



**PEL 95  
Cooper/Eromanga Basin  
South Australia**

**Annual Report  
Permit Year 1**

**30th October 2001 to 29th October 2002**

## **Contents**

- 1 Introduction**
- 2 Permit Summary**
- 3 Exploration Activity**
- 4 Administration**
- 5 Expenditure statement**

## 1 Introduction

Petroleum Exploration Licence No. 95 is situated on the southern margin of the Cooper/Eromanga Basin, South Australia. The first year of the licence covers the period 30th October 2001 to 29th October 2002.

This report details the work performed by the Joint Venture during this first 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 95 at the end of this reporting period were:

**Beach Petroleum NL (Operator)            50%**  
**Magellan Petroleum (NT) Pty Ltd        50%**

The agreed work commitments for PEL 95 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; 320km 2D seismic; reprocess 200km existing seismic	*Two wells 415km 2D seismic; reprocess 109km existing seismic
Year 2 (5/11/02-4/11/03)	One well; 90km 2D seismic	
Year 3 (5/11/03-4/11/04)	One well	
Year 4 (5/11/04-4/11/05)	One well 50km 2D seismic	
Year 5 (5/11/05-4/11/06)	One well	

\* An application to substitute 91 km of seismic reprocessing with new seismic acquisition (on an equivalent cost basis) has been submitted. A request is being prepared to credit actual work in excess of the minimum Year 1 program to future permit commitments.

### **3 Exploration Activity**

#### **3.1 Drilling.**

Two exploration wells (Aldinga-1 and Henley-1) were drilled in the permit during the year. Aldinga-1 spudded on 24/08/02 and drilled to a total depth of 1619 metres. Henley-1 spudded on 9/09/02 and drilled to a total depth of 1673 metres. Both wells intersected thin, abbreviated Cooper Basin Permo/Triassic sediments that were overlain by a typical Eromanga section. Aldinga-1 was cased and suspended after successfully testing oil from the CadnaOwie Formation, while Henley-1 was plugged and abandoned, after oil recoveries and log analysis indicated that only sub-commercial oil was evident in the well.

Well Completion Reports for both wells are currently in preparation and will be submitted in due course.

#### **3.2 Seismic Data Acquisition**

A total of 415km of seismic data (part of the "Nautilus" survey) were acquired during 2002, as compared to the Year 1 commitment of 320 km.

#### **3.3 Seismic Data Processing/ Reprocessing**

In addition to processing the Nautilus survey data, the Joint Venture also re-processed a total of 109 km of existing seismic data. This is 91 km less than committed, but is credited against 2km of newly acquired seismic.

#### **3.4 Geological and Geophysical Studies.**

Technical studies during this first permit term were chiefly directed toward the regional interpretation of seismic structure and oil migration pathways, and preparations for the drilling of the Aldinga-1 and Henley-1 exploration wells.

## 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 various Statements of Environmental Objectives governing the field operations undertaken during Year 1.

### 4.2 Data submissions.

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

**Table 1**  
**PEL 95**  
**Annual Report**  
**Licence Year 1**  
**30<sup>TH</sup> October 2001 to 29<sup>th</sup> October 2002**

#### **List of documents submitted**

<u>Title</u>
Aldinga-1 Well Proposal
Aldinga-1 Drilling Program
Henley-1 Well Proposal
Henley-1 Drilling Program

### 4.3 Planned Exploration Program for Year 2

One exploration well (nominally "Chiton-1") is planned for 2003. However, the final choice of prospect and location is subject to the results of seismic data acquired but not yet processed and interpreted.

Completion and production testing of the suspended Aldinga-1 is also planned for Year 2, at an estimated cost of \$1.28 million.

The minimum 90km seismic work commitment for Licence year 2 has already been partially met by seismic acquired during Year 1 (reference letter to Director Petroleum 26/9/02). Nonetheless, a total of 200 km of 2D seismic data is proposed, with an additional 200km of reprocessed seismic. The program aims to further detail the

region south of the Aldinga discovery and in the vicinity of the Henley structure.

## **5 Expenditure statement**

A licence expenditure summary for the period 30<sup>th</sup> October 2001 to 29<sup>th</sup> October 2002 is presented as Table 2.

