



**PEL 92  
Cooper/Eromanga Basin  
South Australia**

**Annual Report  
Permit Year 2**

**5th November 2002 to 4th November 2003**

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## 1 Introduction

Petroleum Exploration Licence No. 92 is situated on the western margin of the Cooper/Eromanga Basin, South Australia. The second year of the licence covers the period 5th November 2002 to 4th November 2003.

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 92 at the end of this reporting period were:

<b>Beach Petroleum Ltd (Operator)</b>	<b>75%</b>
<b>Cooper Energy NL</b>	<b>25%</b>

The agreed work commitments for PEL 92 are summarised as follows:

<b>Licence Year</b>	<b>Minimum Work Program</b>	<b>Actual Work</b>
Year 1 (5/11/01-4/11/02)	One well; 200km 2D seismic; reprocess 300km of existing seismic	One well; 296 km 2D seismic; 390km reprocess seismic
Year 2 (5/11/02-4/11/03)	One well; 100km 2D seismic; reprocess 50km of existing seismic	Two wells ; 36 km 2D seismic; 30km <sup>2</sup> 3D seismic;412km reprocess seismic
Year 3 (5/11/03-4/11/04)	50km 2D seismic	
Year 4 (5/11/04-4/11/05)	One well; 50km 2D seismic	
Year 5 (5/11/05-4/11/06)	One well	

A Petroleum Production Licence (PPL 204) covering the Sellicks Oilfield was granted on 11 September, 2003.

### 3 Exploration Activity

#### 3.1 Drilling.

Two wells were drilled in the permit during the year.

- **Christies-1**, an exploration well west of the Sellicks field, discovered oil in the Birkhead Formation. The well was subsequently completed, equipped with a beam pump and put on an Extended Production Test (EPT) commencing in October, 2003. At the end of the reporting period, the well was producing at approximately 450 BOPD.
- **Brighton-1**, located approximately 10km SSW of Christies, was plugged and abandoned in September 2003 after failing to encounter hydrocarbons.

Well Completion Reports for both wells will be submitted in due course.

#### 3.2 Seismic Data Acquisition

A total of 118km of new 2D seismic data was recorded during Year 2, and an additional 30km<sup>2</sup> of 3D seismic survey was acquired over the Christies structure after the discovery of oil in Christies-1.

At the end of Permit Year 2, the total acquired 2D seismic was 32 km in excess of the licence commitments, notwithstanding the additional Christies 3D seismic.

#### 3.3 Seismic Data Processing / Reprocessing

A total of 412 km of existing seismic was reprocessed during the permit year. At the end of year 2, the total reprocessed seismic was 452km in excess of the licence commitment.

#### 3.4 Geological, Geophysical & Engineering Studies.

Technical studies during this second permit term were chiefly directed toward the drilling of the Christies-1 and Brighton-1 wells, and the EPTs at Sellicks-1 and Christies-1. The JV is currently assessing the regional implications of oil distribution on the western flank of the Cooper Basin.

## 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 92  
Annual Report  
Licence Year 2  
5th November 2002 to 4<sup>th</sup> November 2003**

**List of Reports Generated**

<b><u>Title</u></b>	<b>Date Submitted to PIRSA</b>
Sellicks-1 Well Completion Report	3-Mar-03
Open Hole DST#1 Bottomhole Pressure Interpretation – Sellicks-1	3-Apr-03
Open Hole DST#2 Bottomhole Pressure Interpretation – Sellicks-1	3-Apr-03
Application for Petroleum Production Licence – Sellicks Field	10-Apr-03
Environmental Monitoring Report for Nautilus Seismic Survey PELs 92, 94, 95	29-Jan-03
Nautilus Seismic Survey Final Operations Report PELs 92, 94, 95	25-Sept-03
Christies-1 Well Proposal	11-Apr-03
Christies -1 Drilling Program	11-Apr-03
Brighton-1 Well Proposal	02-Jun-03
Brighton -1 Drilling Program	02-Jun-03

#### 4.3 Planned Exploration Program for Year 3

Two exploration wells are being considered for drilling in 2004. The final choice of prospect and location is subject to review, but is likely to include the Sheringa prospect (between Christies-1 and Brighton-1).

The minimum 50km seismic work commitment for Licence year 3 has already been met by seismic previously acquired. Nonetheless, the voluntary acquisition of an additional 145km of 2D seismic data is proposed, mostly in the area to the west of Christies-1. The program is designed to firm up prospects near to the Christies field development.

In addition to the exploration program, two wells are notionally proposed to develop the Christies field. The final choice of how many wells and their locations is subject to the 3D seismic data (due in January) and its interpretation. It is anticipated that a PPL application covering the Christies Field will be submitted in early 2004.

## **5 Expenditure statement**

A licence expenditure summary for the period 5th November 2002 to 4<sup>th</sup> November 2003 is presented as Table 2.

Commercial in confidence

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

**FOR**

***PEL 92 - YEAR 2***

***( NOVEMBER 2002 - OCTOBER 2003 )***

**COOPER BASIN, SOUTH AUSTRALIA**





## **Introduction**

Pursuant to Regulation 33 (2) of the 2000 Petroleum Act, Beach Petroleum, as operator of PEL 92 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 92.

The Christies-1 well was drilled during Year 2 to satisfy the original work commitments for the Licence. This well was then followed by an additional well, Brighton-1.

Similarly, seismic work in the permit considerably exceeded the commitment for Year 2 of the Licence, with the recording of an unscheduled 3D survey covering 30 square kilometers, and the reprocessing of 412 line kms of data, well in excess of the committed program of just 50 line kilometres.

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

- **Drilling**

### **Reports for Year 1 wells**

There was one instance of non-compliance associated with submission of drilling reports during Year 2 of the Licence. The Well Completion Report for Sellicks-1, drilled in Year 1 of the Licence, was submitted three weeks after the due date.

## Compliance Report for PEL 92 – Year 2

The late submission was caused primarily by late delivery from contractors of data and information which was required for the WCR. When preparing the WCRs for the wells drilled in Year 2, a time-line schedule will be established to monitor progress on each stage of the preparation.

