

# **Annual Report of South Australian Cooper Basin Operations**

This report has been prepared in accordance with the requirements of the Petroleum Act 2000 and Petroleum Regulations 2000 and covers all of the operations conducted in the SA Cooper Basin by Santos Ltd as Operator for the South Australian Cooper Basin Joint Venture for the period January 1 2003 to December 31, 2003.

## 2003 Annual Report

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# ANNUAL REPORT – 2003

## South Australian Cooper Basin Operations

### 1. INTRODUCTION

This report covers the activities conducted in the South Australian section of the Cooper and Eromanga Basins (SACB) by the South Australian Cooper Basin Joint Venture (SACBJV), of which Santos Ltd is the Operator. The report covers the period 1 January 2003 through to and including December 31, 2003.

Following the approval granted by PIRSA on 3 June 2003, this report now includes

- Details of those pipelines operated under the following Pipeline Licenses
  - PL #5, Ballera to Moomba raw gas trunkline.
  - PL #9, Stokes to Mettika raw gas flowline
  - PL #15, Moon to Kerna raw gas flowline
- Details of emergency response exercises conducted during the year
- The Pump Station at the head of the Moomba to Port Bonython Liquids Pipeline, but does not include the pipeline operated under Pipeline License #2, which is covered under a separate report.

PIRSA approved an ongoing extension in time of one month for the development and submission of this Annual report at the end of March.

During this reporting period, revised Statements of Environmental Objectives (SEO) were approved for Drilling and Well Operations and for Production and Processing Operations. This Annual Report is prepared considering these SEO's.

### 2. EXECUTIVE SUMMARY

There were no incidents or accidents which resulted in injury or illness to any member of the general public.

There was one serious incident reported to PIRSA during this reporting period. This was an incident on the Moomba Plant flare header which resulted in damage requiring a plant shutdown to effect repairs. This occurred on 24.1.03.

During the reporting period, there were;

- 179.7 petajoules (PJ) of sales gas produced into the South Australian and New South Wales natural gas pipelines,
- 13.8 petajoules of ethane produced to a customer in NSW,
- 557.0 mL of gas condensate produced to Port Bonython,
- 3.18 mm BBLs of crude oil produced to Port Bonython.

A total of 47 wells were drilled, 6 of which were plugged and abandoned after failing to intercept hydrocarbons. The remainder were cased and suspended for subsequent completion.

There were 121 well workover operations conducted, and 24 fracture stimulation operations. No production wells were plugged and abandoned, leaving a total of 1303 operational wells (674 producing, 543 inactive and 88 suspended).

During this reporting period, the Operator continued investigations into the potential for downhole crossflow with the conduct of reviews on specified fields.

During the year, a total of 79.4 Km of flow line, made up of 64 individual flowlines, were constructed. Of the 79.4 Km of line constructed, 28.4 Km was Glass Reinforced Epoxy (GRE) line, which was installed in oil service. Testing and trialling of GRE line was initiated in response to the potential internal (bacterial) and external corrosion issues associated with surface laid steel pipelines.

A Pipeline License, PL #15 was issued on 6.1.2003 for the Moon (Qld) to Kerna (SA) gas flowline.

At the Moomba Plant, major control system and electrical system upgrades, which commenced during 2002, continued. The physical cutover to a new control system commenced towards the end of 2003. These projects will enhance the reliability of the Moomba Plant when completed during 2004.

Santos continued to work closely with other independent hydrocarbon and geothermal energy exploration companies operating in the SA Cooper Basin during 2003 to minimise the risk exposure to installed infrastructure and facilities, including pipelines.

Santos continued to actively support local community activities in areas in which the petroleum exploration and production activities take place.

### **3. SUMMARY OF REGULATED ACTIVITIES**

The *Regulated Activities* conducted by the SACBJV under the various petroleum licenses include,

- Exploration for and appraisal of petroleum
- Access road / track construction.
- Borrow Pit construction.
- Seismic line construction
- Seismic survey
- Well drilling operations.
- Water injection / Water flood operations for production enhancement.
- Production of Petroleum
- Construction and operation of plant, equipment, camps, airports and associated infrastructure
- Processing operations
- Disposal of Produced Formation Water
- Natural reservoir storage of natural gas and ethane
- Construction, maintenance, repair and abandonment of pipelines for the transport of petroleum
- Operation of transmission pipelines

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These activities are authorised under various Petroleum Production Licenses.

#### **4. COMPLIANCE**

The activities covered by this report are administered under the Petroleum Act (2000) and the Petroleum Regulations (2000) and Statements Of Environmental Objectives.

During this reporting period, *Statements of Environmental Objectives (SEO's)* covering Production and Processing Operations and Drilling and Well Operations were finalised and approved. These became effective in October 2003 and November 2003 respectively, although the draft SEO's were being utilised prior to this time.

Initial introduction and awareness information was provided to relevant personnel highlighting the new SEO's and a full induction is planned for early 2004.

The *Statement of Environmental Objectives* covering Seismic exploration activities became due for review. While this review and update is now in progress, the original document continues to be used.

Other relevant documents relevant to SACB activities include the relevant Licenses issued by regulatory agencies including PIRSA and EPA and the various State legislation.

##### **a) Provision of Data**

Typically, Santos, on behalf of the SACBJV provides over 1000 reports or data to PIRSA each year. There was some non-conformance with the provision of this data to PIRSA as required by the Petroleum Act and Petroleum Regulations, where the data was either overdue and no extension had been sought or was incomplete. A significant focus was maintained during the year to resolve the data issues, with good progress made.

