

# **Great Artesian Oil and Gas Limited**

ACN 078 607 682

**PEL 106**

**Cooper/Eromanga Basin  
South Australia**

**ANNUAL REPORT  
PERMIT YEAR 1**

**April 9<sup>th</sup> 2003 to April 8<sup>th</sup> 2004**

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## 1. INTRODUCTION

Petroleum Exploration Licence 106 is situated on the southwestern margin of the Patchawarra Trough, one of the major depocentres in the South Australian portion of the Cooper Basin.

This Report covers work undertaken by the Licencee during the first permit year, covering the period 9<sup>th</sup> April 2003 to 8<sup>th</sup> April 2004, in accordance with the requirements of Section 33 of the Petroleum Regulations, 2002.

## 2. PERMIT SUMMARY

The working interests in PEL 106 as at the end of the reporting period were :

Great Artesian Oil and Gas Limited      (“GAOG”)      100%

Beach Petroleum Limited and Traditional Oil Exploration N.L. (a wholly owned subsidiary of Enterprise Energy Limited) held equitable interests in the following portions of PEL 106.

<b>Holder</b>	<b>Nature of Equitable Interest Held</b>
<b>Beach Petroleum</b>	Under the terms of an agreement between GAOG and Beach dated 10 November 2003, Beach will earn a 50% interest in any exploration and production licences granted subsequent to, and encompassing any commercial discovery, made as a result of farmin wells drilled under the Agreement within the “Farmout Block”. A formal Farmin Agreement and JOA, ratifying the details of this Agreement, had not been concluded by the anniversary of the end of the First Permit Year.
<b>Traditional Oil</b>	Under the terms of a Farmin Agreement and JOA signed on 10 March 2004, Traditional will earn a 25% interest in any exploration and production licence granted subsequent to, and encompassing any commercial discovery made as a result of drilling the Smegsy-1 well within the Smegsy Farmout Block

The original work commitments for PEL 106 are summarised as follows.

Licence Year	Minimum Work Program	Actual Work
Year 1* (9/04/03-8/04/04)	2 wells; 100 km 2D seismic; geological and geophysical review; seismic processing.	90 km of 2D seismic 2 wells 379 km of reprocessing**
Year 2* (9/04/04-8/04/05)	2 wells; 100 km 2D seismic or detailed 3 D seismic program	
Year 3* (9/04/05-8/04/06)	2 wells; 100 km 2D seismic or detailed 3D seismic program	
Year 4 (9/04/06-8/04/07)	3 wells	
Year 5 (9/04/07-8/04/08)	3 wells	

\* Compulsory Program

\*\* A request to offset the Permit Year One deficit of 10 km of new seismic acquisition with Permit Year Two seismic acquisition was sought from PIRSA on 1 June 2004.

## **3 EXPLORATION ACTIVITY**

### **3.1 Drilling**

Two exploration wells (Nutmeg-1 and Paranta-1) were drilled during the permit year. Nutmeg-1 spudded on 16/1/2004 and drilled to a total depth of 2910 metres. Nutmeg-1 was a test of an irregular shaped anticlinal feature located approximately 4km south of the Welcome Lake East Gas Field. Nutmeg-1 intersected an Eromanga section overlying a Cooper Basin Permo-Triassic section. Two DST's (one of which was a mis-run) were conducted in response to gas and fluorescence shows within the Patchawarra Formation and Merrimelia Formation, with DST#1, conducted over the interval 2707 –2721 m, flowing gas to surface at a fluctuating rate initially estimated to be 1.8 million feet per day, but later revised to up to 3.8 million cubic feet per day. DST#2, conducted within the Merrimelia Formation over the interval 2839.5-2850m, was a mis-run as a result of a packer failure. The well was subsequently drilled to total depth and cased and suspended as a possible future gas producer. A Well Completion Report for Nutmeg-1 is in preparation.

Paranta-1 spudded on 14/2/2004 and drilled to a total depth of 3013 metres. Paranta-1 was a test of an irregular shaped anticlinal feature located approximately 5 km east of Nutmeg-1 and 6 km southeast of Welcome Lake East Gas Field. Paranta-1 intersected an Eromanga section overlying a Cooper Basin Permo-Triassic section. During drilling the drill assembly became stuck and it was necessary to back-off and drill a side-track from 2747 metres to total depth. Five DST's (four were mis-runs) were conducted in response to gas and fluorescence shows within the Patchawarra Formation, with the fifth DST (DST#3ST in the side-track hole between 2874-2888m) indicating the influx of light oil or condensate at a rate estimated to be up to 300 barrels/day. The well was cased and suspended as a possible future hydrocarbon producer. A Well Completion Report for Paranta-1 is in preparation.

The results of both Nutmeg-1 and Paranta-1 have confirmed the high prospectivity of this portion of the permit, as well as increasing the potential for liquids in this portion of the permit.

### **3.2 Seismic Data Acquisition**

One 2D seismic survey (Paranta Seismic Survey) was acquired within the Permit during the First Permit Year in order to confirm the presence of structural targets in and around the Nutmeg and Paranta areas. At the conclusion of the First Permit Year these seismic data were being processed and were not yet available for interpretation. This survey comprised 90 km of 62 fold 2D seismic data recorded using a 37.5 m group interval and vibroseis energy source and symmetrical spread (2306.25-18.75-0-18.75-2306.25m).

### **3.3 Seismic Reprocessing**

In conjunction with the Paranta Seismic Survey 35 pre-existing 2D seismic approximately 379 km of pre-existing 2D seismic data were reprocessed. These data cover the area in which the Paranta Seismic Survey was recorded. The intention was to reprocess the various vintages of data in and around the Nutmeg and Paranta areas in order to provide as uniform a data set as the various vintage acquisition parameters would allow. This revised data set would form the basis for a reinterpretation of the area including incorporation of the new Paranta Seismic Survey data.

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

Technical studies during the First Permit Year were chiefly directed towards, firstly, the drilling of the two wells, Nutmeg-1 and Paranta-1, and their implications to possible hydrocarbons in place, and secondly, planning the positioning of additional seismic coverage as part of the Paranta Seismic Survey.