### **Data Submission for Year 2 wells**

There was a further instance of non-compliance associated with submission of drilling data from one of the Year 2 wells. Digital **logging data** for Brighton-1 was submitted two weeks late. Delivery was delayed while waiting for the location of the well to be surveyed in the field.

The one month period currently allowed in the Regulations for submitting digital log data ( one month ) is considered generally to be very difficult to comply with, and it is anticipated that the Regulations will soon be amended to allow a more realistic time frame of two months.

There were no other instances of non-compliance with the Regulations during the drilling operations of the Christies-1 and Brighton-1 wells. All reports associated with these wells are due to be submitted in Year 3 of the Licence.

- **Seismic**

### **Submission of data and Reports from 2002 ( Permit Year 1 ) Nautilus Survey**

A seismic survey was conducted in PEL 92 during **Year 1** of the Licence, as part of the Nautilus Seismic Survey, which covered parts of three of Beach Petroleum's PELs ( 92, 94 and 95 ). Recording of the lines in PEL 92 finished on October 19<sup>th</sup>, 2002.

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

Due to the size of the combined Nautilus survey ( 1020 line kilometers ) and the need to process all of the data together, processing of the PEL 92 data could not be completed until August 2003, 10 months after recording in PEL 92 had finished.

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 25<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 30th, 2003.

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

Regulation 36 requires that the **Interpretation Report** for the Nautilus 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 Nautilus Survey, to allow time for a more comprehensive interpretation of the data.

### ***Submission of data and Reports relating to Data Reprocessing Commitments - Years 1 and 2***

Reprocessing of archive seismic data from PEL 92 was carried out in conjunction with the processing of the new data from the 2002 Nautilus Survey. A total of 802 kilometres of archive data from PEL 92 was reprocessed in Years 1 and 2.

The reprocessed data was submitted to PIRSA with the data from the 2002 Nautilus survey on 25<sup>th</sup> September, 2003. Information on the techniques applied during the reprocessing of the data was documented in the Processing Report for the Nautilus Survey submitted to PIRSA at the same time ( as part of the Operations Report ).

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

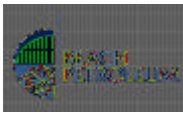
As part of the Albus 2D Seismic Survey, 35 kilometers of seismic data were recorded over two days in PEL 92, finishing on 2<sup>nd</sup> October, 2003.

Recording of this survey finished only five weeks prior to the end of Permit Year 2. The attached Geophysical Reports Checklist shows that the dates before which the various data sets and Reports for the Albus Survey must be submitted to PIRSA are all in Permit Year 3.

### ***Field Operations for the 2003 3D Christies Seismic Survey***

The Christies 3D seismic survey was recorded over four days, finishing on 10<sup>th</sup> October, 2003. The rectangular area covered by the survey was approximately 30 square kilometres and centred on the Christies-1 producing well.

Recording of this survey finished on 10<sup>th</sup> October, 2003, only four weeks prior to the end of Permit Year 2. The attached Geophysical Reports Checklist shows that the dates by which the various data sets and Reports for the Christies 3D Survey must be submitted to PIRSA are all in Permit Year 3.



## Record of Non - Compliance with Regulations

**Permit :** PEL 92      **Year 2 :**    **5 November 2002 - 4 November 2003**

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

Field Operation	Date	Description of Incident	Resolution
<i>Plug and Abandonment Program for Brighton-1</i>		DWLBC have advised PIRSA that, under the terms of the new SEO for Drilling Operations in the Cooper Basin, an additional two plugs should have been inserted in the well during the abandonment program to isolate additional potential aquifers.	Further discussions will be held with PIRSA and DWLBC to resolve the issue following the submission of a report from DWLBC to PIRSA. Beach has undertaken a review of its downhole procedures for well abandonment in the Cooper Basin.

**Report Non Compliance :**

Name of Report	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
<i>Well Completion Report for Sellicks-1</i>	2-Feb-03	3-Mar-03	Four weeks overdue waiting for technical data from contractors which was required for inclusion in the WCR	Tighter supervision of collating information for inclusion in WCR

*Note : Well Completion Reports for Christies-1 and Brighton-1 are 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
<i>Wireline Log data for Brighton -1</i>	14-Oct-03	30-Oct-03	2 weeks overdue . Current Regulations provide very difficult time frame for logging contractors to produce final logs.	PIRSA have acknowledged the current time frame ( one month ) prescribed in the Regs for submitting digital log data is difficult to achieve. For future drilling operations, Beach will apply for a longer period.

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

Field Operation	Date	Incident Date & Description	Resolution
<i>No incidents of Non - Compliance</i>			

**Report Non Compliance :**

Name of Report	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
<i>Nautilus Seismic Survey - Environmental Report</i>	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.
<i>Nautilus Seismic Survey - Final Operations Report</i>	19-Apr-03	25-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.
<i>Nautilus Seismic Survey - Interpretation Report</i>	14-Feb-04			

**Data Submission Non Compliance :**

Data Type	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
<i>Nautilus Seismic Survey - Field Data, Field statics, Observer's Logs, Nav data</i>	19-Apr-03	25-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.

## CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS

Permit : PEL 92      Year 2 :      5 November 2002 - 4 November 2003

Well Name : **Christies -1**      Commenced Drilling Operations : 23rd June 2003      Completed Drilling Operations : 12th July 2003

REQUIREMENT	Format	Person / agency to whom Notification is to be provided	Period required for Notification	Due Date for Notification	Actual Date of Notification	Beach officer responsible for compliance	Comments
Notification of proposed drilling activity including demonstration of the suitability of an existing SEO.		PIRSA / Mike Malavazos	35 days prior to proposed start date	19-May-03	17-Apr-03	Exploration Manager	Updated Version sent on 3-6-03 - with Corporate Capabilities. PIRSA approval received 5 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 for construction of access tracks granted on 13th May.
Notification to landowner (s)		Pastoral Lessee;	21 days prior to proposed start date	2-Jun-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	2-Jun-03	14-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	

Well Name : **Brighton -1**      Commenced Drilling Operations : 3rd September 2003      Completed Drilling Operations : 15th September 2003

REQUIREMENT	Format	Person / agency to whom Notification is to be provided	Period required for Notification	Due Date for Notification	Actual Date of Notification	Beach officer responsible for compliance	Comments
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-Jul-03	17-Apr-03	Exploration Manager	Updated Version sent on 19 - 6 - 03 - with Corporate Capabilities. PIRSA approval received 23 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 for construction of access tracks granted on 13th May.
Notification to landowner (s)		Pastoral Lessee;	21 days prior to proposed start date	17-Oct-03	21-Feb-03	Exploration Manager	G.Betts - Mungeranie Station
		National Parks;	21 days prior to proposed start date	Not Required			
		Native Title Claimant(s);	21 days prior to proposed start date	17-Oct-03	27-Feb-03		Ngayana Dieri Karna & ALRM
		other PEL or PL licensees as appropriate.	21 days prior to proposed start date	Not Required			

## CHECKLIST FOR SUBMISSION OF DRILLING REPORTS TO PIRSA

Permit : PEL 92      Year 2 :      5 November 2002 - 4 November 2003

**Well Name** : **Christies -1**      Commenced Drilling Operations : 23rd June 2003      Completed Drilling Operations : 12th July 2003

REPORT / DATA SET	Format	Person / agency to whom information is to be provided.	Period allowed for Submitting data.	Date Due	Date Submitted	Beach officer responsible for compliance	Comments
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.	6-Aug-03	6-Aug-03	Exploration Manager	
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.	12-Jan-03	Not due until Year 3	Exploration Manager	
Well Completion Reports	Refer Note below	PIRSA	Within 6 months of rig release.	12-Jan-03		Exploration Manager	
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>							

**Well Name** : **Brighton -1**      Commenced Drilling Operations : 3rd September 2003      Completed Drilling Operations : 15th September 2003

REPORT / DATA SET	Format	Person / agency to whom information is to be provided.	Period allowed for Submitting data.	Date Due	Date Submitted	Beach officer responsible for compliance	Comments
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.	14-Oct-03	30-Oct-03	Exploration Manager	2 weeks late
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.	15-Mar-04	Not due until Permit Year 3	Exploration Manager	
Well Completion Reports		PIRSA	Within 6 months of rig release.	15-Mar-04		Exploration Manager	Refer note below
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 92      Year 2 :      5 November 2002 - 4 November 2003

PAGE 1

Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments
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**Survey Name : 2002 Nautilus Seismic Survey**

**Completed Recording 19th October 2002**

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	25-Sep-03		Within 6 months of completion of <b>recording</b> data	19-Apr-03	Final Report submitted on 25 September, 2003. PIRSA had previously approved extensions for submission of the Operations Report until 30 September, 2003.
Geophysical Data - Seismic	Seismic Field Data		24-Sep-03	3 boxes of 3480E tapes	Same time as associated Operations Reports	19-Apr-03	
Geophysical Data - Seismic	Obs Logs	GDA 94	25-Sep-03	CD-ROM		19-Apr-03	
Geophysical Data - Seismic	Nav data including elevations & bathymetry	GDA 94	25-Sep-03	CD-ROM		19-Apr-03	
Geophysical Data - Seismic	Field statics		25-Sep-03	CD-ROM		19-Apr-03	
Geophysical Data - Seismic	Processed 2D seismic sections	CGM+	24-Sep-03	Exabyte Tape # 713FS014E		19-Apr-03	
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 <b>processing</b> 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	

**Year 1 Reprocessing - 390 kms**

Geophysical Operations Report - reprocessing		Hardcopy, PDF	25-Sep-03		Within 2 months of completion of reprocessing data	19-Apr-03	Reprocessing was undertaken in conjunction with the processing of the new data from the Nautilus survey. Reports and file listings relating to the reprocessing were included with the Operations report for the Nautilus Survey.
Geophysical Data - Seismic	Reprocessing - transcribed copy of field data		24-Sep-03		Same time as associated Operations Reports	19-Apr-03	
Geophysical Data - Seismic	Reprocessing - field tape transcription log		24-Sep-03			19-Apr-03	
Geophysical Data - Seismic	Reprocessing - tape & file listing of field data that has been copied & reprocessed	Ops Report - Archive Listing	24-Sep-03			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 92      Year 2 :      5 November 2002 - 4 November 2003

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Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments
<b>Survey Name : 2003 Albus 2D Seismic Survey</b>							
				Completed Recording 2nd October 2003			
						Survey Time : 2 days	
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	2-Apr-04	<b>No Data or Reports for the Albus Survey are required to be submitted <u>until after the end of Permit Year 2</u></b>
Geophysical Data - Seismic	Seismic Field Data				Same time as associated Operations Reports	2-Apr-04	
Geophysical Data - Seismic	Obs Logs	GDA 94				2-Apr-04	
Geophysical Data - Seismic	Nav data including elevations & bathymetry	GDA 94				2-Apr-04	
Geophysical Data - Seismic	Field statics					2-Apr-04	
Geophysical Data - Seismic	Processed 2D seismic sections	CGM+				2-Apr-04	
Geophysical Interpretation Report		Hardcopy, PDF			Within 6 months of completion of processing data		Processing expected to be completed in Feb 2004
<b>Survey Name : 2003 Christies 3D Seismic Survey</b>							
				Completed Recording 10th October 2003			
						Survey Time : 7 days	
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	10-Apr-04	<b>No Data or Reports for the Christies 3D Survey are required to be submitted <u>until after the end of Permit Year 2</u></b>
Geophysical Data - Seismic	Seismic Field Data				Same time as associated Operations Reports	10-Apr-04	
Geophysical Data - Seismic	Obs Logs	GDA 94				10-Apr-04	
Geophysical Data - Seismic	Nav data including elevations	GDA 94				10-Apr-04	
Geophysical Data - Seismic	Field statics					10-Apr-04	
Geophysical Data - Seismic	Processed 3D data vols and velocities						
Geophysical Data - Seismic	Processed 3D time slices (if they have been produced)						
Geophysical Data	Any other field acquisition data!!!!					N / A	
Geophysical Interpretation Report		Hardcopy, PDF			Within 6 months of completion of processing data		Processing expected to be completed late Feb 2004