The aspects subject to non-conformance were associated with,

- Downhole assembly installations or modifications.
- The return of core and other cuttings and samples together with written reports to PIRSA within the stipulated timeframes.
- Special high temperature memory production logs, which were presented in electronic format which was non-compatible with the PIRSA system.
- Late submission of Fitness for Purpose and Annual Reports for the Licensed Pipelines which cross the SA / Queensland border.
- Della 20 downhole crossflow issue, which resulted in the conduct of further investigations in the Della, Moomba and Big Lake gas fields to determine the potential for crossflow in other wells.

A procedure was introduced by Santos during the period to improve the management of the removal of core from the PIRSA Core Library to prevent non-conformance in this area.

There were a few occasions where 21 days Notice of Entry could not be provided to land holders. These occasions arose as a result of the need to alter the drilling program.

In these instances, detailed discussion was held with the land holder to review the particular project and identify any potential concerns or specific requirements. Without exception, no Landholder issues were identified.

In respect of Regulation 33 (2) (e), agreement has previously been reached with PIRSA about the list of reports to be included in this report for compliance with the legislation. From PIRSA correspondence of 16.8.2002, "*PIRSA will be satisfied that Regulation 33 (2) (e) has been complied with if a list of all technical geological reports and data (including those reports required by Regulations 34 to 45) is submitted. This list should include all interpretive geological and reserve reports. This arrangement may be reviewed at any time by PIRSA, but no change will be required unless at least 2 months warning has been given prior to the required submission date for the Annual Report. A copy of this statement indicating the limitation to the listing should be included in the relevant section of the Annual Report*". This report is provided at [Appendix 1](#).

**b) AS2885**

As reported in the 2002 Annual Report, Santos commissioned an audit of compliance against the pipeline code AS 2885. Follow-up actions were agreed with PIRSA in early 2003 and were progressed during this reporting period, with formal review at PIRSA quarterly compliance meetings. Good progress continued to be made. A followup audit in November 2003 concluded that fundamental improvements in the management of pipelines had occurred and that a focus was directed to measuring implementation of the systems in order to indicate compliance with AS2885

**c) Quarterly Compliance Meetings**

Quarterly meetings between PIRSA and Santos continued during this reporting period. The dates of these meeting are listed in [Appendix 2](#).

**d) Fitness for Purpose Report**

In accordance with the Petroleum Act (2000), the SACBJV Fitness For Purpose Report (FFP) was submitted to PIRSA on 28 November 2001. The FFP report demonstrates how Santos is managing risk as part of its overall business activities and is complying with the requirements of the Petroleum Act 2000 and regulations. This report covers the whole of Santos production facilities in the South Australian section of the Cooper and Eromanga Basins.

In a letter to Santos of February 28 2002, PIRSA identified seven aspects of the FFP Report for further investigation and review as validation of the report. Due to the work involved in this request, a plan was developed and agreed with PIRSA to address this request.

In May 2002, a presentation was made to PIRSA on the issue of risk assessments. PIRSA subsequently advised that sufficient information to adequately demonstrate that an appropriate level of assurance was being achieved for the identification and management of major risks to and of these operations. The competence and professionalism of the consultants and companies used to carry out this work was demonstrated to have been of an appropriate level and that the WOPRA provided additional assurance that major risks are being identified and subsequently managed.

In July 2002, a demonstration was provided to PIRSA which covered aspects of risk reduction activities, corrosion control, vapour cloud explosion and the assumptions used

in the report did not produce an unacceptable level of risk. PIRSA subsequently advised that subject to additional evidence from the WOPRA activity, Santos had adequately demonstrated these aspects.

In September 2002, a demonstration was provided which demonstrated the existence and operation of a system for managing change in plant and well operations.

In March 2003, a further demonstration was provided to PIRSA in relation to audits and the management system and achieving compliance with the Petroleum Act 2000 and Petroleum Regulations 2000. PIRSA advised that they were not satisfied with CBU's management system's ability to detect non conformance with the new Act, particularly in relation to SEO's and AS 2885. This generated a formal warning, which is regarded as a low level "persuasive" enforcement tool available to PIRSA under its Compliance Enforcement Policy. Typical examples of such warnings include late submission of data and reports, or incomplete reports.

The shortcoming that led to the warning had already been recognised by Santos with a more comprehensive 2003 compliance audit schedule developed, and an updated EHSMS under development. In April 2003, the audit schedule and EHSMS development timetable were agreed with PIRSA as part of an action plan to address the warning. Progress is reviewed regularly with PIRSA and has been satisfactory. Santos continues to work with PIRSA on this matter.

All other aspects of the 2001 FFP report were demonstrated to PIRSA's satisfaction. It was also agreed that the next FFP report would be submitted in June 2005.

## **5. INCIDENTS**

The Petroleum Act defines *Serious Incidents* which are required to be reported promptly to PIRSA. There were no incidents which resulted in injury to any member of the public. During 2003, one *Serious Incident*, as defined by the Petroleum legislation, was reported to PIRSA.

This incident occurred on 24.1.03 during maintenance activity to conduct a hot tap into a flare line within the Moomba Plant. A coupon cut from a pipe became free, resulting in internal damage to the flare line. This required a shutdown of sections of the plant to effect repairs. The incident was reported immediately to PIRSA and a full written report was provided on 15 April, 2003.

An investigation into this incident identified issues with the procedure for the conduct of Hot Taps. As a result, changes have been made to procedures.

Incidents reported in the 2002 Annual report involving Moomba Plant pipework corrosion were closed out. Pipework was progressively replaced and continuous corrosion inhibitor injection into the piping system was established together with a program of pipework thickness testing. These actions close out the follow-up to these incidents.

A number of *Reportable Incidents* were reported to PIRSA at quarterly compliance meetings during 2003. A summary of these reports are available at [Appendix 3](#).