**Table 2**

**PEL 95  
Annual Report  
Licence Year 1  
30<sup>th</sup> October 2001 to 29<sup>th</sup> October 2002**

**Statement of Expenditure**

Commercial in confidence

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

**FOR**

***PEL 95 - YEAR 1***

***( NOVEMBER 2001 - OCTOBER 2002 )***

**COOPER BASIN, SOUTH AUSTRALIA**



## **Introduction**

Pursuant to Regulation 33 (2) of the 2000 Petroleum Act, Beach Petroleum, as operator of PEL 95 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 1 of the Permit where Beach Petroleum did not comply with the Regulations or 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 either the 2000 Petroleum Act or the terms of the Licence during Year 1 of PEL 95.

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

- **Drilling**

There was one instance of non-compliance with the Regulations of the 2000 Petroleum Act.

Beach failed to comply with Regulation 39 when submitting the wireline log data for the Aldinga-1 and Henley-1 wells. Beach submitted a complete set of digital log data to PIRSA within the specified time period. However, there were two deficiencies in the data set submitted.

Firstly, the data was submitted in .LAS format, rather than the required .LIS ( or DLIS ) format. Secondly, the header section of this log data set did not include the surveyed coordinates of the well, as this data could not be supplied to Beach by the surveying contractors until well after the due date for submitting the digital log data.

A replacement digital log data set ( in the correct .LIS format ) was subsequently submitted when the location survey information became available.

From an operational viewpoint, it will be difficult to avoid a recurrence of this non-compliance when submitting log data for future wells. Accordingly, Beach will request from PIRSA an extension of the time allowed for submitting digital log data from each of its future wells. Beach will request that the period of one month, as specified in the Regulations, be extended to three months.

- **Seismic**

There were no instances of non-compliance with the Regulations in regard to Beach's **seismic field operations** in PEL 95.

The 2002 Nautilus Seismic Survey included 415 kilometres of survey lines in PEL 95. Recording of this survey finished only three weeks prior to the end of Permit Year 1.

The attached Geophysical Reports Checklist shows that the dates on which the various data sets and Reports from the Nautilus Survey are due to be submitted to PIRSA are all during Permit Year 2.

Work commitments for Year 1 of PEL 95 called for the **reprocessing** of 109 kms of archive seismic data. To achieve optimum results when merging the reprocessed data with the new data from the 2002 Nautilus Survey, it was necessary that both new and old data sets should be processed together. For further efficiency, the processing of the PEL 95 data was combined with the processing of ( new and old ) data from PELs 91, 92 and 94, required by the work commitments for those Licences.

The combined project involves the processing of over 2,064 kilometres of data. Completion of this work is not expected until the second quarter of 2003.



## Record of Non - Compliance with Regulations

**Permit :** PEL 95      **Year 1 :**      **30 October 2001 - 29 October 2002**

<b>Drilling</b>			
-----------------	--	--	--

SEO Non Compliance	Date	Incident Date & Description	Resolution
--------------------	------	-----------------------------	------------

Non Compliance of Report Submission	Date Due	Report Name	Resolution
-------------------------------------	----------	-------------	------------

*Well Completion Reports for Aldinga-1 and Henley-1 are not required to be submitted to PIRSA until after the end of Year 1 of the Licence.*

Non Compliance of Data Submission	Date Due	Data Type	Resolution
-----------------------------------	----------	-----------	------------

Aldinga-1 Digital Wireline Data - Late submission	3/10/2002	Conventional log data submitted 19/12/02; digital dipmeter data submitted 2/5/03	Final header information (survey location) not available until end of 4-well program. Difficulty obtaining digital dipmeter data from contractor.
Henley-1 Digital Wireline Data - Late submission	17/10/2002	Digital log data submitted 22/11/02	Final header information (survey location) not available until end of 4-well program. Digital data w/o final surveyed well location supplied within to PIRSA within 2 days.