## **4. ADMINISTRATION**

### **4.1 Regulatory Compliance**

A Compliance Report is attached which details the Licencee'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 tabulated below:

Document	Date Submitted
Submission for Operator Assessment (Well Drilling) Nutmeg-1, containing 18 appendices - including Drilling Proposal and Drilling Program.	8 Dec 2003
Submission for Operator Assessment (Well Drilling) Paranta-1, containing 18 appendices – including Drilling Proposal and Drilling Program.	23 Dec 2003
Submission for Operator Assessment (Well Drilling) Smegsy-1 Containing 18 appendices – including Drilling Proposal and Drilling Program.	19 Dec 2003
Submission for Operator Assessment (Seismic ) Paranta Seismic Survey, including 10 appendices.	5 December 2003
PEL 106 Seismic Field Operations Report and including Environmental Monitoring Report.	7 April 2004

### **4.3 Planned Exploration Program for Permit Year Two.**

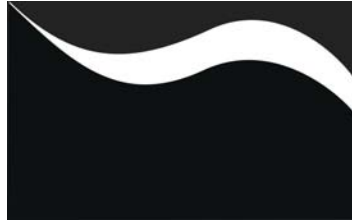
Smegsy-1 will be the first of a two well commitment program during Permit Year Two in PEL 106. Approval to drill the Smegsy-1 was granted by PIRSA on 13 February 2004. Initially Smegsy-1 was programmed as a contingent exploration well to be drilled in Permit Year One. However, following delays in completing Paranta-1 and problems with rig availability the well was re-scheduled for July 2004. Smegsy-1 is now one of the two Permit Year Two commitment wells. The second commitment well location has yet to be chosen. This second commitment well will be drilled during the last quarter of 2004 or first quarter of 2005, once the outcomes of the production testing, Smegsy-1 and interpretation of the Paranta Seismic Survey become known.

A 150 km 2D seismic survey (Malleus Seismic Survey) will be acquired during the Second Permit Year. Acquisition commenced in May 2004. However, due to weather the programme was delayed and acquisition was not completed until June. This program has been operated and designed by Beach to delineate a number of potential structural noses and leads, previously identified from seismic data across the western flank of the permit, in order to progress them to a drillable status. Beach Petroleum has been operating field activities for this survey as part of their farmin requirements.

## 5. EXPENDITURE STATEMENT

Commercial in confidence





# **Great Artesian Oil and Gas Limited**

ACN 078 607 682

**PEL 106**

**Cooper/Eromanga Basin  
South Australia**

**ANNUAL COMPLIANCE REPORT  
PERMIT YEAR ONE**

**April 9<sup>th</sup> 2003 to April 8<sup>th</sup> 2004**

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**INTRODUCTION**

**CHECKLIST FOR SUBMITTING DATA**

**COMPLIANCE – SEO DRILLING**

**COMPLIANCE – SEO SEISMIC**

## 1. INTRODUCTION

Pursuant to Regulation 33(2) of the 2000 Petroleum Act, Great Artesian Oil and Gas Limited, as Licensee and Operator of PEL 106, in the Cooper Basin South Australia, herewith submits its report on compliance with :

- The Petroleum Act
- Regulations of the Petroleum Act
- The PEL License Conditions, and
- The various Statements of Environmental Objectives to which Great Artesian Oil and Gas was committed in conducting its work commitments for Permit Year One of the Licence.

A table is attached summarising the instances during the Permit One Year wherein Great Artesian did not comply either with the Regulations of the Act or with the requirements of the relevant SEO under which it conducted its operations, or conducted operations which if not redressed would have led to non-compliance.

Further details of the circumstances surrounding the non-compliances, or potential non-compliance issues, are outlined below.

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

There were no instances of non-compliance with the 2000 Petroleum Act during the First Permit Year of PEL 106.

The Nutmeg-1 and Paranta-1 wells were drilled during Permit Year One to satisfy the original work commitments for the Licence. Likewise, seismic work in the permit was conducted in order to satisfy the original work commitments for the Licence. It is proposed that the deficit in seismic work over the original work program (amounting to some 10 km) could be offset either by the reprocessing of some 300 km of 2D seismic data or, alternatively, the surplus of seismic data recorded in Permit Year Two as part of the Malleus Seismic Survey in PEL 106, which will be approximately 50 km in surplus of the minimum 100km requirement. A letter seeking to offset this deficit was sent to PIRSA on 1 June 2004, in order that a potential non-compliance is avoided.

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

- ***Drilling***

There were no instances of non-compliance with the Regulations during the drilling operations of the Nutmeg-1 or Paranta-1 well. All reports associated with this well are being prepared and will be submitted during Permit Year Two of the Licence.

- ***Submission of data and Reports relating to Drilling.***

Data related to the drilling of the Nutmeg-1 and Paranta-1 wells has been submitted to as per checklist tabulation provided in this section. Non-compliance of data submission arose as a result of inadvertent supply of field tapes for Nutmeg-1 logs by the well-site geologist. Additionally Paranta-1 FMT logs provided by Baker Atlas directly to PIRSA were not in a compliant format. Non-compliance issues with logs generally have arisen as a result of logging companies providing logs in the field without adequate quality control, particularly in regard to compliant formats. A protocol will be implemented in future such that all logs will be forwarded from the business office, once compliance has been established. Hand-delivery of data, directly from the field, will not longer be acceptable.

- ***Seismic***

The Paranta Seismic Survey was conducted in PEL 106 during Year One of the Licence. Line clearing preparation commenced on 27 January 2004, up-hole drilling on 11 February 2004, and recording on 12 February 2004. Recording was completed on 17 February 2004 with final up-hole drilling completed on 19 February 2004.

Regulation 35 requires that, for any seismic survey, an Operations Report is to be submitted to PIRSA within 6 months of the completion of recording, and that this Report includes a report on the processing of the data.

The Paranta Seismic Survey was acquired during the 27 January 2004 to 19 February 2004. Field Operations Report was hand-submitted to PIRSA on 7 April 2004. It included an Environmental Monitoring Report. As processing is still underway a final Operations Report, which includes the Processing Report, has yet to be submitted. As this is still within the 6 month period, Great Artesian has complied with the Regulations in this regard.

Likewise, Regulation 36 requires that the Interpretation Report be submitted within 6 months following the completion of the processing of these data. As processing of these data have still not yet been finalised, this Report has not yet been prepared and as such Great Artesian has complied with the Regulations in this regard.