The Operator reported a failed casing string on the water injection well Jena #4, which was the subject of a specific SEO. A remedial program to repair this was successfully undertaken.

A suspected hydrogen sulphide (H<sub>2</sub>S) release from the McLeod 1 gas well on 26.1.03 was reported by another operator. Investigations and modelling by Santos was unable to substantiate any significant volume of H<sub>2</sub>S.

A logging tool with a low level radio-active source became stuck during contractor drilling of the Big Lake 71 well in March 2003. Following failed attempts to retrieve this tool, approval was sought to abandon the tool down-hole. Approval was obtained from PIRSA and the EPA before the tool was abandoned at approximately 9600 feet below the surface.

## **Monitoring**

Monitoring of historic oil spill sites continued in 2003, with soil samples collected and analysed for hydrocarbon from some previous spill sites at approximately 6-monthly intervals. Results tracked through the year indicate that bioremediation (breakdown of hydrocarbon into CO<sub>2</sub> and water by soil bacteria) is actively occurring at most sites. Where necessary, bioremediation was encouraged by the addition of water and fertiliser, and ploughing of the soils to aerate them.

Monitoring of groundwater beneath the Moomba Waste Depot continued through 2003, with waters sampled at 6 monthly intervals from a series of monitoring bores located around the depot facilities. These are routinely tested for a large range of physico-chemical parameters. Monitoring to date has indicated no deleterious environmental impacts upon groundwaters beneath the Waste Depot as a consequence of waste management activities.

Groundwater beneath the Moomba Landfarm Bioremediation Facility were sampled in 2003 as a component of the 6-monthly groundwater monitoring program. Analysis of data to date indicate groundwater beneath the Landfarm are mostly not impacted by bioremediation practices. Data for waters collected from one monitoring bore do indicate a minor elevation of hydrocarbon compared to surrounding bores. The same data however indicate this trend may be declining with time.

All PFW facilities in SA Cooper Basin are monitored under the surface water monitoring program, which compares pond water quality against the Australian & New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000), and the Goal Attainment Scaling (GAS) system. Historically, this program is undertaken every year. No sampling was necessary in 2003 since data obtained in Nov 2002 indicated no significant deviation from the trends observed over several years of monitoring.

Moomba Plant Flaring – A comprehensive monitoring program to track smoke emissions from the Moomba Plant flares commenced in 2003. This program records

daily smoke emissions and tracks them against a calibrated baseline. Data are recorded electronically and submitted to the SA EPA.

### **Studies:**

The Cooper Creek Oil Spill Study was completed in 2003. This investigated the potential effects of a spill of crude oil or condensate to the Cooper Creek. The study comprised literature reviews, field inspections and an ecotoxicological study. The study found that waterholes and ephemeral lakes were most sensitive to spills, with condensate being more toxic to biota than crude oil and pipeline additives (biocides and corrosion inhibitors) being highly toxic to biota.

The Soil Health Index (SHI) project (an approach for managing ecological risks from formation water) was progressed in 2003. Activities included completion of a Method Statement, which detailed the further development of the SHI process and its application to remediation of sites associated with the SACBJV Cooper Basin Operations, and a remediation trial, conducted in the last half of 2003.

The final results of this trial are expected in 2004 and will enable remediation options to be defined and physical remediation of the selected trial sites to commence.

An independent Auditor was appointed to review the SHI process and its application. A review undertaken by the Auditor indicated the SHI to be acceptable and in line with national standards, being the National Environment Protection (Assessment of Site Contamination) Measure (1999). PIRSA was updated on the project status at each Quarterly Compliance meeting.

## **6. MANAGEMENT SYSTEM**

### **Environment, Health & Safety System**

The upgraded Santos Environment, Health and Safety Management System (EHSMS) continued to be developed and implemented during 2003 to replace the previous ISO 9001 certified system. Implementation progress was consistent with previously communicated milestones and was monitored at quarterly compliance meetings.

The management standards provide a framework for sustainable achievement of acceptable EHS outcomes. The framework describes requirements such as EHS policies, compliance to legislative and regulatory obligations, EHS objective setting, risk assessment and control of hazards, procedure management, management system assessment/auditing and management review requirements. The management standards have been completed and implementation of these will progressively take place during 2004.

The hazard standards provide a clear process for control of hazards that are specific to Santos' business. Standards are being developed for health, safety, and environmental hazards. Due to the technical nature of these standards and their impact on site based personnel, consultation with the site EHS committees is undertaken.

Assessment and audit is used to determine the effectiveness of the management system and identifies areas for improvement (system based audits). Initial management system audits assess 'baseline conformance' of existing management processes to requirements of the new EHSMS. Additionally, audits are also conducted to establish compliance levels to licence and regulatory requirements (compliance based audits).

In April 2003, the compliance audit schedule and EHSMS implementation milestones were agreed with PIRSA. Good progress was made and was reviewed regularly with PIRSA who were satisfied with progress, which included,

- Completion of Management Standards development.
- Commencement of Hazard Standards development.
- Appointment of a dedicated resource to steward the implementation of the EHSMS for the CBU;
- Completion of nominated compliance audits for 2003, including a follow up audit of AS-2885 and auditing of parts of the SEO's formally gazetted in October and November 2003, and
- EHSMS implementation milestones achieved.

## Audits and Reports

### System Based Audits

Baseline assessments were conducted of key Central Business Unit (CBU) locations to determine the level of conformance with the requirements of the EHSMS Management Standards. These audits determined that key Management Standard procedures and practices existed at all locations, but as expected, improvements were identified. These baseline assessments were effective in improving EHSMS awareness and driving the development of upgraded site improvement plans.