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

Permit : PEL 92      Year 2 :      5 November 2002 - 4 November 2003

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Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments
<b>Year 2 Reprocessing - 412 kms</b>							
Geophysical Operations Report - reprocessing		Hardcopy, PDF	25-Sep-03		Within 2 months of completion of reprocessing data	19-Apr-03	Reprocessing was undertaken in conjunction with the processing of the new data from the Nautilus survey. Reports and file listings relating to the reprocessing were included with the Operations report for the Nautilus Survey.
Geophysical Data - Seismic	Reprocessing - transcribed copy of field data		24-Sep-03		Same time as associated Operations Reports	19-Apr-03	
Geophysical Data - Seismic	Reprocessing - field tape transcription log		24-Sep-03			19-Apr-03	
Geophysical Data - Seismic	Reprocessing - tape & file listing of field data that has been copied & reprocessed	Ops Report - Archive Listing	24-Sep-03			19-Apr-03	
Geophysical Interpretation Reports		Hardcopy, PDF	Completion date for re-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

## Statements of Environmental Objectives.

### **A ) Drilling Operations**

Government approval for Beach to drill the **Christies-1** and **Brighton-1** wells in PEL 92 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 Christies -1 well was successful in discovering a commercial oil reservoir, with production commencing in early October, 2003.

Rehabilitation of the **Christies-1** well site and access track is not scheduled until production operations cease. Accordingly, it will not be possible to assess Beach’s performance in achieving the SEO objectives relating to site rehabilitation until that time.

Rehabilitation of the **Brighton-1** well site will commence when the water remaining in the sump pit has evaporated, which is anticipated to be in the second quarter of 2004. Rehabilitation of the access track to the Brighton-1 well 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 Brighton-1 well was in breach of the guidelines specified in the SEO for Cooper Basin Drilling and Well Operations ( PIRSA, August 2000 ). Brighton-1 was drilled in September 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 two additional plugs should have been placed in the Brighton-1 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, for both wells Christies-1 and Brighton-1, 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 :**      **CHRISTIES-1**

**PEL No. :**      **92**

**SPUD DATE :**      **JUNE 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 agreed and given heritage clearance.</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 present no long term impact on the biological or wilderness values of this particular area.</li> </ul>

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**WELLNAME :**      **CHRISTIES-1**

**PEL No. :**      **92**

**SPUD DATE :**      **JUNE 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>▪ The access track to the well followed tracks that had already been cleared for recent seismic work. 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>▪ Beach's Rig Site Representative reported no instances of the spillage of hazardous chemicals during Drilling Operations..</li> <li>▪ Topsoil was stockpiled for subsequent respreading when restoration activities are conducted.</li> <li>▪ As the well is now successfully producing oil, the well site will not be rehabilitated until the end of production. At that stage</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.  
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		legislation on dangerous substances.	<p>the 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>, to attain the highest feasible GAS rating.</p> <ul style="list-style-type: none"> <li>▪ Discussions will be held at that time with the landowner to discuss appropriate rehabilitation of the access track, or if it is to be left open for future use as a station track.</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> <li>▪</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	<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</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 Christies -1 well.</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>of preventing weed introduction is by thoroughly cleaning vehicles and equipment prior to entering the Cooper–Eromanga Basins.</p>	<p>specified company procedures and accepted practices.</p> <ul style="list-style-type: none"> <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>	
<p>6. Minimise impacts to soil.</p>	<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>▪ For the upgrade of the station track and the construction of the well pad, clay material was extracted from several borrow pits along the access route.</li> <li>▪ The 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>, 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>
<p>7. Avoid initiating erosion on gibber pavements.</p>	<p>It is recognised that the removal of the overlying gibber mantle inevitably leads to severe gully erosion on the gibber plains with a</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> </ul>	<ul style="list-style-type: none"> <li>▪ There are no gibber pavements along the proposed access track or at the Christies well site.</li> </ul>

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	<p>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 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 nest areas.</li> <li>▪ Gibber mantle removed from such areas is respread and rolled over the disturbed area during restoration.</li> </ul>	
<p>8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.</p>	<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</p>	<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 –</li> </ul>	<ul style="list-style-type: none"> <li>▪ The Christies-1 well has been completed for production. When production operations are completed, the well will be plugged and abandoned in accordance with the requirements of the Cooper Basin Drilling Operations SEO.</li> <li>▪ Cement plugs will be placed downhole during the well abandonment program to isolate any aquifers and any zones of pressure differential to ensure no likelihood of crossflow.</li> </ul>

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

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	<p>implemented to isolate these formations. 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> <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>where present – is substantiated (eg through well logs, pressure measurements or casing integrity measurements).</p> <ul style="list-style-type: none"> <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 programs, carried out in accordance with company approved procedure(s), show adequate casing condition to satisfy the objective.</li> </ul> <p><u>Inactive Wells</u></p> <p>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</li> </ul>	



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		<p>well bore, designed and set in accord with defined procedures to satisfy worst case expected loads and downhole environmental conditions.</p> <ul style="list-style-type: none"> <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>	
<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>▪ Christies well site was located in an interdunal floodplain, approx. 4 kms from any significant drainage features ( Cooper Creek ).</li> <li>▪ The access track to the Christies -1 well site crosses the Cooper Creek. Where the track crosses the Creek, the channels are typically only 30 cms deep.</li> <li>▪ There was no significant rainfall during the period of the drilling operations.</li> </ul>
<p>10. Minimise visual impacts on the natural landscape.</p>	<p>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.</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</li> </ul>	<ul style="list-style-type: none"> <li>▪ The wellsite is located at the end of an 8 km long purpose – built access track and lies on a clay pan hidden from view between two sand dunes.</li> <li>▪ The 8 km access track to the wellsite turns off a station track which carries very</li> </ul>