- ***Submission of data and Reports relating to Data Reprocessing Commitments in Permit Year One.***

Reprocessing of archive seismic data from PEL 106 was carried out in conjunction with the processing of the new data acquired during the Paranta Seismic Survey. A total of 35 lines involving a total of approximately of 379 km of archive data from PEL 106 was submitted for reprocessing in Permit Year One.

As the reprocessing of these data has not been completed at the end of Permit Year One, no report, outlining the techniques applied during the reprocessing of the data, has yet been submitted to PIRSA. A report will be submitted to PIRSA during Permit Year TWO.

**TABLE 1 : RECORD OF NON-COMPLIANCE WITH REGULATIONS  
PERMIT PEL 106 Year One : 9 April 2003 – 8 April 2004**

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

Field Operation	Date	Description of Incident	Resolution
<i>No incidents of Non-Compliance arising from the drilling operations of Nutmeg-1.</i>			
<i>No incidents of Non-Compliance arising from the drilling operations of Paranta-1.</i>			

**Report Non Compliance**

Name of Report	Date Due	Date Submitted	Cause of Overdue Submission	Resolution
<i>No incidents of Non-Compliance</i>				
<i>Note : Well completion reports for Nutmeg-1 and Paranta-1 were not required to be submitted to PIRSA until after the end of Year 1 of the Licence.</i>				

**Data Submission Non-Compliance**

Date Type	Date Due	Data Submitted	Cause of Overdue Submission	Resolution
<i>Incident of Non-Compliance</i>				
<i>Baker Atlas well log data in non-standard format</i>				

**Seismic**

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**SEO Non Compliance**

Field Operation	Date	Description of Incident	Resolution
<i>No incidents of non-compliance arising from the field operations of the 2004 Paranta Seismic Survey.</i>			
<i>No incidents of non-compliance arising from application for ALF 7 within PPL 148.</i>			

**TABLE 2 : CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS FOR NUTMEG-1**

**PERMIT PEL 106 YEAR ONE : 9 April 2003 to 8 April 2004**

REPORT /DATA SET	FORMAT	Person/agency to whom information is to be provided	Period allowed for submitting data.	Date Due	Date Submitted	Great Artesian 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	10 Dec 03	3 Nov 03 8 Dec 03	Managing Director	Approval granted on 22 Dec 2003
Notification of proposed commencement of earthworks – preparation of access tracks and well leases.			2 days prior to proposed start date	12 Jan 04	21 Nov 03	Managing Director	Approval granted 22 Dec 2003
Notification to landowners(s)		Pastoral Lessee	21 days prior to proposed start date	<b>24 Dec 03</b>	<b>3 Nov 03</b>	Managing Director	<b>Notices reissued following delay from original notification date in November to January</b>
		National Parks	21 days prior to proposed start date	Not Applicable		Managing Director	<b>Notices reissued following delay from original notification date in November to January</b>
		Native Title Claimant(s)	21 days prior to proposed start date	<b>24 Dec 03</b>	3 Nov 03	Managing Director	Ngayana Dieri Kama. Notice reissued as per above.
		Other PEL or PL licensees as appropriate	21 days prior to proposed start date	<b>24 Dec 03</b>	3 Nov 03	Managing Director	

**TABLE 3 : CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS FOR PARANTA-1**

**PERMIT PEL 106 YEAR ONE : 9 April 2003 to 8 April 2004**

REPORT /DATA SET	FORMAT	Person/agency to whom information is to be provided	Period allowed for submitting data.	Date Due	Date Submitted	Great Artesian 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	11 Jan 04	19 Dec 2003	Managing Director	Approved 7 Jan 2004
Notification of proposed commencement of earthworks – preparation of access tracks and well leases.			2 days prior to proposed start date	12 Feb 04	19 Dec 03	Managing Director	Approved 24 Dec 2004
Notification to landowners(s)		Pastoral Lessee	21 days prior to proposed start date	24 Feb 04	19 Dec 03	Managing Director	Notices reissued following delay from original notification date in November to January
		National Parks	21 days prior to proposed start date	Not Applicable		Managing Director	
		Native Title Claimant(s)	21 days prior to proposed start date	24 Feb 04	19 Dec 03	Managing Director	Ngayana Dieri Kama. Notices reissued following delay from original notification date in November to January
		Other PEL or PL licensees as appropriate	21 days prior to proposed start date	24 Feb 04	19 Dec 03	Managing Director	Notices reissued following delay from original notification date in November to January

**TABLE 4 : CHECKLIST FOR NOTIFICATIONS OF DRILLING OPERATIONS FOR SMEGSY-1  
PERMIT PEL 106 YEAR ONE : 9 April 2003 to 8 April 2004**

<b>REPORT /DATA SET</b>	<b>FORMAT</b>	<b>Person/agency to whom information is to be provided</b>	<b>Period allowed for submitting data.</b>	<b>Date Due</b>	<b>Date Submitted</b>	<b>Great Artesian Officer Responsible for Compliance</b>	<b>Comments</b>
Notification of proposed drilling activity including demonstration of the suitability of an existing SEO.		PIRSA/Mike Malavazos	35 days prior to proposed start date	7 June 2004	19 Dec 03	Managing Director	Approval granted 13 Feb 2004
Notification of proposed commencement of earthworks – preparation of access tracks and well leases.			2 days prior to proposed start date	<b>24 June 04</b>	<b>23 June 04</b>	Managing Director	
Notification to landowners(s)		Pastoral Lessee	21 days prior to proposed start date	<b>27 June 03*</b>	<b>19 Dec 03</b>	Managing Director	
		National Parks	21 days prior to proposed start date	Not Applicable		Managing Director	
		Native Title Claimant(s)	21 days prior to proposed start date	<b>27 June 03*</b>	<b>19 Dec 03</b>	Managing Director	Ngayana Dieri Karna.
		Other PEL or PL licensees as appropriate	21 days prior to proposed start date	<b>27 June 03*</b>	<b>19 Dec 03</b>	Managing Director	

\* Assumes spud date for Smegsy-1 as July 12 2004.