<b>Seismic</b>			
----------------	--	--	--

SEO Non Compliance	Date	Incident Date & Description	Resolution
--------------------	------	-----------------------------	------------

Non Compliance of Report Submission	Date Due	Report Name	Resolution
-------------------------------------	----------	-------------	------------

*No seismic Reports are required to be submitted to PIRSA until after the end of Year 1 of the Licence.*

Non Compliance of Data Submission	Date Due	Data Type	Resolution
-----------------------------------	----------	-----------	------------

*No seismic Data sets are required to be submitted to PIRSA until after the end of Year 1 of the Licence.*

## CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS

Permit : PEL 95      Year 1 :    30 October 2001 - 29 October 2002

Well Name : **Aldinga -1**      Commenced Drilling Operations : 26th August 2002    Completed Drilling Operations : 5th September 2002

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	23-Jul-02	6-Mar-02	Exploration Manager	PIRSA gave Approval for Drilling on 6 May 2002
Notification of proposed commencement of earthworks – preparation of access tracks and well leases		PIRSA / Tony Wright	2 days prior to proposed start date		11-Jul-02	Exploration Manager	
Notification to landowner (s)		Pastoral Lessee;	21 days prior to proposed start date	5-Aug-02	9-Apr-02	Exploration Manager	
		National Parks;	21 days prior to proposed start date	5-Aug-02	Not Required		
		Native Title Claimant(s);	21 days prior to proposed start date	5-Aug-02	9-Apr-02		
		other PEL or PL licensees as appropriate.	21 days prior to proposed start date	5-Aug-02	Not Required		

Well Name : **Henley -1**      Commenced Drilling Operations : 9th September 2002    Completed Drilling Operations : 23rd September 2002

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	5-Aug-03	6-Mar-02	Exploration Manager	PIRSA gave Approval for Drilling on 6 May 2002
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	
Notification to landowner (s)		Pastoral Lessee;	21 days prior to proposed start date	19-Aug-02	9-Apr-02	Exploration Manager	
		National Parks;	21 days prior to proposed start date	19-Aug-02	Not Required		
		Native Title Claimant(s);	21 days prior to proposed start date	19-Aug-02	9-Apr-02		
		other PEL or PL licensees as appropriate.	21 days prior to proposed start date	19-Aug-02	Not Required		

## CHECKLIST FOR SUBMISSION OF DRILLING REPORTS TO PIRSA

Permit : PEL 95      Year 1 :      30 October 2001 - 29 October 2002

**Aldinga - 1**      Commenced Drilling Operations : 26th August 2002      Completed Drilling Operations : 5th September 2002

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.	5-Oct-02		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.	5-Mar-03	Not due until Permit Year 2	Exploration Manager	
Well Completion Reports		PIRSA	Within 6 months of rig release.	5-Mar-03		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>							

**Henley - 1**      Commenced Drilling Operations : 9th September 2002      Completed Drilling Operations : 23rd September 2002

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.	23-Oct-02		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.	23-Mar-03	Not due until Permit Year 2	Exploration Manager	
Well Completion Reports		PIRSA	Within 6 months of rig release.	23-Mar-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>							

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

**Permit : PEL 95      Year 1 :      30 October 2001 - 29 October 2002**

Geophysical Data	Specifics	Format	Transmittal	Sent to	Time Period	Due Date	Comments
<b>Survey Name : 2002 Nautilus Seismic Survey</b>							
<b>Completed Recording 19th October 2002</b>							
Geophysical Progress Reports		Word or PDF		<a href="mailto:cockshell.david@saugov.sa.gov.au">email or fax : cockshell.david@saugov.sa.gov.au</a>	Periodic basis determined after consultation with Minister		
Geophysical <b>Operations</b> Reports - recording and processing		Hardcopy, PDF			Within 6 months of completion of <b>recording</b> data ( 19th October )	19-Apr-03	<b>No Data or Reports for the Nautilus Survey are required to be submitted <u>until after the end of Permit Year 1</u></b>
Geophysical Data - Seismic	Seismic Field Data				Same time as associated Operations Reports	19-Apr-03	
Geophysical Data - Seismic	Obs Logs	GDA 94				19-Apr-03	
Geophysical Data - Seismic	Nav data including elevations & bathymetry	GDA 94				19-Apr-03	
Geophysical Data - Seismic	Field statics					19-Apr-03	
Geophysical Data - Seismic	Processed 2D seismic sections					19-Apr-03	
Geophysical <b>Interpretation</b> Reports		Hardcopy, PDF			Within 6 months of completion of processing of data		Processing of data from Nautilus Survey will not be completed until Year 2 of the Licence.
Geophysical Data - Seismic	Processed 3D data vols and velocities					N / A	No 3D surveys recorded during Permit Year
Geophysical Data - Seismic	Processed 3D time slices (if they have been produced)					N / A	No 3D surveys recorded during Permit Year
Geophysical Data	Any other field acquisition data!!!!					N / A	
<b>Reprocessing of 109 kms</b>							
Geophysical Operations Reports - reprocessing		Hardcopy, PDF			Within 2 months of completion of reprocessing data	19-Apr-03	Reprocessing will be completed at the same time as the processing of the new data from the Nautilus survey. Reports relating to the reprocessing will be included with Operations and Interpretation Reports for the Nautilus Survey.
Geophysical Interpretation Reports		Hardcopy, PDF			Within 6 months of completion of reprocessing data	19-Apr-03	
Geophysical Data - Seismic	Reprocessing - transcribed copy of field data				Same time as associated Operations Reports	19-Apr-03	
Geophysical Data - Seismic	Reprocessing - field tape transcription log					19-Apr-03	
Geophysical Data - Seismic	Reprocessing - tape & file listing of field data that has been copied & reprocessed					19-Apr-03	