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

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		Appendix 2.	occasional tourist traffic. Tourists require permission from the landowner to use the road. The well site is over 120 km from the nearest public road ( Moomba to Adelaide ).
11. Minimise risks to the safety of the public and other third parties.	<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</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no incidents during the drilling operations at Christies where the safety of the public or third parties was in question.</li> <li>▪ An Emergency Response Plan was developed for the Christies Drilling Operation.</li> <li>▪ The Christies -1 well has been completed for production. When production operations are terminated, the well will be plugged and abandoned in accordance with the requirements of the Cooper Basin Drilling Operations SEO. Plugs will be inserted to isolate potential aquifers penetrated below surface casing as required by the SEO for downhole abandonment.</li> <li>▪ The well site will also 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> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<p>adequate casing condition to satisfy the objective.</p> <ul style="list-style-type: none"> <li>▪ Effective emergency response plan and procedures are in place in the event of a blow out.</li> <li>▪ Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances for occupational, health and safety.</li> </ul> <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</p>	<ul style="list-style-type: none"> <li>▪ Appropriate signage and fencing has been installed at the facility to isolate it from third parties. The facility is not permanently manned.</li> <li>▪ An Emergency Response Plan has been developed for the Christies Production Operations.</li> </ul>

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		<p>assess the threats to third party safety from drilling, well completion, well production, downhole abandonment and from inactive and abandoned wells.</p>	
<p>12. Minimise the impact on the environment of waste handling and disposal.</p>	<p>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>.</p>	<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> </ul>	<ul style="list-style-type: none"> <li>▪ All hard waste was removed from the Christies well site in accordance with Beach'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>
<p>13. Avoid adverse impacts on livestock.</p>	<p>The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.</p>	<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 Christies 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>
<p>14. Avoid spills of oil or hazardous material <b>outside</b> of impermeable</p>	<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</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</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no periods of flood inundation during the drilling operations.</li> </ul>

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<p>sumps or other areas designed to contain such spills.</p>	<p>cellar and/or confined to the pad area of the well site.</p> <p>As specified under objective 9, any threat to 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>period from the previous year and a general declining trend in number and volume of spills over the long term.</p> <ul style="list-style-type: none"> <li>▪ No spills which pose a significant threat to the Cooper Creek system.</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> <li>▪ The location of the Christies well is well removed (approximately 4 km) from the nearest drainage system ( the main channel of the Cooper Creek).</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

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**WELLNAME :**     **BRIGHTON-1**

**PEL No. :**     **92**

**SPUD DATE :**     **SEPTEMBER 2002**

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>▪ Some cultural sites were identified, recorded and marked as exclusion areas.</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>

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**WELLNAME :**     **BRIGHTON-1**

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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>▪ The access track to the well followed tracks already cleared from recent seismic work. 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 wellsite area contained only sparse grassy vegetation. No 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</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.  
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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		legislation on dangerous substances.	GAS rating. <ul style="list-style-type: none"> <li>▪ Beach's Rig Site Representative reported no instances of the spillage of hazardous chemicals during Drilling Operations..</li> <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 Brighton well.</li> </ul>

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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 along the route of the access track To upgrade the station tracks used for access route and for the construction of the new section of the access track.</li> <li>▪ The access track will be rehabilitated if not required to be left as a station track by the landowner.</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 nest areas.</li> <li>▪ Gibber mantle removed from such areas is</li> </ul>	<ul style="list-style-type: none"> <li>▪ There are no gibber pavements along the proposed access track or at the Brighton 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
<p>8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.</p>	<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> <li>▪ Poolowanna formation;</li> <li>▪ Cuddapan formation;</li> </ul>	<p>respread and rolled over the disturbed area during restoration.</p> <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 programs, carried out in accordance with company approved procedure(s), show adequate casing condition to satisfy the</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 Brighton-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 Brighton -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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	<ul style="list-style-type: none"> <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 align="center">objective.</p> <p><u>Inactive Wells</u></p> <p>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>	
<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</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>▪ Brighton well site was located in a dunefield environment, and was approximately one kilometre from any significant drainage features.</li> <li>▪ The access track to the Christies -1 well site crosses the Cooper Creek. Where the track crosses the Creek, the channels are typically only 30 cms deep.</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.	<p>producing or from the mud pits during drilling.</p> <p>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.</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> </ul>	<ul style="list-style-type: none"> <li>▪ The wellsite is located at the end of an 9 km long purpose – built access track and lies on a clay pan hidden from view between two sand dunes.</li> <li>▪ The 9 km 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 120 km from the nearest public road ( Moomba to Adelaide ).</li> <li>▪ The Brighton-1well 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 still remaining in the sump pit has evaporated.</li> </ul>
11. Minimise risks to the safety of the public and other third parties.	<p>The criteria for assessing the achievement of this objective have been developed on the basis of the current understanding of the risks</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</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> </ul>

<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>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>approved procedures to satisfy worst case expected loads and environmental conditions determined for the specific geology intercepted by the well.</p> <ul style="list-style-type: none"> <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 disposed of in accordance with relevant legislation on dangerous substances for occupational, health and safety.</li> </ul> <p><u>Well Abandonment Activities</u></p>	<ul style="list-style-type: none"> <li>▪ The Brighton 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 Brighton-1 well.</li> </ul>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<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>	
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</li> </ul>	<ul style="list-style-type: none"> <li>▪ All hard waste was removed from the Brighton-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>

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OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<p>licensed facility.</p> <ul style="list-style-type: none"> <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>	
<p>13. Avoid adverse impacts on livestock.</p>	<p>The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.</p>	<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 Brighton 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>
<p>14. Avoid spills of oil or hazardous material <b>outside</b> of impermeable sumps or other areas designed to contain such spills.</p>	<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 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</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 the Cooper Creek system.</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no periods of local flood inundation during the drilling operations at Brighton-1.</li> <li>▪ There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> <li>▪ The location of the Brighton-1 well was sufficiently far removed ( approximately 1 km ) from the nearest significant drainage system ( a main tributary of the Cooper Creek ) that flood inundation was considered unlikely.</li> </ul>



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	<p>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>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> </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>

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

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		<ul style="list-style-type: none"> <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>	

## **B ) Seismic Operations**

Government approval for Beach to undertake its Seismic Operations in PEL 92 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 both the Albus 2D Survey ( two days of recording ) and the Christies 3D survey ( four days of recording ) are outlined below.