**TABLE 5 : CHECKLIST FOR SUBMISSION OF DRILLING REPORTS**

Permit PEL 106 Permit Year One 9 April 2003 to 8 April 2004 Well : **Nutmeg-1**  
 Drilling Commenced Operations : 16 January 2004 Completed Drilling Operations : 12 February 2004

Report/Data Set	Format	Person/agency to whom information is to be provided	Period allowed for submitting data	Date Due	Date Submitted	Great Artesian Officer Responsible	Comments
Daily Drilling Reports		PIRSA	Within 12 hours of report period.	During drilling operations	During drilling operations	Ray Shaw	
Wireline Logs		PIRSA	Within 1 month of acquisition of data.	11 May 2004	Feb 2004	Ray Shaw	Non-compliance with submission of log data – incorrect format.
Mud Logging Data		PIRSA	Included with Daily Drilling Reports, then subsequently with the Well Completion Report	During Drilling Operations	During drilling operations	Ray Shaw	
Well Samples		PIRSA	Within 6 months of rig release	11 Aug 2004	Samples sent on 17 and 29 June 2004	Ray Shaw	
Well Completion Reports	Refer note below	PIRSA	Within 6 months of rig release	11 Aug 2004	Required during Year 2	Ray Shaw	Yet to be submitted, not required until Permit Year Two
Reportable Incidents		PIRSA	Serious incidents must be reported immediately (within 24 hours), with a written report following within 3 months.	No Reportable Incidents		Ray Shaw	

Note : Well Completion Reports contain borehole deviation data; surveyed location of well, and other technical reports associated with the well and will be submitted prior to 11 Aug 2004.

**TABLE 6 : CHECKLIST FOR SUBMISSION OF DRILLING REPORTS**  
 Permit PEL 106 Permit Year One 9 April 2003 to 8 April 2004 Well : **Paranta-1**  
 Drilling Commenced Operations : 14 February 2004 Completed Drilling Operations : 31 March 2004

Report/Data Set	Format	Person/agency to whom information is to be provided	Period allowed for submitting data	Date Due	Date Submitted	Great Artesian Officer Responsible	Comments
Daily Drilling Reports		PIRSA	Within 12 hours of report period.	During drilling operations	During drilling operations	Ray Shaw	
Wireline Logs		PIRSA	Within 1 month of acquisition of data.	30 April 2004	Feb 2004	Ray Shaw	Non-compliance with submission of logs. Incorrect format.
Mud Logging Data		PIRSA	Included with Daily Drilling Reports, then subsequently with the Well Completion Report.	During Drilling Operations	During drilling operations	Ray Shaw	
Well Samples		PIRSA	Within 6 months of rig release	30 Sept 2004	Samples sent on 17 and 29 June 2004	Ray Shaw	
Well Completion Reports	Refer note below	PIRSA	Within 6 months of rig release	30 Sept 2004	Required during Year 2	Ray Shaw	Yet to be submitted. Not required until Permit Year Two
Reportable Incidents		PIRSA	Serious incidents must be reported immediately (within 24 hours), with a written report following within 3 months.	No Reportable Incidents		Ray Shaw	

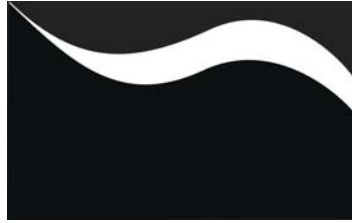
**TABLE 7 : CHECKLIST FOR SUBMISSION OF GEOPHYSICAL DATA AND REPORTS TO PIRSA**  
 Permit PEL 106 Permit Year One 9 April 2003 to 8 April 2004 SURVEY : PARANTA SEISMIC SURVEY

Geophysical Data Survey Paranta Seismic Survey	Specifics	Format	Transmittal	Sent To	Time Period	Due Date	Comments
Geophysical Progress Reports Paranta 2D Seismic Survey		Word or PDF		Email or fax to cockshell.david@saugov.sa.gov.au	Periodic basis determined by consultation with the Minister		Daily field reports forwarded by email to PIRSA.
Geophysical Operations Reports – recording and processing		Hardcopy, PDF		Prelim report provided 7 Apr 2004	Within 6 months of completion of recording data.	19 Aug 2004	
Geophysical Data - Seismic	Seismic Processed Data			Not required until Permit Year Two		Same time as associated Operations Report.	Notices reissued following delay from original notification date in November to January.
Geophysical Data - Seismic	Seismic Field Data			Not required until Permit Year Two			
Geophysical Data - Seismic	Obs Logs	GDA 94		Not required until Permit Year Two			
Geophysical Data - Seismic	Nav data including elevations and bathymetry	GDA 94		Not required until Permit Year Two			
Geophysical Data - Seismic	Field Statics			Not required until Permit Year Two			
Geophysical Data - Seismic	Processed 2D seismic sections	CGM+		Not required until Permit Year Two			
Geophysical Interpretation Report		Hardcopy, PDF	Completion date for processing was mid August 2004. Hence due date for Interpretation Report is mid JDJ 2004.	Completion date for processing was mid August 2004. Hence due date for Interpretation Report is mid JDJ 2004.	Within 6 months of completion of processing data.		
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 detail					N/A	

**TABLE 8 : CHECKLIST FOR SUBMISSION OF GEOPHYSICAL DATA AND REPORTS TO PIRSA  
PEL 106 : REPROCESSED SEISMIC DATA.**

Geophysical Data	Specifics	Format	Transmittal	Sent To	Time Period	Due Date	Comments
Geophysical Operations Report - reprocessing	Description of techniques applied for reprocessing	Hardcopy, PDF		Not yet required	Within 2 months of completion of the reprocessing report.	1 Sept 2004*	Reprocessing is not yet completed as at June 26 2004
Geophysical Data - Seismic	Reprocessing – transcribed copy of field data.		Not yet required				
Geophysical Data - Seismic	Reprocessing – Sections of reprocessed data	CGM+	Not yet required				
Geophysical Data - Seismic	Reprocessing – field tape transcription log.		Not yet required				
Geophysical Data - Seismic	Reprocessing – tape and file listing of field data that has been copied and reprocessed.	Ops Report- archive listing	Not yet required				
Geophysical Interpretation Reports		Hardcopy , PDF			Within 6 months of completion of reprocessing data.	1 Mar 2005*	

\* Assumes that the reprocessing will be completed on or about 1 July 2004.



# **Great Artesian Oil and Gas Limited**

ACN 078 607 682

**PEL 106**

**Cooper/Eromanga Basin  
South Australia**

**COMPLIANCE SEO - DRILLING  
PERMIT YEAR 1**

**April 9<sup>th</sup> 2003 to April 8<sup>th</sup> 2004**

## **STATEMENTS OF ENVIRONMENTAL OBJECTIVES**

### **A. Drilling Operations.**

Government approval for Great Artesian to drill the Nutmeg-1 and Paranta-1 well in PEL 106 was conditional upon Great Artesian 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 Nutmeg-1 and Paranta-1 wells did encounter commercial indications of hydrocarbons and both were cased and suspended pending extended production testing.