Future audits will determine progress made in achieving full conformance with the system requirements.

### Compliance Based Audits

The 2003 Legislative and Regulatory Compliance Audit Schedule was conducted, as shown below,

No	Audit Title	Act/Reg #
1	South Australian pipeline operations (AS 2885)	Pet Act 2000/SEO
2	Information and Data provision	Pet Act 2000/SEO
3	Notice of Entry / Detailed Activity Information	Pet Act 2000/SEO
4	Incident Reporting	Pet Act 2000/SEO
5	Cooper Basin New Flowlines	Pet Act 2000/SEO
6	Cooper Basin Suspended Wells	Pet Act 2000/SEO
7	Cooper Basin Field Satellites	Pet Act 2000/SEO
8	Construction Industry Training Fund Act	CITF Act
9	Work Permit and JHA Compliance Audit, with specific focus on Working at Heights and Confined Space Entry Hazard Standard.	OHS&W Act
10	Moomba Waste Depot	EPA Licence 1259
11	Moomba Plant , and Petroleum Production and Storage within the SACB	EPA Licence 2569

In addition to the planned compliance audits referenced above, a range of audits were also conducted, including:

- Audit against relevant codes for the haulage of dangerous goods.
- PIRSA commissioned HPOS review of pipelines against AS 2885.
- Work Permit System audits.
- Contractor Safety audits and reviews.
- Emergency Response Plans reviews.

Safety Management Plans, Hazard Standards and audit outcomes are regularly reviewed by safety committees to ensure ongoing improvement in safety performance.

A report was also completed of an environmental inspection of the Moomba Plant (*Moomba Plant and Associated Facilities – Environmental Performance Inspection December 2002*). This inspection identified a good level of compliance with Statutory and Company requirements. Several recommendations for improvement actions were made.

Some highlights of compliance audits completed included:

A compliance audit of the Moomba Plant undertaken in Dec 2003 (*Draft Moomba EPA Licence 2569 (Petroleum Storage & Production) Compliance Audit*). The level of compliance and general housekeeping was good. Several recommendations for improvement were made.

A compliance audit of the Moomba Waste Facilities undertaken in November 2003 (*Moomba EPA Licence 1259 (Waste Depots) Compliance Audit*). This audit identified full Licence compliance, with a good level of housekeeping and attention to minimising any potential for environmental harm. Several recommendations were made to ensure ongoing improvement.

An environmental audit of flowlines installed in the Cooper Basin was undertaken (*Environmental Audit of Recently Constructed Flowlines in the Cooper Basin Nov 2003*). The focus of this audit was new installations and indicated the standard of installation to be “very good to excellent” overall. Measurement against the SEO and Goal Attainment Scaling (GAS) identified only a few instances of minor non-conformance with Santos’ environmental objectives.

An environmental audit of satellite stations (*Environmental Audit of Satellite Stations in the Cooper Basin SA & QLD Nov 2003*) was undertaken. The audit identified aspects where environmental performance could be improved, with non-conformance with Santos codes and/or procedures identified relating to the prevention of oil spills, remediation of contaminated soil, housekeeping, rehabilitation of earthworks, and access by cattle to PFW facilities. All issues identified were ranked according to priority and operational area, with specific actions identified for closeout. At the time of reporting significant progress had been made against closure of high priority issues.

A detailed environmental inspection was conducted of a drilling rig new to the Cooper Basin. The inspection found a high level of conformance with Santos’ environmental objectives. Recommendations for improvement were made in relation to sewage effluent disposal, solids waste management, and chemical and lube oil storage.

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Follow-up to earlier audits / reviews included:

An Environment Improvement Programme was developed for SA Cooper Basin operations (*SA CBJV Environment Improvement Programme 2003, Oct 2003*), and comprises a prioritised plan of actions and allocated responsibilities for the achievement of specific environmental goals/objectives. It was developed with the intent of assisting the management of key environmental initiatives in the Cooper Basin and will be regularly reviewed during 2004 to maintain the focus.

Following items identified under the *Risk Assessment – SA Cooper Basin Produced Formation Water Disposal Facilities in September 2003*, a *Draft SA Cooper Basin Evaporation Pond Environment Management Programme* was developed for review. This details a prioritised action plan for the ongoing achievement of environmental objectives specific to evaporation pond management and nominates responsibilities and timeframes for completion of actions during 2004.

An environmental management programme specific to the evaporation ponds servicing the Moomba Plant was developed (*SACBJV Northern Evaporation Pond Environment Management Programme Oct 2003*). This programme was implemented primarily to address requirements specific to EPA Licence #2569 that relate to groundwater monitoring, pond integrity, landscaping, closure management and future land use.

## **7. RISK ASSESSMENT**

Santos commissioned a number of risk assessments during the period. These risk assessments are aimed at identification of risks and the development of actions designed to reduce the risk to as low as is reasonably practicable.

Some of these risk assessments are extensions of programs initiated in previous reporting periods. WOPRA is one such assessment, where the program was initiated in the Moomba Plant in 2002 and extended to field facilities during this reporting period.

There were also a number of projects identified in previous risk assessments which continued to be progressed during 2003. These projects are addressed in this report.

Detailed risk assessments were undertaken of several pipelines and flowline networks. The major trunklines from Ballera to Moomba, Cuttahirrie to Moorari, Keleary to Merrimelia, and Bookabourdie to Tirrawarra, and the oil and gas flowline networks were separately examined at risk assessment workshops held in 2003. The risk assessments considered a range of risk scenarios. For each, mitigation controls were identified that ensure the risks are reduced to as low as reasonably practicable. The risk assessment on the Ballera to Moomba Licensed pipeline (PL #5) identified a requirement for additional signage at road crossings and an increased frequency of landowner liaison.