## **Statements of Environmental Objectives.**

### **A ) Drilling Operations**

Government approval for Beach to drill the Henley-1 and Aldinga-1 wells in PEL 95 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 “.

The Aldinga-1 well was successful in discovering a commercial oil reservoir, with production due to commence in the second quarter of 2003 ( Year 2 of the Licence ).

Rehabilitation of the Aldinga-1 well site and access road will not commence 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 Henley-1 well site and access road will commence when the water remaining in the sump pit has evaporated, which is anticipated to be in the second quarter of 2003. The landowner is agreeable to this proposed schedule.

Beach is satisfied that all the other objectives required by the SEO were met, and the spreadsheet below summarises the strategies that were employed to accomplish this compliance.

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

**WELLNAME :** ALDINGA-1

**PEL No. :** 95

**DATE :** OCTOBER 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 Yandruwandha / Yawarrawarrka 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>▪ Joint site visits were carried out with the Native Title Claimant group. The proposed drilling location and access route were agreed and given heritage clearance.</li> <li>▪ Areas of significance, which were to be avoided during drilling operations, were identified.</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>

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

**WELLNAME :**     **ALDINGA-1**

**PEL No. :**     **95**

**DATE :**       **OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<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>▪ A new road, approx 12 kms long, was constructed to provide access to the well site. The route for the road was mainly through sparse grassy vegetation with no requirement for clearing substantial trees.</li> <li>▪ The wellsite area contained only sparse grassy vegetation. No trees or shrubs needed to be cleared.</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 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</li> </ul>

<sup>1</sup> Leigh, J.H. and Briggs, J.D (Eds), 1994. *Threatened Australian Plants: Overview and Case Studies*. Australian National Parks and Wildlife Service, Canberra;  
Garnett, S., 1992a. *The Action Plan for Australian Birds of Australia*, Australian National Parks and Wildlife Service. Endangered Species Program, Project 121.  
Garnett, S. (Ed.), 1992b. *Threatened and Extinct Birds of Australia*. Royal Australian Ornithologists Union. Report, 82.  
Wager, R. and Jackson, P., 1993. *The Action Plan for Australian Fresh Water Fishes*. Australian Nature Conservation Agency. Endangered Species Program, Project 147.  
Lee, A.K., 1995. *The Action Plan for Australian Rodents*. Australian Nature Conservation Agency. Endangered Species Program, Project 130.  
Kennedy, M., 1992. *Australian Endangered Marsupials and Monotremes: An Action Plan for their Conservation*. IVCN, Gland, Switzerland.

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

**WELLNAME :     ALDINGA-1**

**PEL No. :     95**

**DATE :        OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		legislation on dangerous substances.	feasible 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> <li>▪</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 Aldinga well.</li> </ul>

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

**WELLNAME :** ALDINGA-1

**PEL No. :** 95

**DATE :** OCTOBER 2002

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>▪ For the construction of the access track and the well pad, clay material was extracted from a number of borrow pits alongside the access track.</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, 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> </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 Aldinga well site.</li> </ul>