Because of this no site rehabilitation has yet commenced, the well head areas having been fenced in order to protect and secure them from both humans and cattle. Appropriate rehabilitation of the sites will commence once the results of the production testing, due to take place in June and July 2004, are known.

To-date Great Artesian is satisfied that all the objectives required by the SEO have been met, and spreadsheets presented herein summarise the strategies that have been, and will be, employed to achieve compliance.

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

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>1. Avoid disturbance to known Aboriginal and European heritage significance.</p>	<p>The aim of this objective is to ensure that any sites of Aboriginal and European heritage are identified and protected. Sites can be identified during the planning stages of well site and access track 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> <p>Following comment from PIRSA an additional scouting exercise was initiated to identify the whereabouts of any Priority 1 and 2 vegetation, particularly old man saltbush. No occurrences were reported at the proposed camp site.</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><b>Note</b> : Where a negotiated agreement or determination for heritage clearance is in place, compliance to that agreement or determination takes precedence over the above criteria.</p>	<p>Great Artesian has an agreement with the Ngayana Dieri Karna Native Title Claimant group which specifies the requirements for scouting proposed well and access tracks to identify and avoid areas of heritage value and archaeological significance.</p> <p>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.</p> <p>There were no sites identified near the proposed operations areas as having particular cultural significance.</p>
<p>2. Avoid disturbances which have long term impact on biological or wilderness values of a particular area.</p>	<p>No areas which are considered to have high biological or wilderness values in terms of those shown in Figure 1 of the SEO.</p>	<ul style="list-style-type: none"> <li>No activities that are assessed to be located in the regions described in the scope above arte to be carried out without the prior specific approval of the Minister.</li> </ul>	<p>The well is not located in or near 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.</p>

## ASSESSMENT OF GREAT ARTESIAN'S PERFORMANCE IN ACHIEVING THE ENVIRONMENTAQL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
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(1). 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 formative 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> </ul> <p>Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances.</p>	<ul style="list-style-type: none"> <li>• Only 2500 metres of new access track was required. Very little further clearing was required. The well site contained only sparse grassy vegetation. No significant trees or shrubs needed to be cleared.</li> <li>• The well site and access track will be rehabilitated and restored in accordance with the guidelines set down in PIRSA's Field Guide for the Environmental Assessment of Abandoned Petroleum Wellsites in the Cooper Basin, South Australia, to attain the highest feasible GAS rating, if the production testing does not lead to commercial production.</li> <li>• Great Artesian's Rig 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>

(1) 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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**ASSESSMENT OF GREAT ARTESIAN'S PERFORMANCE IN ACHIEVING THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<p>4. Avoid disturbance to rare, vulnerable and endangered flora and fauna species.</p>	<p>Rare, vulnerable and endangered flora and fauna species are defined by Schedules 7, 8 and 9 of the National Parks and Wildlife Act, 1972.</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 before the commencement of construction for rare, vulnerable and endangered species.</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 data-bases contain no recorded of vulnerable or endangered species within 20 km of the site.</li> </ul>
<p>5. Prevent the introduction and establishment of exotic weed species.</p>	<p>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.</p>	<ul style="list-style-type: none"> <li>• All vehicles and equipment appropriately cleaned prior to entering the Cooper-Eromanga Basins.</li> <li>• Clearing carried out in accordance with specified company procedures and accepted practices.</li> <li>• Reports 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 services in the Cooper Basin prior to commencing work at the Nutmeg-1 well.</li> </ul>

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

<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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 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>The attainment of 0, +1, or +2 GAS Criteria for "Minimise Visual Impact of Abandoned Well sites" 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 0, +1, or +2 GAS Criteria for "Re-establish natural vegetation on abandoned well sites and access tracks" objective listed in Appendix 2.</li> </ul> <p>Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances.</p>	<ul style="list-style-type: none"> <li>Clay material was extracted from several borrow pits alongside the station track that was used for the majority of the access route. The clay was used for upgrading the track, and constructing the short new access section from Welcome Lake East to Nutmeg-1 site.</li> <li>The access track to the well site will be rehabilitated if the extended production testing does not indicate commercially producible quantities of hydrocarbons.</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 two degrees in the Cooper Basin(2). 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 Well sites" 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 removed on well sites confined to the mud pit, cellar and turkeys nest.</li> </ul>	<ul style="list-style-type: none"> <li>There are no gibber pavements along the access site to Nutmeg-1</li> </ul>



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

<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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>	<p><u>Drilling and 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> </ul>	<p>The Nutmeg-1 well has been fully cased and suspended prior to extended production testing. If this EPT does not prove commercial producible hydrocarbons then the appropriate casing program will be implemented.</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>	

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

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.</p>	<p>Eyre Formation  Winton Formation  Mackunda Formation  Coorikiana Sandstone  Cadna-Owie Foramtion  Namur Sandstone  Adori Sandstone  Hutton Sandstone  Poolowanna Formation  Cuddapan Formation  Nappermerri Group Formations , Walkandi and  Peera Peera Formations (multiple sands)  Toolachee Formation (multiple sands)  Daralingie Formation (multiple sands)  Epsilon Formation (multiple sands)  Patchawarra Formation  Tirrawarra Sandstone  Merrimelia Formation  Basement Reservoirs.</p>	<p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>Monitoring programs, carried out in accord with company approved procedures (s), demonstrate no cross-flow or fluid migration occurring behind casing.</li> <li>Casing integrity and corrosion monitoring programs, carried out in accordance with company approved procedures, 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 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 aquifers which are present which are not in natural hydraulic communication nor have been isolated by cement behind casing.</li> </ul>	

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

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>9. Minimise Impact on Surface Water and Drainage Patterns</p>	<p>Due to the small and confined area impacted on well sites, there should be minimal impact to surface water drainage patterns in the region. The only foreseeable threat to drainage patterns could arise from long and wide access tracks which could divert a portion of the natural water flow. The main threat to the surface water is contamination from spills during times of major flooding. Potential spills can originate from the well while the well is producing or from the mud pits during drilling.</p>	<p><u>Drilling and Completion Activities</u></p> <ul style="list-style-type: none"> <li>Oil well producing operations shut in during period 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>The Nutmeg-1 well site is located in a dune field environment and is remote from any significant drainage features.</li> <li>There was no significant rainfall during the period of the drilling operations.</li> </ul>