<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 92. 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.

The north-western corner of the Christies 3D survey area covered a short section of the Cooper Creek. However, due to the very flat terrain in this region, the Creek , in most places, comprises a broad stretch of shallow, braided washaways, rather than any definitive steep sided channels. Accordingly, the survey access tracks crossing the Cooper Creek will have negligible disturbance to the natural flow of the Creek.

**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 92 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 impacts of the Albus 2D Seismic survey and the Christies 3D Seismic Survey have been audited against these criteria and the results are presented in the attached tables.

**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 and the Christies 3D survey, an assessment of the impacts was undertaken against the first set of criteria by selecting one location from each survey area to be an Environmental Monitoring Point ( EMP ). Both of these EMPs are located in both dunefield and floodplain environments .

The results of the GAS audits are presented in the attached tables. 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 and Christies 3D surveys were similar to many previous seismic surveys undertaken in these dune field and floodplain environments.

The Gas auditing reported in the Environmental Report for these surveys 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.

Further 2D seismic survey operations are planned for 2004 in the area adjacent to the Christies 3D survey area. Part of those operations will involve auditing a sample of the 2003 survey lines to monitor the progress of natural rehabilitation.

## GAS scores for assessing seismic lines on completion of survey in the Cooper and Eromanga Basins, South Australia

Beach Petroleum Limited: 2003 PEL 92 Albus 2D & 2003 Christies 3D Seismic Surveys: Recorded October 2003: Audited by: Bruce Beer

LAND SYSTEM  (Locations)	MEASURE  (Associated goals) <sup>(a)</sup>	SCORE				
		+2 <sup>(b, c)</sup>	+1 <sup>(b, c)</sup>	0 <sup>(b, c)</sup>	-1	-2 <sup>(d)</sup>
<b>Non land system specific</b> 1) BC03-EMP-04; Line BC03-35 # 277 2) CHR03-EMP-01; Lines S508/R168  <b>Note: GAS scores refer to the area 500m either side of the EMP location</b>	<i>Impact on infrastructure</i> 2.6			• N/A	•	•
	<i>Visual impact</i> 2.5, 2.7	•	•	1)2)	•	•
	<i>Uphole site restoration</i> 2.3, 2.5 <sup>(e)</sup>	•	•	1)2)	•	•
	<i>Pollution or litter</i> 2.1, 2.2, 2.3, 2.5		•	1),2)	•	•
Dunefield	<i>Impact on vegetation</i> 2.1, 2.2 <sup>(f)</sup>	•	1), 2)		•	•
	<i>Disturbance to land surface</i> 2.2, 2.3 <sup>(e)</sup>	•	1),2)		•	•

(.../cont.)



(Table A2.2 cont.)

LAND SYSTEM	MEASURE (Associated goals) <sup>(a)</sup>	SCORE				
		+2 <sup>(b, c)</sup>	+1 <sup>(b, c)</sup>	0 <sup>(b, c)</sup>	-1	-2 <sup>(d)</sup>
Floodplain and wetlands	Impact on vegetation 2.1, 2.2 <sup>(f)</sup>	•	1),2)	•	•	•
	Disturbance to land surface 2.2, 2.3, 2.4, 2.5 <sup>(e)</sup>	•	1),2)	•	•	•
Gibber plain and tableland	Impact on vegetation 2.1, 2.2	•	• N/A	•	•	•
	Disturbance to land surface 2.2, 2.3, 2.5 <sup>(e)</sup>	•	• N/A	•	•	•
Salt lake	Disturbance to land surface 2.3, 2.5 <sup>(e)</sup>	•	• N/A	•	•	•

(a) Goals under Objective 2:

- 2.1 Clearing or other impacts on native vegetation are minimised.
- 2.2 Disturbance or other impacts on native fauna and their habitats are minimised.
- 2.3 Impact on soil is minimised.
- 2.4 Impact on surface drainage is minimised
- 2.5 Visual impact of operations (including litter) is minimised.
- 2.6 Impact on other land users is minimised.
- 2.7 Third party use of sites, following the completion of operations, is discouraged.

(b) If any criterion (dot point) within a -1 or -2 cell occurs, then a score of -1 or -2 will be allocated.

(c) For 0,+1 and +2 cells, all relevant criteria (dot point) within the cell must be satisfied to score at that level.

(d) Some criteria at -2 level may also be subject to defined conditions, but are included in this table to ensure that they are clearly identified.

(e) All vertical measurements to be measured from normal ground surface.

(f) Priority classification refers to Wiltshire and Schmidt (1977).

(g) 'Windrows' in this context means mounding of gibbers through the action of wheel trafficking and associated dispersal of gibbers away from wheel track

## **C ) Production Testing Operations**

Early in Year 2 of the PEL 92 Licence ( 9<sup>th</sup> December , 2002 ), Beach was given approval by PIRSA to undertake production testing of the **Sellicks-1** well.

Government approval was conditional on Beach committing to achieving the objectives defined in the “Statement of Environmental Objectives – Acrasia Field ( PEL90, Cooper Basin ) – Extended Petroleum Production Test – August 2002 “.

Beach is satisfied that the production operations at the Sellicks facility have met the objectives required by the SEO, and the spreadsheet below summarises the strategies that were employed to achieve this compliance.

On September 11, 2003 , PIRSA granted Petroleum Production Licence 204 covering the area of the anticipated production field at Sellicks.

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On 9<sup>th</sup> October , 2003, Beach was given approval by PIRSA to undertake production testing of the **Christies-1** well.

This approval was again conditional on Beach committing to achieving the objectives defined in the “Statement of Environmental Objectives – Acrasia Field ( PEL90, Cooper Basin ) – Extended Petroleum Production Test – August 2002 “.

