PIRSA's report concluded that, in general, rehabilitation of the lines they inspected from the 2002 program were proceeding well as a consequence of careful adherence to best practice by the line preparation crews and favourable weather conditions ( wind and rain ) in the subsequent period.

**BC-EMP - 07** Line BC02-68 Stn 470 / BC02 - 78 stn 226 looking northeast  
on line BC02-78 on grid bearing 31 deg

***Immediately after recording***



***12 months after recording***



**BC-EMP-07** Line BC02-68 Stn 470 / BC02-78 Stn 226 looking southwest  
On Line BC02-78 on grid bearing 210 deg

***Immediately after recording***



***12 months after recording***