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

<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
10. Minimise visual impacts on the natural landscape.	The major impact of well sites and access tracks is their visual impact (3). Location, construction and restoration practices can significantly reduce the visual impact of well sites and access tracks.	The attainment of 0, +1, or + 2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2. The attainment of 0, +1, or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.	<ul style="list-style-type: none"> <li>The wellsite is located in very flat country in a dune corridor hidden from view between two sand dunes. The access track to Nutmeg-1 turns off the Welcome Lake Bore Road which carries very little traffic, save for maintenance crews travelling to Welcome Lake East and Nulla Gas Fields. The well site is approximately 80 km by road from the nearest public road (Moomba to Adelaide).</li> <li>The Nutmeg-1 wellsite will be rehabilitated and restored in accordance with the guidelines set out in PIRSA's Field Guild.</li> <li>Rehabilitation will commence contingent on the outcome of the extended production testing which will occur during June and July 2004.</li> </ul>

(3) Refer to Fatchen and Woodburn in the references section of this Statement of Environmental Objectives.

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

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
<p><b>OBJECTIVE</b></p> <p>11. Minimise risks to the safety of the public and other third parties.</p>	<p align="center"><b>COMMENT</b></p> <p>The criteria for assessing the achievement of this objective have been developed on the basis of the current understanding of the risks of wells to third party safety.</p> <p>The key to achieving the third party safety objective in relation to both downhole abandonment and surface well site restoration is to ensure that the visual prominence of the abandonment 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 align="center"><b>ASSESSMENT CRITERIA</b></p> <p><u>Drilling and 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>Blowout 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 procedures, show adequate casing condition to satisfy the objective. 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 align="center"><b>LEVEL OF ACHIEVEMENT</b></p> <p>The Nutmeg-1 well has been fully cased and suspended prior to production testing. If this production testing does not prove commercial producible hydrocarbons then the appropriate casing program will be implemented.</p>



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

WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
11 (cont'd)		<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> <p>The attainment of 0, +1, or + 2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</p> <p>The attainment of 0, +1, or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</p> <p>The attainment of 0. GAS criteria for "Site left in a Clean, Tidy and Safe Condition after Final Cleanup" objective listed in Appendix 2.</p> <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>	

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

<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
12. Minimise the impact on the environment of waste handling and disposal.	Waste refers to all wastes with the exception of Listed Wastes in Schedule 1 Part B of the Environment Protection Act, 1993.	<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 Nutmeg-1 well site in accordance with Great Artesian's policy set out in the company's Drilling Operations Manual.</li> <li>Putrescible waste will be disposed of in a mud pit following backfilling.</li> </ul>
13. Avoid adverse impacts on livestock.	The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.	<ul style="list-style-type: none"> <li>In the likely presence of livestock, the mud pits and/or flame 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 Nutmeg-1 well site was fenced off, prior to production testing in order to protect any cattle that may stray onto the site, notwithstanding that it is an area with only low density or negligible grazing.</li> </ul>

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WELL NAME	NUTMEG-1	PEL 106	SPUD DATE : JAN 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>14. Avoid spills of oil or hazardous material outside 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 or 2 metres 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 or wetlands.</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 Nutmeg-1.</li> <li>There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> <li>The location of Nutmeg-1 is very remote from the nearest significant drainage system forming a tributary of the Cooper Creek that flood inundation is considered unlikely.</li> </ul>



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<b>WELL NAME</b>	<b>NUTMEG-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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(4).</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).</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>

(4) Megalos, N.P., 1994. Bioremediation of Oil Contaminated Soil, South Australian Department of Mines and Energy, Report Book, No 94/4.

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>1. Avoid disturbance to known Aboriginal and European heritage significance.</p>	<p>The aim of this objective is to ensure that any sites of Aboriginal and European heritage are identified and protected. Sites can be identified during the planning stages of well site and access track 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><b>Note</b> : Where a negotiated agreement or determination for heritage clearance is in place, compliance to that agreement or determination takes precedence over the above criteria.</p>	<ul style="list-style-type: none"> <li>Great Artesian has an agreement with the Ngayana Dieri Karna Native Title Claimant group which specifies the requirements for scouting proposed well and access tracks to identify and avoid areas of heritage value and archaeological significance.</li> <li>A site visit was carried out by a scouting team from the Ngayana Dieri Karna Native Title Claimant Group. The proposed drilling location and access route were given heritage clearance.</li> <li>There were no sites identified near the proposed operations areas as having particular cultural significance.</li> </ul>
<p>2. Avoid disturbances which have long term impact on biological or wilderness values of a particular area.</p>	<p>A number of areas which are considered to have high biological or wilderness values are shown in Figure 1. Also included are any activities that are assessed to be of significant risk to the Cooper Creek system.</p>	<ul style="list-style-type: none"> <li>No activities that are assessed to be located in the regions described in the scope above arte to be carried out without the prior specific approval of the Minister.</li> </ul>	<p>The well is not located in or near 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.</p>

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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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(1). 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> <p>Following comment from PIRSA an additional scouting exercise was initiated to identify the whereabouts of any Priority 1 and 2 vegetation, particularly old man saltbush. No occurrences were reported at the proposed camp site.</p>	<ul style="list-style-type: none"> <li>• Proposed well site and access track locations have been scouted by appropriately trained and experienced personnel formative 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. Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances.</li> </ul>	<ul style="list-style-type: none"> <li>• Only 5 km of new access track was required. This was modified after the initial scouting, following conference with NT representatives that the modified access would involve less clearing than original track. The well site contained only sparse grassy vegetation. No significant trees or shrubs needed to be cleared. The site of the well was moved approx. 100m from the crest of a sand dune in order to reduce clearing.</li> <li>• The well site and access track will be rehabilitated and restored in accordance with the guidelines set down in PIRSA's Field Guide for the Environmental Assessment of Abandoned Petroleum Wellsites in the Cooper Basin, South Australia, to attain the highest feasible GAS rating, if the production testing does not lead to commercial production.</li> <li>• Great Artesian's Rig 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>