A detailed Risk Assessment was undertaken (*Risk Assessment – SA Cooper Basin Produced Formation Water Disposal Facilities Sep 2003*) with the intent of appraising the design, operation and maintenance of SA Cooper Basin produced formation water disposal facilities against the intent of the *Environment Protection (Water Quality) Policy 2003*.

## **8. THREATS**

Foreseeable threats to the operation were reviewed. During 2002, a *Whole Of Plant Risk Assessment* (WOPRA) was commenced on the Moomba Plant and was completed in 2003. The outcomes of this risk assessment have been prioritised and follow up actions initiated. This risk assessment process was expanded to cover field facilities in late 2003.

The main threats to the operation and reliability of the Moomba Plant were addressed in 2002 with the decision to

- replace the Moomba Plant control system. This project continued through 2003, with the physical replacement of the control system commencing in late 2003. This project is scheduled to be completed in 2004.
- install remotely operated valves upstream of pig receivers at the Moomba Plant inlet.

Improvements to the Moomba Plant high voltage electrical system were also continued during 2003, as were the upgrading of control systems on high speed rotating machinery and steam boilers. These projects are scheduled for completion in 2004.

Threats posed to the facilities, in particular to high pressure natural gas pipelines, are managed to as low as reasonably practicable by regular communications with other parties operating in the area. This includes pastoralists, on whose properties the operational activities are conducted, and third party exploration companies who have exploration licenses in the area. Information in relation to infrastructure, including pipeline maps and information, is provided and regularly updated. The threat level to Licensed Pipelines was reviewed and found to remain very low.

Threats posed by oil and gas wells were re-evaluated. As a result, a more consistent rating format, consistent with the Santos Environmental Health and Safety Management System has been developed and is being implemented.

Threats associated with the national geo-political situation have continued to be monitored and close liaison continues to be maintained with State and Federal authorities responsible for managing this issue.

Threats identified in earlier Annual Reports have been reviewed. Other than those identified above and the work undertaken to mitigate these, no additional threats were identified.

## **9. EMERGENCY RESPONSE**

A large emergency response capability, consisting of personnel, equipment, plans and procedures is maintained to allow a rapid response to any emergency situation. This capability includes trained Nurses based at Moomba, a trained and dedicated emergency response team and emergency response equipment and systems.

Emergency Response Procedures (ERP) have been developed and implemented to guide response to any emergency situation which may arise. ERPs have been developed to cover the following incidents,

- Plant emergency.
- Field emergency
- Aircraft emergency
- Camp emergency
- Well control emergency

Santos and the Joint Venture operations are also called upon to provide assistance in emergencies in the local community. This assistance may be to landholders, third party exploration companies or to tourists and involve activities ranging from participation in searches to the provision of medical assistance and retrieval.

Emergency response exercises are conducted during the year to test these procedures and provide training for personnel. Each exercise, and any response to an actual event, is reviewed to allow learnings and improvements to be incorporated into the emergency plans.

The major emergency exercises conducted during 2003 were,

- Fire at Diesel Plant within the area of the main Moomba Plant. This exercise, on 13.3.03, was designed to exercise the callout and mobilisation of emergency response personnel and the evacuation of the Moomba plant.
- Cooper Creek Spill on the Ballera – Moomba pipeline near the Nappamerrie Bridge on 27.5.03 was designed to exercise the mobilisation and deployment of personnel and equipment to a remote location and to test communications between different operational groups and between the remote site and the Moomba and Ballera operational bases. Regulatory authorities from SA and Queensland were invited to observe this exercise.
- A fire at the Gidgealpa gas satellite.
- Setting up the Moomba Emergency Operations Centre and the Alternate Emergency Operations Centre for familiarisation of new personnel.
- Briefing and callout exercise for the Adelaide based senior management team.
- Desktop exercise on snubbing rig, designed to evaluate understanding by personnel and to update the Well Control Emergency Plan.

In addition, the Corporate Santos Incident Management Plan (SIMP) was enhanced during 2004.

## **10. GENERAL**

Santos and the SACBJV operations continued to support the local community during this reporting period. This support includes the following,

- active participation on local soil boards
- active participation in and support of local community events.
- provision of emergency assistance to the local population, landholders, third party explorers and tourists.
- logistical assistance and support to educational and research organisations working in the area.
- provision of logistical support to landholders.

## 11. SEISMIC EXPLORATION

There were no seismic acquisition projects undertaken by the SACBJV during the calendar year 2003.

## 12. DRILLING AND WELL OPERATIONS

### **Wellsite, campsite, borrow pit and access track construction and restoration.**

During this reporting period, 85 wellsite leases were constructed, which included 113 km of new tracks to provide access to these sites. A total of 131 borrow pits were necessary to provide fill for the tracks and leases.

Partial restoration of drilling leases was carried out, together with the restoration of 16 km of roads and access tracks. Three borrow pits were sought by landholders. These were formally signed over to the relevant landholders.

Close consultation was maintained with pastoral lessees to ensure their interests remained high in consideration when conducting petroleum activities.

Disturbance to sites of Aboriginal and European heritage was avoided. Company trained staff are used to scout sites prior to work commencing on the construction of sites and access. Where necessary, a consultant archaeologist is engaged to ensure all heritage sites are avoided.