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

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

**WELLNAME : ALDINGA-1**

**PEL No. : 95**

**DATE : OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
-----------	---------	---------------------	----------------------

		respread and rolled over the disturbed area during restoration.	
8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.	<p>This objective seeks to protect the water quality and water pressure of aquifers that may potentially be useful as water supplies, and to maintain pressure in sands that may host petroleum accumulations elsewhere.</p> <p>To address this objective, the risks of crossflow between formations known to be permeable and in natural hydraulic isolation from each other, or where there is insufficient information to determine that they are permeable or in hydraulic communication, must be assessed on a case by case basis and procedures implemented to isolate these formations.</p> <p>The following geological formations in the Cooper-Eromanga Basins may contain permeable sands (aquifers) which may be in natural hydraulic isolation from each other (from shallowest to deepest):</p> <ul style="list-style-type: none"> <li>▪ Eyre formation;</li> <li>▪ Winton formation;</li> <li>▪ Mackunda formation;</li> <li>▪ Coorikiana sandstone;</li> <li>▪ Cadna-owie formation;</li> <li>▪ Namur sandstone;</li> <li>▪ Adori sandstone;</li> <li>▪ Hutton sandstone;</li> <li>▪ Poolowanna formation;</li> <li>▪ Cuddapan formation;</li> <li>▪ Nappamerri Group formations, Walkandi</li> </ul>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ Casing design (including setting depths) have been carried out in accordance with company defined procedures which satisfy worst case expected loads and environmental conditions determined for the particular well.</li> <li>▪ Casing set in accord with design parameters and company approved procedures.</li> <li>▪ Sufficient isolation between any of the formations listed in the adjacent column – where present – is substantiated (eg through well logs, pressure measurements or casing integrity measurements).</li> <li>▪ For cases where isolation of these formations is not established, sufficient evidence is available to demonstrate that they are in natural hydraulic communication.</li> </ul> <p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>▪ Monitoring programs, carried out in accord with company approved procedure(s), demonstrate no crossflow or fluid migration occurring behind casing.</li> <li>▪ Casing integrity and corrosion monitoring 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>▪ The Aldinga 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.</li> <li>▪ Cement plugs will be placed to isolate any aquifers penetrated below surface casing, and any zones of pressure differential, to ensure no likelihood of crossflow.</li> </ul>

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

**WELLNAME : ALDINGA-1**

**PEL No. : 95**

**DATE : OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>and Peera Peera formations (multiple sands);</p> <ul style="list-style-type: none"> <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>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 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>▪ Aldinga well site is located in an interdunal floodplain, and is approximately 4 kms from any significant drainage features.</li> <li>▪ The access track does not cross any significant watercourses or drainage features.</li> <li>▪ There was no rainfall during the period of the drilling operations.</li> <li>▪ Subsequent local flooding has occurred</li> </ul>

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

**WELLNAME : ALDINGA-1**

**PEL No. : 95**

**DATE : OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
			since the drilling operations were completed. There have been no observed impacts on surface water or drainage patterns due to the site facility.
10. Minimise visual impacts on the natural landscape.	The major impact of well sites and access tracks is their visual impact <sup>3</sup> . Location, construction and restoration practices can significantly reduce the visual impact of well sites and access tracks.	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The wellsite is located at the end of a 12 km long purpose – built private track and lies on a clay pan between two sand dunes.</li> <li>▪ At the conclusion of production operations, 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></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 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</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</li> </ul>	<ul style="list-style-type: none"> <li>▪ There were no incidents during the drilling operations where the safety of the public or third parties was in question.</li> <li>▪ The Aldinga 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</li> </ul>

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

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

**WELLNAME :**     **ALDINGA-1**

**PEL No. :**     **95**

**DATE :**       **OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>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>procedures.</p> <ul style="list-style-type: none"> <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>▪ 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>Drilling Operations SEO. Plugs will be inserted to isolate potential aquifers penetrated below surface casing as required by the SEO for downhole abandonment</p> <ul style="list-style-type: none"> <li>▪ As the well is now successfully producing oil, the well site will not be rehabilitated until the end of production. At that stage 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>▪ Appropriate signage and fencing has been installed at the facility to isolate it from third parties.</li> <li>▪ An Emergency Response Plan has been developed for the Aldinga Production Operations.</li> </ul>

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

**WELLNAME :** ALDINGA-1

**PEL No. :** 95

**DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<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 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 Aldinga 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>