## Footnote

- (2) Leigh, J.H. and Briggs, J.D. (eds), 1994. Threatened Ausraqlian Plants : Overview and Case Studies. Australian National Parks and Wildlife Service, Canberra.
- 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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**ASSESSMENT OF GREAT ARTESIAN'S PERFORMANCE IN ACHIEVING THE ENVIRONMENTAL OBJECTIVES DEFINED IN THE COOPER BASIN DRILLING SEO**

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<p>4. Avoid disturbance to rare, vulnerable and endangered flora and fauna species.</p>	<p>Rare, vulnerable and endangered flora and fauna species are defined by Schedules 7, 8 and 9 of the National Parks and Wildlife Act, 1972.</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 before the commencement of construction for rare, vulnerable and endangered species.</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 data-bases contain no recorded of vulnerable or endangered species within 20 km of the site.</li> <li>Following comment from PIRSA an additional scouting exercise was initiated to identify the whereabouts of any Priority 1 and 2 vegetation, particularly old man saltbush. No occurrences were reported at the proposed lease site.</li> </ul>
<p>5. Prevent the introduction and establishment of exotic weed species.</p>	<p>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.</p>	<ul style="list-style-type: none"> <li>All vehicles and equipment appropriately cleaned prior to entering the Cooper-Eromanga Basins.</li> <li>Clearing carried out in accordance with specified company procedures and accepted practices.</li> <li>Reports 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 services in the Cooper Basin prior to commencing work at the Paranta-1 well.</li> </ul>

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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
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 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 Well sites" 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, +1, or +2 GAS Criteria for "Re-establish natural vegetation on abandoned well sites and access tracks" objective listed in Appendix 2.</li> <li>Hazardous material stored, used and disposed of in accordance with relevant legislation on dangerous substances.</li> </ul>	<ul style="list-style-type: none"> <li>Clay material was extracted from several borrow pits alongside the station track that was used for the majority of the access route. The clay was used for upgrading the track, and constructing the relatively short new access section from Nutmeg-1 to Paranta-1 site.</li> <li>The access track to the well site will be rehabilitated if the extended production testing does not indicate commercially producible quantities of hydrocarbons.</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 two degrees in the Cooper Basin(2). 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 Well sites" 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 removed on well sites confined to the mud pit, cellar and turkeys nest.</li> </ul>	<ul style="list-style-type: none"> <li>There are no gibber pavements along the access site to Paranta-1</li> </ul>

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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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>	<p><u>Drilling and 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> </ul>	<p>The Paranta-1 well has been fully cased and suspended prior to extended production testing. If this production testing does not prove commercial producible hydrocarbons then the appropriate casing program will be implemented.</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>	

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
8. Minimise loss of reservoir and aquifer pressures and contamination of freshwater aquifers.	Eyre Formation Winton Formation Mackunda Formation Coorikiana Sandstone Cadna-Owie Foramtion Namur Sandstone Adori Sandstone Hutton Sandstone Poolowanna Formation Cuddapan Formation Nappermerri Group Formations , Walkandi and Peera Peera Formations (multiple sands) Toolachee Formation (multiple sands) Daralingie Formation (multiple sands) Epsilon Formation (multiple sands) Patchawarra Formation Tirrawarra Sandstone Merrimelia Formation Basement Reservoirs.	<p><u>Producing Wells</u></p> <ul style="list-style-type: none"> <li>Monitoring programs, carried out in accord with company approved procedures (s), demonstrate no cross-flow or fluid migration occurring behind casing.</li> <li>Casing integrity and corrosion monitoring programs, carried out in accordance with company approved procedures, 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 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 aquifers which are present which are not in natural hydraulic communication nor have been isolated by cement behind casing.</li> </ul>	

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>9. Minimise Impact on Surface Water and Drainage Patterns</p>	<p>Due to the small and confined area impacted on well sites, there should be minimal impact to surface water drainage patterns in the region. The only foreseeable threat to drainage patterns could arise from long and wide access tracks which could divert a portion of the natural water flow. The main threat to the surface water is contamination from spills during times of major flooding. Potential spills can originate from the well while the well is producing or from the mud pits during drilling.</p>	<p><u>Drilling and Completion Activities</u></p> <ul style="list-style-type: none"> <li>Oil well producing operations shut in during period 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>The Paranta-1 well site is located in a dune field environment and is remote from any significant drainage features. The well location was moved approximately 100 m from the crest of a dune in order to minimise environmental impact. Likewise, the camp site was located approx 600 m from the well site in order to utilise an existing flat area and hence minimise clearing and levelling of existing terrain.</li> <li>There was no significant rainfall during the period of the drilling operations.</li> </ul>

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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : JAN 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
10. Minimise visual impacts on the natural landscape.	The major impact of well sites and access tracks is their visual impact (3). Location, construction and restoration practices can significantly reduce the visual impact of well sites and access tracks.	The attainment of 0, +1, or + 2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2. The attainment of 0, +1, or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.	<ul style="list-style-type: none"> <li>• The wellsite is shifted from the proposed dune crest to the lower flank in a dune corridor hidden from view between two sand dunes.</li> <li>• The access track to Paranta-1 turns of the Welcome Lake Bore – Nutmeg-1 Road which carries very little traffic, save for maintenance crews travelling to Welcome Lake East and Nulla Gas Fields. The well site is approximately 80 km by road from the nearest public road (Moomba to Adelaide).</li> <li>• The camp site for Paranta-1 was located some 600 m from the well location in order to utilise an existing flat area and minimise clearing.</li> <li>• The Paranta-1 wellsite will be rehabilitated and restored in accordance with the guidelines set out in PIRSA's Field Guild.</li> <li>• Rehabilitation will commence contingent on the outcome of the extended production testing which will occur during June and July 2004.</li> </ul>

(3) Refer to Fatchen and Woodburn in the references section of this Statement of Environmental Objectives.