The major activity planned for 2004 includes the following,

- 31 wells to be drilled.
- construction of flow lines to connect successful wells to the production system.
- the construction of access tracks, borrow pits and campsites as necessary.
- approximately 100 completion or re-completion operations.
- 25 fracture stimulations

### **Drilling Operations**

The revised *Statement of Environmental Objectives, Drilling and Well Operations* was finalised and submitted to PIRSA for approval. Approval was granted in November 2003 and the SEO became operational. The "draft" revised document was used prior to its approval. Personnel are generally aware of the revisions to the SEO and the formal induction of the SEO will be undertaken early in 2004.

There were 47 wells drilled in the operational area in 2003. Of these, 5 were plugged and abandoned after not encountering commercial quantities of hydrocarbons. One well was completed while the drilling rig was on location. The remainder of the wells were cased and suspended for later completion using a workover rig. A list of wells drilled in 2003 is provided in [Appendix 10](#).

Issues associated with well abandonment, and in particular objective 6 of the Drilling and Well Operations SEO, were being addressed with PIRSA and DLWBC in relation to the abandonment of wells, including Korma 1. These discussions were ongoing at the close of the reporting period.

The drilling operations conducted by Santos are undertaken in accordance with the Statement of Environmental Objectives for Drilling and Well Operations and the Santos Drilling Management System and Drilling Operations Manual. Well casing design is undertaken in accordance with Santos procedures and industry guidelines, which take account of the pressures, stresses, risks, loads and the environmental conditions which exist in each circumstance.

## **2004 Activity**

During 2004, it is planned to drill 11 new gas wells and 9 Oil wells.

### **Well Completion, Workover, Production, Suspension and Abandonment.**

At the end of this reporting period, there were a total of 1305 operational wells. Of these, 700 wells (operational, inactive or suspended) were subject to casing annulus pressure testing. 459 wells were also subject to corrosion monitoring. There were two incidents reported to PIRSA during the year. A logging tool with a low level radio-active source was abandoned after it became stuck during the contractor drilling of Big Lake 71. A procedure was developed for the abandonment of this tool and approved by PIRSA and the SA EPA before the tool was abandoned.

The second incident involved a minor gas release from the Dullingari 11 well.

There were 121 individual workover operations conducted. A further 24 Fracture stimulation operations were conducted. Workover activities included tubing repair, downhole pump installation / repair, well completion or recompletion, siphon string installation, ESP installation and perforation or reperforation operations. These activities are listed in [Appendix 4](#).

Monitoring of well casing annuli pressure continued. Available data was reviewed and a risk assessment undertaken to determine the best means to effectively categorise these wells. As a result, it is difficult to make a direct comparison with data from previous reporting periods. The number of casing strings with leaks (a major factor in determining well integrity) is as follows,

- 93 wells with pressure on Surface Annulus, indicating Production or Intermediate Casing leaking to Surface Casing Annulus.
- 65 wells with pressure on Intermediate Casing Annulus, indicating Production Casing leaking to Intermediate Casing annulus.
- 220 wells with pressure on tubing, indicating Tubing leaking to Production annulus.

[Appendix 5](#) provides additional detail.

In addition to the above, temperature logs were run on selected wells in the Della, Big Lake and Moomba fields associated with aquifer crossflow studies. Monitoring and review for cross flow was ongoing at the close of this report.

## **Operations – 2004**

The corrosion monitoring and annulus pressure testing program will continue in 2004. Further temperature logs are planned for the determination and assessment of crossflow in aquifers. Eight workover operations are planned to address well integrity issues.

It is planned to recomplete 14 gas wells and 21 oil wells and conduct fracture stimulation operations on 15 gas wells and 14 oil wells. Artificial lift devices are expected to be installed on 18 oil wells.

### **Downhole Well Abandonment**

No wells were abandoned in 2003 as a result of depletion or integrity issues.

### **Operations – 2004.**

Six well abandonments are provided for in 2004, although no specific well selections have been made.

Performance against the Drilling and Well operations SEO is described in the following Table.

**Environmental Objectives and Performance – Drilling and Well Operations**

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 1:</b> Minimise the risk to public and other third parties.</p>	<ul style="list-style-type: none"> <li>▪ All employees and contractor personnel complete a safety induction prior to commencement of work in the field.</li> <li>▪ All employees and contractor personnel undertake a refresher induction every 2 years.</li> <li>▪ Signage in place to warn third parties of access restrictions to operational areas, with particular warnings when potentially dangerous operations are being undertaken.</li> <li>▪ Permit to work systems in place for staff and contractors in dangerous situations.</li> <li>▪ All appropriate PPE (personnel protective equipment) is issued and available as required in accordance with company operating requirements and applicable standards.</li> <li>▪ Effective Emergency Response Plan (ERP) and procedures are in place in the event of a fire or explosion.</li> <li>▪ Annual exercise of ERP.</li> <li>▪ Communication of rig moves and other potential hazards to safety associated with drilling and well operations to potentially affected parties prior to commencement of operations.</li> <li>▪ Reporting systems for recording injuries and accidents in place, and annual; (at minimum) review of records to determine injury trends. Implementation of appropriate corrective actions.</li> <li>▪ Ensuring safety management plans are updated and reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reasonable measures implemented to ensure no injuries to the public or third parties.</li> </ul>	<p>There were no injuries to the public arising from Drilling and Well operations.</p> <p>All Santos and Contractor employees are required to attend a safety induction prior to commencing work. A refresher is provided at regular intervals.</p> <p>Signs are installed at strategic locations to deter the public from accessing drilling and production areas and when potentially hazardous tasks are undertaken.</p> <p>A specific Wellsite Permit-to-Work system is utilised to manage workplace / worksite safety.</p> <p>Personnel are provided with approved and appropriate PPE as required when undertaking potentially hazardous tasks.</p> <p>Emergency Response Plans and procedures are in place. These procedures are regularly exercised with identified improvements included into the ERPs.</p> <p>Relevant parties are advised of potentially hazardous operations before they are undertaken.</p> <p>An electronic accident and incident recording system is used to report and monitor accidents and incidents</p> <p>Safety Management Plans, including KPIs, have been developed and introduced by Santos and its contractors. These are regularly reviewed and updated.</p> <p>Emergency Response procedures for well operations reviewed and updated during this reporting period.</p>