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

**WELLNAME :**     **ALDINGA-1**

**PEL No. :**     **95**

**DATE :**       **OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<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 Aldinga 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> <li>▪ The production facility at Aldinga is suitably fenced to protect any cattle from injury.</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 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>	<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 flood inundation during the drilling operations.</li> <li>▪ There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> <li>▪ The Aldinga-1 well is located sufficiently distant ( approximately 14 km ) from the nearest drainage system ( the main channel of the StrzeleckiCreek) that flood inundation is not considered a likelihood.</li> </ul>

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

**WELLNAME :** ALDINGA-1

**PEL No. :** 95

**DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<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> <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>

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

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

**WELLNAME : HENLEY-1**

**PEL No. : 95**

**SPUD DATE : OCTOBER 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 Yandruwandha / Yawarrawarkka 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 Yandruwandha / Yawarrawarkka 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</li> </ul>
<p>2 Avoid disturbances which have long term impact on biological or wilderness values of a particular area.</p>	<p>A number of areas which are considered to have high biological or wilderness values are shown in Figure 1. Also included are any activities that are assessed to be of significant risk to the Cooper Creek system.</p>	<ul style="list-style-type: none"> <li>▪ No activities that are assessed to be located in the regions described in the scope above are to be carried out without the prior specific approval of the Minister.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The well is not located in or near the areas of high biological or wilderness values shown in Figure 1 of the SEO. The drilling operations presented no danger of long term impact on the biological or wilderness values of this particular area.</li> </ul>

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
-----------	---------	---------------------	----------------------

<p>3. Minimise disturbance to native vegetation and wildlife habitat.</p>	<p>Well site and access track construction has been shown to have an insignificant impact on native vegetation and wildlife habitat by a number of studies<sup>1</sup>. This is due to the small and confined area impacted on by the well site and access track. Nevertheless, due to the significance of native vegetation and fauna it is important to monitor the achievement of this objective.</p> <p>The aim of this objective is to also maximise the potential for revegetation success.</p>	<ul style="list-style-type: none"> <li>▪ Proposed well site and access track locations have been scouted by appropriately trained and experienced personnel for native vegetation and wildlife habitats.</li> <li>▪ Vegetation clearance has been minimised and has taken into account the conservation needs of particular species.</li> <li>▪ Records of vegetation clearance are kept and available for auditing.</li> <li>▪ The attainment of either 0, +1 or +2 GAS criteria for "Re-establish natural vegetation on abandoned wellsites and access tracks" objective listed in Appendix 2.</li> <li>▪ Hazardous material stored, used and disposed of in accordance with relevant</li> </ul>	<ul style="list-style-type: none"> <li>▪ Only two kilometres of the new access route needed to be cleared. The wellsite was located 1 kilometre north of the ROW for the Moomba to Sydney Pipeline.</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 GAS rating.</li> </ul>
---------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

<sup>1</sup> Leigh, J.H. and Briggs, J.D (Eds), 1994. *Threatened Australian Plants: Overview and Case Studies*. Australian National Parks and Wildlife Service, Canberra;  
 Garnett, S., 1992a. *The Action Plan for Australian Birds of Australia*, Australian National Parks and Wildlife Service. Endangered Species Program, Project 121.  
 Garnett, S. (Ed.), 1992b. *Threatened and Extinct Birds of Australia*. Royal Australian Ornithologists Union. Report, 82.  
 Wager, R. and Jackson, P., 1993. *The Action Plan for Australian Fresh Water Fishes*. Australian Nature Conservation Agency. Endangered Species Program, Project 147.  
 Lee, A.K., 1995. *The Action Plan for Australian Rodents*. Australian Nature Conservation Agency. Endangered Species Program, Project 130.  
 Kennedy, M., 1992. *Australian Endangered Marsupials and Monotremes: An Action Plan for their Conservation*. IVCN, Gland, Switzerland.