Beach is satisfied that the production operations associated with the Christies facility have met the objectives required by the adopted SEO, and the spreadsheet below provides comments on the strategies that were employed to achieve this compliance.

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During 2003, Beach prepared its own EIR and SEO for Production Operations in the Cooper Basin, which was submitted in November, and approved in December , 2003. From that date, the production operations at both Sellicks and Christies will comply with the objectives identified in the Beach Petroleum Production SEO.

# ACHIEVEMENT OF ENVIRONMENTAL OBJECTIVES DURING PRODUCTION TESTING AT SELLICKS - 1 AND CHRISTIES - 1 IN PEL 92

LICENCE YEAR 2 : NOVEMBER 5 2002 TO NOVEMBER 4 2003

Environmental objective	Assessment Criteria	Performance Against Objectives
<p>1) Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance.</p>	<ul style="list-style-type: none"> <li>• Proposed location of facility and access route inspected and any additional borrow material sources formally cleared for use by signatories to the PEL 92 Native Title agreement.</li> </ul>	<p>All activities were confined to areas which have been inspected and approved through Work Area Clearances by the relevant Native Title Claimant Group. All workers arriving at the Sellicks facility were given an induction, in which they are advised of the Native Title Exclusion Zone adjacent to the facility.</p> <p>Road building material is taken either from existing borrow sources, or from new sources inspected by scouting teams from the Native Title holders. There are no known non-indigenous heritage sites near facility or along the access route.</p> <p>A scouting team from the Native Title Claimant Group inspected and approved an area adjacent to the facility that is proposed to become a shallow evaporation pond.</p>
<p>2) Minimise direct disturbance to vegetation and habitat</p>	<ul style="list-style-type: none"> <li>• Only already existing access used.</li> <li>• Sellicks 1 and Christies 1 haul roads are maintained to prevent vehicles deviating off the road.</li> <li>• Borrow for maintenance taken either from existing pits, or from sources checked for low erosion hazard, vegetation and habitat.</li> <li>• Procedures in place to limit spill and fire damage (see "Avoid spills" below).</li> </ul>	<p>Vegetation clearance has been confined to the fenced area of both facilities which are approximately 500 metres by 200metres. The haul roads closely follows the route of the original station track to minimise further vegetation clearance.</p> <p>Routine maintenance has ensured there have been no deviations of vehicles off the main haul road corridor.</p>

Environmental objective	Assessment Criteria	Comment
<p>3) Minimise soil impacts; and</p> <p>4) Minimise disturbance to gibber surfaces</p>	<ul style="list-style-type: none"> <li>• Existing access to be used.</li> <li>• Further formation construction where necessary and maintenance of formation on Acrasia 1 rig road.</li> <li>• Routine maintenance applied to whole of rig road.</li> <li>• Borrow for maintenance taken either from existing pits, or from sources checked for low erosion hazard</li> <li>• No new pad construction.</li> <li>• Procedures in place to limit and rehabilitate spill damage (see "Avoid spills" below).</li> </ul>	<p>The access road into Sellicks from the end of the Santos haul road at Tantanna was upgraded with a layer of clay before production commenced to ensure minimal disturbance of the soil beneath.</p> <p>No gibber plains in the Sellicks / Christies area, nor along the access roads.</p> <p>Borrow pit locations were selected to ensure minimal likelihood of erosion.</p>
<p>5) Avoid disturbance to rare, endangered, vulnerable species</p>	<ul style="list-style-type: none"> <li>• Existing access only used (other criteria already in (2) above).</li> </ul>	<p>All production activities were confined to the facility areas, which are approximately 500 metres by 200metres, and also the haul roads, which closely follow the route of the original station track to minimise disturbance to habitat.</p>
<p>6) Avoid impacts on high biological value or high wilderness value areas</p>	<ul style="list-style-type: none"> <li>• Procedures exist to avoid spill risks under wet conditions; see under "Avoid spills" (below).</li> </ul>	<p>There are no high biological value areas near the facility, nor the access routes.</p> <p>The haul road from the Christies-1 well to the Sellicks facility crosses the Cooper Creek twice. However, due to the very flat terrain in this region, the Creek, in most places, comprises a broad stretch of shallow, braided washaways, rather than any definitive steep sided channels. Accordingly, should the Cooper Creek flood, there would be negligible disturbance to its natural flow resulting from the haul road crossings.</p>

Environmental objective	Assessment Criteria	Comment
<p>6) Avoid impacts on high biological value or high wilderness value areas ..... ( Continued )</p>	<ul style="list-style-type: none"> <li>• Procedures exist to limit the spread of fires associated with spills</li> </ul>	<p>The nearest area of high biological or high wilderness value is the Coongie Lakes system, located over 100 kilometres upstream from the points where the Christies haul road crosses the Cooper Creek.</p> <p>The main section of the haul road, from Sellicks to Tantanna, does not cross any drainage systems.</p> <p>Procedures defined in Emergency Response Plan</p>
<p>7) Minimise fire risk at facility and prevent the spread of any fires to wellhead</p>	<ul style="list-style-type: none"> <li>• Facility and tankers designed and constructed in accordance with AS3000 to limit ignition potential</li> <li>• Uninterrupted attendance at tanker filling operations</li> <li>• Maintenance of separation distances of well, tanks, pump and tanker filling point.</li> <li>• Manual shutoff / isolation of fuel possible even with a fire in process.</li> <li>• Pool containment as described for Objective 8.</li> <li>• First attack extinguishers present in operable condition for fires at loading pump or at tanker.</li> <li>• Approval held under AS1940 to permit fires to burn out where first attack has failed.</li> </ul>	<p>A routine inspection of the facilities by Workplace Services found the fire fighting equipment to be satisfactory in terms of the Government Regulations.</p> <p>A Beach operator is in attendance while road tankers are being filled.</p> <p>First attack extinguishers are present at all potential ignition points.</p> <p>Landowner and government have given approval for fires to burn out where first attack has failed.</p>