<p><b>Objective 2:</b> Minimise disturbance and avoid contamination to soil.</p>	<p><u>Well Site and Access Track Construction</u></p> <ul style="list-style-type: none"> <li>▪ Consider alternate routes during planning phase to minimise environmental impacts</li> <li>▪ Gibber mantle on access tracks and well sites (excluding sumps) has not been removed, only rolled, during construction and restoration on gibber and tableland land systems.</li> <li>▪ Topsoil stockpiled (including gibber mantle) from sump construction and respread on abandonment.</li> <li>▪ The need to traverse sensitive land systems and the methods of managing the impacts should be justified in accordance with company procedures, recorded and available for auditing.</li> </ul> <p><u>Production Testing / Well Blowdowns</u></p> <ul style="list-style-type: none"> <li>▪ If appropriate use:             <ul style="list-style-type: none"> <li>- impermeable flare pit</li> <li>- flare tanks.</li> </ul> </li> </ul>	<p><u>Well Site and Access Track Construction</u></p> <ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for “Minimise visual impacts of abandoned well sites and access tracks” objective as listed in <a href="#">Appendix 4</a> for well lease and access track construction.</li> <li>▪ No unauthorised off-road driving or creation of shortcuts.</li> <li>▪ No construction activities are carried out on salt lakes, steep tableland land systems or wetlands land systems (as defined in EIR).</li> </ul> <p><u>Borrow pit construction and restoration</u></p> <ul style="list-style-type: none"> <li>• 0, +1 or +2 GAS criteria are attained for “Minimise Visual Impacts for constructing borrow pits” objective as listed in <a href="#">Appendix 3</a>, and “Minimise visual impacts” and “Minimise impact on soil” objectives as listed in <a href="#">Appendix 5</a>.</li> </ul> <p><u>Production Testing/Well Blowdowns</u></p> <ul style="list-style-type: none"> <li>▪ No soil contamination as a result of production testing or well blowdown operations.</li> </ul>	<p>Soil disturbance is minimised wherever possible. Rootstock is left intact and top soil is stockpiled for respreading and is respread during site restoration.</p> <p>Offroad driving is actively discouraged. Alternate routes considered in planning. Work is restricted to ROW.</p> <p>No construction activity is carried out on salt lakes, steep tablelands or wetland systems.</p> <p>Audit of construction activity undertaken with high level of compliance.</p> <p>Borrow pit construction is minimised by reuse of any suitable existing borrow pits. Borrow pits are restored on an ongoing basis to ensure the most time efficient restoration</p> <p>Prototype blowdown (vent) tanks developed and trialled. Reviewing practices for flaring operations.</p>
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<p><b>Objective 2 cont:</b> Minimise disturbance and avoid contamination to soil.</p>	<p><u>Fuel and Chemical Storage and Handling</u></p> <ul style="list-style-type: none"> <li>▪ All fuel, oil and chemical storages banded in accordance with the appropriate standards</li> <li>▪ Records of spill events and corrective actions maintained in accordance with company procedures.</li> <li>▪ Spills or leaks are immediately reported and clean up actions initiated.</li> <li>▪ Logged incidents are reviewed annually to determine areas that may require corrective action in order to reduce spill volumes in subsequent years (and drive continual improvement).</li> <li>▪ Chemical and fuel storage procedures, including signage, are reviewed and monitored in audit process.</li> </ul> <p><u>Spill Response / Contingency Planning</u></p> <ul style="list-style-type: none"> <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.</li> <li>▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas.</li> <li>▪ Spill response equipment is audited annually.</li> <li>▪ Annual spill response training exercise is undertaken.</li> </ul>	<p><u>Fuel and Chemical Storage and Handling</u></p> <ul style="list-style-type: none"> <li>▪ No spills/leaks outside of areas designed to contain them.</li> <li>▪ Level of hydrocarbon continually decreasing for in situ remediation of spills.</li> <li>▪ Soils remediated to a level as determined by the SHI process.</li> </ul>	<p>Some spills occurred outside areas designed to contain them as reported at quarterly meetings. Incidents reviewed to enable improvement strategies to be identified. Soil removed to land farm in some instances to eliminate contamination. No oil spill is likely to have impacted ground water. Records of spills are maintained. Spills are reported in accordance with legislative and company requirements. Incident registers are reviewed to determine areas requiring improvement and to ensure ongoing improvement.</p>
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Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
	<p><u>Waste Disposal (domestic, sewage and sludges)</u></p> <ul style="list-style-type: none"> <li>▪ Covered bins are provided for the collection and storage of wastes.</li> <li>▪ All loads of rubbish are covered during transport to the central waste facility.</li> <li>▪ Pits are not established in locations, which pose an unacceptable hazard to stock or wildlife.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All domestic wastes are disposed of in accordance with EPA licensing requirements.</li> <li>▪ 0, +1 or +2 GAS criteria for 'Waste material' objective is attained.</li> <li>▪ No spills or leaks from sewage treatment process and sludge pits.</li> </ul>	<p>Domestic wastes are disposed of in accordance with EPA License Requirements. Audits identified full compliance. Waste bins and containers are covered during transport. Waste pits are located only at Authorised facilities and are fenced to exclude stock and wildlife.</p> <p>There were no incidents at installed sewerage disposal facilities.</p>
Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 3:</b> Avoid the introduction or spread of pest plants and animals and implement control measures as necessary.</p>	<ul style="list-style-type: none"> <li>▪ Where appropriate a weed and feral animal management strategy is in place (avoidance and control strategies).</li> <li>▪ Rig and vehicle wash downs are initiated in accordance with the management strategy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No weeds or feral animals are introduced to operational areas.</li> </ul>	<p>Weed and feral animal strategies are in place. There is no evidence of the introduction of weeds or feral animals. Vehicles and rig equipment is washed in accordance with the management strategy.</p>