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		legislation on dangerous substances.	<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 Henley well.</li> </ul>
6. Minimise impacts to soil.	The main impact to soil is caused by the removal of existing soil and / or the importation	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS Criteria for "Minimise Visual Impact of Abandoned</li> </ul>	<ul style="list-style-type: none"> <li>▪ Clay material was extracted from several borrow pits along the route of the access</li> </ul>

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

**WELLNAME :**     **HENLEY-1**

**PEL No. :**     **95**

**SPUD DATE :**     **OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>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>	<p>Wellsites" objective listed in Appendix 2.</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>▪ 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>	<p>track To upgrade the station tracks used for access route and for the construction of the new section of the access track.</p> <ul style="list-style-type: none"> <li>▪ The access track will be rehabilitated if not required to be left as a station track by the landowner.</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 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 respread and rolled over the disturbed area during restoration.</li> </ul>	<ul style="list-style-type: none"> <li>▪ There are no gibber pavements along the proposed access track or at the Henley well site.</li> </ul>

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

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

**WELLNAME : HENLEY-1**

**PEL No. : 95**

**SPUD DATE : OCTOBER 2002**

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> <li>▪ Nappamerri Group formations, Walkandi and Peera Peera formations (multiple</li> </ul>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ Casing design (including setting depths) have been carried out in accordance with company defined procedures which satisfy worst case expected loads and environmental conditions determined for the particular well.</li> <li>▪ Casing set in accord with design parameters and company approved procedures.</li> <li>▪ Sufficient isolation between any of the formations listed in the adjacent column – where present – is substantiated (eg through well logs, pressure measurements or casing integrity measurements).</li> <li>▪ For cases where isolation of these formations is not established, sufficient evidence is available to demonstrate that they are in natural hydraulic communication.</li> </ul> <p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>▪ Monitoring programs, carried out in accord with company approved procedure(s), demonstrate no crossflow or fluid migration occurring behind casing.</li> <li>▪ Casing integrity and corrosion monitoring programs, carried out in accordance with company approved procedure(s), show adequate casing condition to satisfy the objective.</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> </ul>

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>sands);</p> <ul style="list-style-type: none"> <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><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 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>▪ Henley well site was located in a dunefield environment, and was approximately 40 kms from any significant drainage features.</li> <li>▪ The access track to the well site does not cross any significant watercourses or drainage features.</li> <li>▪ There was no rainfall during the period of the drilling operations.</li> </ul>

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
10. Minimise visual impacts on the natural landscape.	The major impact of well sites and access tracks is their visual impact <sup>3</sup> . Location, construction and restoration practices can significantly reduce the visual impact of well sites and access tracks.	<ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</li> <li>▪ The attainment of 0, +1 or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The wellsite was located 10 kms from the nearest public road ( Bore Track ), and approx 1 kilometre from the ROW attached to the Moomba to Sydney pipeline, which carries very occasional traffic of maintenance crews.</li> <li>▪ The Henley-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 2003 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 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</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> </ul>	<ul style="list-style-type: none"> <li>▪ There were no incidents during the drilling operations where the safety of the public or third parties was in question.</li> <li>▪ The Henley 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</li> </ul>

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

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
	<p>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>	<ul style="list-style-type: none"> <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>▪ 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>downhole abandonment.</p> <ul style="list-style-type: none"> <li>▪ An Emergency Response Plan was in place during the drilling operations of the Henley-1 well.</li> </ul>

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
		<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 licensed facility.</li> <li>▪ Records show that sewage at drilling camps was stored and disposed of in a manner which posed no risk to the human health and hygiene.</li> <li>▪</li> </ul>	<ul style="list-style-type: none"> <li>▪ All hard waste was removed from the Henley-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>

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

**WELLNAME : HENLEY-1**

**PEL No. : 95**

**SPUD DATE : OCTOBER 2002**

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
13. Avoid adverse impacts on livestock.	The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.	<ul style="list-style-type: none"> <li>▪ In the likely presence of livestock, the mud pits and/or flare pits and moving beam pumps are fenced off.</li> <li>▪ In the case of a producing well, the well cellar, rat hole and mouse hole are made safe for livestock either through appropriate covering or fencing.</li> <li>▪ In the case of an abandoned restored well site, the cellar has been backfilled to a level with the surrounding landscape.</li> </ul>	<ul style="list-style-type: none"> <li>▪ The Henley well site was sufficiently distant from any cattle watering point that any threat to the cattle's safety was insignificant, particularly when combined with the low density of cattle in the area.</li> </ul>
14. Avoid spills of oil or hazardous material <b>outside</b> of impermeable sumps or other areas designed to contain such spills.	<p>The main potential for spills to occur is around the well head. Spills that occur around the well head can normally be contained within the cellar and/or confined to the pad area of the well site.</p> <p>As specified under objective 9, any threat to 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>	<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 Henley-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 Henley-1 well was so far removed ( approximately 40 km ) from the nearest significant drainage system ( the main channel of the Strzelecki Creek) that flood inundation was not considered a likelihood.</li> </ul>

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

**WELLNAME :** HENLEY-1

**PEL No. :** 95

**SPUD DATE :** OCTOBER 2002

OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
-----------	---------	---------------------	----------------------

	<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> <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>

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

## **B ) Seismic Operations**

Government approval for Beach to undertake its Seismic Operations in PEL 95 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 are outlined below.