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>11. Minimise risks to the safety of the public and other third parties.</p>	<p>The criteria for assessing the achievement of this objective have been developed on the basis of the current understanding of the risks of wells to third party safety.</p> <p>The key to achieving the third party safety objective in relation to both downhole abandonment and surface well site restoration is to ensure that the visual prominence of the abandonment 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 and 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>Blowout 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 procedures, show adequate casing condition to satisfy the objective. 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>The Paranta-1 well has been fully cased and suspended prior to production testing. If this testing does not prove commercial producible hydrocarbons then the appropriate casing program will be implemented.</p>

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
11 (cont'd)		<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> <p>The attainment of 0, +1, or + 2 GAS criteria for "Minimise Visual Impact of Abandoned Wellsites" objective listed in Appendix 2.</p> <p>The attainment of 0, +1, or +2 GAS criteria for "Minimise Visual Impact of Abandoned Access Tracks" objective listed in Appendix 2.</p> <p>The attainment of 0. GAS criteria for "Site left in a Clean, Tidy and Safe Condition after Final Cleanup" objective listed in Appendix 2.</p> <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>	



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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
12. Minimise the impact on the environment of waste handling and disposal.	Waste refers to all wastes with the exception of Listed Wastes in Schedule 1 Part B of the Environment Protection Act, 1993.	<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 Paranta-1 well site in accordance with Great Artesian's policy set out in the company's Drilling Operations Manual.</li> <li>Putrescible waste will be disposed of in a mud pit following backfilling.</li> </ul>
13. Avoid adverse impacts on livestock.	The main risk posed to livestock is injury from open drill sumps, open well cellars and moving beam pump oil wells.	<ul style="list-style-type: none"> <li>In the likely presence of livestock, the mud pits and/or flame 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 Paranta-1 well site was fenced off, prior to production testing in order to protect any cattle that may stray onto the site, notwithstanding that it is an area with only low density or negligible grazing.</li> </ul>

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

WELL NAME	PARANTA-1	PEL 106	SPUD DATE : FEB 2004
OBJECTIVE	COMMENT	ASSESSMENT CRITERIA	LEVEL OF ACHIEVEMENT
<p>14. Avoid spills of oil or hazardous material outside 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 or 2 metres 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 or wetlands.</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 Paranta-1.</li> <li>There were no spills of oil or hazardous materials of any significance during the drilling operations.</li> <li>The location of Paranta-1 is very remote from the nearest significant drainage system forming a tributary of the Cooper Creek that flood inundation is considered unlikely.</li> </ul>



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

<b>WELL NAME</b>	<b>PARANTA-1</b>	<b>PEL 106</b>	<b>SPUD DATE : FEB 2004</b>
<b>OBJECTIVE</b>	<b>COMMENT</b>	<b>ASSESSMENT CRITERIA</b>	<b>LEVEL OF ACHIEVEMENT</b>
<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(4).</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).</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>

(4) Megalos, N.P., 1994. Bioremediation of Oil Contaminated Soil, South Australian Department of Mines and Energy, Report Book, No 94/4.

## **B. SEISMIC OPERATIONS**

### **NEW FIELD OPERATIONS**

Seismic field operations for Permit Year ONE of PEL 106 consisted of the recording of 12 seismic lines (GA04-2 to –13 inclusive) as the Paranta Seismic Survey. This survey commenced, with line preparations, on 27 January 2004 and was completed on 19 February 2004, following drilling of the last uphole.

Government approval for Great Artesian to conduct the Paranta Seismic Survey was conditional upon Great Artesian committing to the objectives defined in the “Statement of Environmental Objectives for Seismic Operations in the Cooper/Eromanga Basins – South Australia”.

Great Artesian’s strategies for achieving each of the SEO objectives for the Paranta Seismic survey are outlined below.

The SEO requires an Environmental Report to be submitted at the completion of each seismic survey. The environmental Report for the Paranta Seismic Survey was submitted on 7 April 2004, together with a draft field operations report, some 6 weeks after the end of recording.

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

Great Artesian has an Agreement with the Ngayana Dieri Karna (NDK) Claimant Group, whose Claim Area covers portion of PEL 106. Prior to the commencement of the 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. Details of this report were submitted to PIRSA as part of the application process.

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

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

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

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

The area covered by PEL 106 in which the activities occurred comprises one land systems : dunefield. GAS criteria for assessing adverse impacts on biodiversity for this land system is provided in the Statement of Environmental Objectives (Table A2.2).

The seismic lines for the Paranta Seismic Survey were recorded in PEL 106 during Permit Year ONE within a grid of pre-existing seismic lines covering a number of vintages, primarily from 1981 to 1997. No adverse impact have been identified in this region as arising from these previous seismic operations.

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

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

A company representative, Mr Bruce Beer, 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>	Monitor and manage those activities that have, or are likely to have, temporary impacts on biological diversity, cultural components of the environment, groundwater, or other land users, and facilitate rehabilitation so as to minimise 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 Paranta Seismic Survey, an assessment of the impacts was undertaken against the first set of GAS criteria at various locations referred to as Environmental Monitoring Points (EMPs). These EMPs are located in representative areas of the dunefield environment. The results of the GAS audits are presented in the Environmental Report submitted to PIRSA at the completion of the survey. All GAS scores were in the range of 0 to +1.



<b>SEO Objective 3 :</b>	Avoid undertaking any activities which have, or are likely to have, long-term significant adverse impacts(s) on biological diversity, cultural components of the environment, groundwater, or other land uses.
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The seismic recording activities undertaken in the Paranta Seismic Survey were similar to many previous seismic surveys undertaken in these dune field environments within the Cooper Basin.

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

The technique of weaving the routes of the seismic lines had been practised extensively during acquisition, enabling the minimising of any visual impact of the operations.

***Rehabilitation of the seismic lines recorded in Year One of the Permit during the Paranta Seismic Survey.***

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

Great Artesian submitted an Environmental Monitoring Report for the Paranta Seismic Survey as part of the Draft Field Operations Report on 7 April 2004. This report included a description of the location of an Environmental Monitoring Point (EMP-01) in PEL 106 that is to be used for future monitoring of the progress of natural rehabilitation of the disturbed ground.

Photographs were taken at EMP-01 which is at the intersection of two seismic lines, immediately after the survey operations had been completed. The level of environmental impact at EMP-01 resulting from the survey operations was also assessed using the GAS (Goal Attainment Scaling) system specified in the SEO.

As part of the on-going monitoring process, "repeat" photographs will be taken at EMP-01 approximately 12 months after recording operations have finished. Copies of these photographs will be used to provide a comparative study of the regenerative processes.

It was proposed that in May 2004, PIRSA would undertake an aerial environmental audit of recent seismic lines recorded in the Cooper Basin, including lines from the Paranta Seismic Survey. At the time of preparing this Report, the results of that audit were not available.