Environmental objective	Assessment Criteria	Comment
<p>8) Avoid facility spills; and</p> <p>9) In the event of a facility spill, minimise impacts on biota, soils and surface water (including rapid cleanup)</p>	<ul style="list-style-type: none"> <li>• Storage and loading facility with high containment integrity systems using steel piping and complying with AS4041 <i>Pressure Piping</i>.</li> <li>• Piping pressure tested to the highest forecast production operating pressures and production conditions.</li> <li>• Frac tanks banded with bands sufficiently large to provide for catastrophic tank failure.</li> <li>• Delivery pump and manifold(s) separately banded to cope with local failure.</li> <li>• Delivery hard-piped to pump and loading point.</li> <li>• Loading point with clay pad over gibber surface.</li> <li>• Flexible hose with automatic cutoffs for train loading.</li> <li>• Minor spillages at loading point to be left to evaporate and bio-remediate. Where contamination is major, contaminated soils disposed into drilling sump.</li> <li>• Procedures in place for minimising overflow and loading spill risks and integrity management.</li> <li>• Attendance at equipment at all times during road tanker filling.</li> <li>• Active management of storage tank filling.</li> <li>• Filling systems, storage tank operation and tanker procedures in accordance with AS1940 <i>The Storage and Handling of <u>Flammable and Combustible Liquids</u></i>.</li> </ul>	<p>There were no spills at either facility outside of banded areas, nor along the access roads</p>

Environmental objective	Assessment Criteria	Comment
10) Avoid transportation spills	<ul style="list-style-type: none"> <li>• Procedures in place for safe movement on lease of oil transport.</li> <li>• Full trains moving only in daylight hours.</li> <li>• No movement on wet roads or in wet conditions.</li> <li>• No "wet-wheel" fording of flowing watercourses.</li> <li>• Upgrading/maintencnce of upgraded rig access road.</li> <li>• Appropriate speed limiting on rig access road.</li> </ul>	<p>There were no spills during transportation of oil to Moomba during the reporting period.</p> <p>Roads were maintained to ensure the possibility of a spill is minimised.</p> <p>No oil was trucked when the access roads were wet.</p>
11) In the event of a transportation spill, minimise the likelihood of its spread, minimise impacts of fire resulting, cleanup of oil-affected land	<ul style="list-style-type: none"> <li>• Purchaser/transportation company to have spill contingency and emergency response plans in place, and conform to Dangerous Substances Act 1979 and Environment Protection Act 1993</li> <li>• For spills in transit within the lease area, contaminated soil on sandplain or dune either landfarmed in place for bio-remediation, or in extreme cases removed for pit disposal.</li> <li>• Contaminated soil from spillage at a watercourse crossing removed.</li> <li>• No evidence of oil contamination remaining at spill site after 3 months.</li> <li>• Transportation fires permitted to burn out. Spread of secondary fires limited.</li> <li>• Fire handling provided for in emergency response plans.</li> </ul>	<p>There were no spills during transportation of oil to Moomba during the reporting period.</p> <p>Oil is sold at the wellhead to Santos who have 30 years experience of transporting oil in road tankers in the Cooper Basin.</p>

Environmental objective	Assessment Criteria	Comment
<p>12) Formation water cleaned to no visible oil (equivalent to &lt;30ppm hydrocarbons) before disposal.</p>	<ul style="list-style-type: none"> <li>• No visible oil film on disposed water.</li> <li>• No disposal occurring once the final clarification pond (ex-turkey's nest) level has exposed the central riser of the breaker siphon.</li> <li>• Zone under test is shut in if production of formation water approached limits of formation water handling system</li> </ul>	<p>An evaporation pond was constructed <b>within</b> the Sellicks facility in May 2003. Visual checks are made on a weekly basis as part of the Weekly Environmental Report to ensure no oil visible on the surface.</p>
<p>13) Minimise adverse impact on livestock; and</p> <p>14) Avoid contamination of stockwaters with hydrocarbons.</p>	<ul style="list-style-type: none"> <li>• Existing access only used.</li> <li>• Formation water only released where no visible oil present (&lt;30ppm)</li> <li>• End-use and location of formation water determined in discussion and agreement with pastoral leaseholder (including option of use as stockwater), including fencing requirements, if any.</li> <li>• Contaminated water either contained (extended duration separation tank) or fenced (final clarification at turkey's nest).</li> <li>• Pastoral leaseholder has been informed of oil movements.</li> </ul>	<p>The existing evaporation pond at Sellicks is located within the cattle proof fence surrounding the facility. The proposed free-form evaporation pond at Sellicks will also be fenced to ensure there is no access for cattle.</p> <p>There are currently no plans for a dewatering plant at Christies. Plans are in progress to lay a flowline from the Christies well to the Sellicks facility. Water produced from the Christies well will remain with the oil until it reaches the Sellicks facility.</p> <p>There are no stock watering points within several kilometres of either the Sellicks or Christies facility.</p> <p>Pastoral leaseholder was consulted regarding the proposed location for a freeform evaporation pond.</p>



Environmental objective	Assessment Criteria	Comment
15) Minimise visual impacts	<ul style="list-style-type: none"> <li>• Existing access only to be used</li> </ul>	<p>Both the Sellicks and Christies facilities are over 100 kms from the nearest public roads ( Innamincka and Strzelecki Tracks ).</p> <p>Vehicular traffic is restricted to the main haul road to Sellicks and Christies.</p>
16) Minimise public and third party risks	<ul style="list-style-type: none"> <li>• Signage on rig road/public road intersection prohibiting entry, warning against trespassing, and warning of danger associated with petroleum activity and truck movements.</li> <li>• Limitations on road train movements as above.</li> </ul>	
17) Minimise workforce hazards	<ul style="list-style-type: none"> <li>• Cutoff valves installed and operable at wellhead.</li> <li>• Firefighting provisions (extinguishers) for loading area and pump bunded area.</li> <li>• Sufficient separation of wellhead, pump, tanks and loading sufficient for isolating major fires.</li> <li>• Storage and loading facilities fully earthed (single earth).</li> <li>• Emergency action and evacuation procedures in place.</li> </ul>	