<b>SEO Objective 1 :</b>	<b>Ensure that the potential impacts of the proposed seismic operations on biological diversity and cultural requirements of the environment are assessed within a planning process and incorporated into field management procedures.</b>
--------------------------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

**Goal 1.1 : *Identify important or sensitive environmental and cultural components.***

Beach has an Agreement with the Ngayana Dieri Kar na ( NDK ) Claimant Group, whose Claim Area covers PEL 95. 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. The report further documented general guidelines to assist the line preparation crew on appropriate deviation procedures where further sites of cultural significance were identified along the proposed lines that had not been inspected by the scouting team.

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.

Several of the seismic lines crossed the Cooper Creek. However, due to the flat terrain in this region, the Creek is, in most places, a broad stretch of shallow, braided washaways, rather than definitive steep sided channels. Accordingly, the 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 95 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 Nautilus Seismic survey have been audited against these criteria and the results are presented in the attached table.

**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.
--------------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

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 Nautilus survey, an assessment of the impacts was undertaken against the first set of criteria by selecting six locations as Environmental Monitoring Points ( EMPs ). Three of these EMPs, ( 1 ), (2) and ( 3 ), are located in PEL 95. EMP - 1 and EMP - 2 are in a dunefield environment, while EMP – 3 is in a floodplain environment .

The results of the GAS audit are presented in the attached table. All GAS scores were in the range of 0 to +2.

<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>
--------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Shortly after completion of the field operations for the Nautilus Seismic survey ( October 2002 ), company representatives from Beach Petroleum inspected some of the seismic lines which had been recently recorded, to assess the likely time frame for rehabilitation .

In the few weeks since field activities had ceased, there was already evidence that the consistent strong winds were commencing the natural rehabilitation process, particularly on the dune cuts.

The line clearing crews had used environmentally appropriate techniques that will enable the combination of wind action and occasional rainfall to revegetate the lines to the point they will be indiscernible within a few years.

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.

There was no indication of any likely long-term adverse impacts.

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

**Beach Petroleum Limited: 2002 Nautilus Seismic Survey, PELs 95,94,92: Recorded May – October, 2002: 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) BC-EMP-01; Line BC01-34 stn 511 2) BC-EMP-02; Line BC02-22 stn 544  3) BC-EMP-03; Line BC02-25 stn 248 4) BC-EMP-04; Line BC02-49 stn 245  5) BC-EMP-05; Line BC02-18 stn 324 6) BC-EMP-06; Line BC02-67 stn 200  <b>Note: GAS scores refer to the area 500m either side of the EMP location</b>	Impact on infrastructure 2.6	1)2)3)4)5)6)		•	•	•
	Visual impact 2.5, 2.7	•	•	1)2)3)4)5)6)	•	•
	Uphole site restoration 2.3, 2.5 <sup>(e)</sup>	•	•	1)2)3)4)5)6)	•	•
	Pollution or litter 2.1, 2.2, 2.3, 2.5	1)2)3)4)5)6)	•		•	•
Dunefield	Impact on vegetation 2.1, 2.2 <sup>(f)</sup>	•	•	1)2)4)5)3)6) N/A	•	•
	Disturbance to land surface 2.2, 2.3 <sup>(e)</sup>	•	•	1)2)4)5)3)6) N/A	•	•

(.../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>	•	3), 6)	•	•	•
	Disturbance to land surface 2.2, 2.3, 2.4, 2.5 <sup>(e)</sup>	•	3), 6)	•	•	•
Gibber plain and tableland	Impact on vegetation 2.1, 2.2	•	•	•	•	•
	Disturbance to land surface 2.2, 2.3, 2.5 <sup>(e)</sup>	•	•	•	•	•
Salt lake	Disturbance to land surface 2.3, 2.5 <sup>(e)</sup>	•	•	•	•	•

(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 tracks.