Environmental Objectives	Guide to Objectives Achievement	Assessment Criteria	Performance
<p><b>Objective 4:</b> Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.</p>	<p><u>Drilling Mud Sumps and Flare Pits</u></p> <ul style="list-style-type: none"> <li>▪ All drill cuttings, muds and non toxic drill fluids are contained within the designated mud sumps with adequate freeboard at the completion of operations to allow for a 1m cover of clean fill at remediation.</li> </ul>	<p><u>Well Lease and Access Track Construction</u></p> <ul style="list-style-type: none"> <li>▪ Well leases and access tracks are located and constructed to maintain pre-existing water flows (i.e. channel contours are maintained on floodplains and at creek crossings).</li> </ul> <p><u>Drilling Mud Sumps and Flare Pits</u></p> <ul style="list-style-type: none"> <li>▪ No overflow of drill cuttings, muds and other drilling fluids from mud sumps.</li> <li>▪ No waste material disposal to sumps and flare pits.</li> </ul>	<ul style="list-style-type: none"> <li>• Drainage channels and patterns are maintained or restored to minimise impeding or changing natural drainage patterns associated with well leases, access tracks and roads and at creek crossings.</li> </ul> <p>Work programs are modified to avoid periods of flooding and other seasonal influences and variations.</p> <p>No overflow of drilling mud sumps occurred. No waste material is disposed of in drilling mud sumps or flare pits.</p>
	<p><u>Well Heads (Oil and Gas Systems)</u></p> <ul style="list-style-type: none"> <li>▪ Where appropriate, imperviously lined well cellars are installed on oil wells.</li> <li>▪ Chemical containment devices are installed on gas well skids.</li> <li>▪ Well heads shut in and chemicals removed prior to flood events.</li> <li>▪ Jet pumps are installed within containment device with an adequately sized containment sump.</li> </ul>	<p><u>Well Heads (Oil and Gas Systems)</u></p> <ul style="list-style-type: none"> <li>▪ No leaks/spills outside of areas designed to contain them.</li> </ul>	<p>Investigated alternatives for impervious lining for well cellars.</p> <p>Automatic shutdown of wellhead pumps investigated and devices progressively fitted to all beam pumps to shutdown pump if Polished rod packer fails.</p> <p>Wells are shut-in and wellhead equipment is removed in areas to be impacted by flooding.</p> <p>Jet-pumps are installed with 9M3 sumps.</p>
	<p><u>Well Blowdown/Production Testing</u></p> <ul style="list-style-type: none"> <li>▪ Activity is conducted in accordance with accepted industry standards / good oilfield practice.</li> <li>▪ If appropriate use:               <ul style="list-style-type: none"> <li>- impermeable flare pit</li> <li>- flare tanks</li> <li>- separators</li> <li>- supervision</li> </ul> </li> </ul>	<p><u>Well Blowdown/Production Testing</u></p> <ul style="list-style-type: none"> <li>▪ No water (surface or groundwater) contamination as a result of production testing or well blowdown operations.</li> </ul>	<p><u>See Objective 2 above.</u></p>
<p><b>Objective 4 cont:</b></p>	<p><u>Fuel and Chemical Storage and Handling</u></p>	<p><u>Fuel/Chemical Storage and Handling</u></p>	<p>Spills which occurred outside areas designed to contain</p>

Environmental Objectives	Guide to Objectives Achievement	Assessment Criteria	Performance
<p>Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.</p>	<ul style="list-style-type: none"> <li>▪ All fuel, oil and chemical storages banded in accordance with the appropriate standards</li> <li>▪ Records of spill events and corrective actions maintained in accordance with company procedures.</li> <li>▪ Spills or leaks are immediately reported and clean up actions initiated.</li> <li>▪ Logged incidents are reviewed annually to determine areas that may require corrective action in order to reduce spill volumes in subsequent years (and drive continual improvement).</li> <li>▪ Chemical and fuel storage procedures, including signage, are reviewed and monitored in audit process.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No leaks/spills outside of areas designed to contain them.</li> </ul>	<p>they are reported at quarterly meetings, as listed in <a href="#">Appendix 3</a>. Soil removed to land farm in some instances to eliminate contamination. No spill is likely to have impacted ground water. Records of spills are maintained. Spills are reported in accordance with legislative and company requirements. Incident registers are reviewed to determine areas requiring improvement and to ensure ongoing improvement.</p>
	<p><u>Spill Response / Contingency Planning</u></p> <ul style="list-style-type: none"> <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.</li> <li>▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas.</li> <li>▪ Spill response equipment is audited annually.</li> <li>▪ Annual spill response training exercise is undertaken.</li> </ul>		<p>Emergency response procedures for spill response is in place and regularly exercised. Learnings from exercises and actual events are included in Plans.</p> <p>Oil Spill Plans are up-to-date and regularly tested.</p> <p>Spill response equipment and procedures are regularly audited. Regular exercises are conducted.</p>

Environmental Objectives	Guide to Objectives Achievement	Assessment Criteria	Performance
Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	
<p><b>Objective 5:</b> Avoid disturbance to sites of cultural and heritage significance.</p>	<ul style="list-style-type: none"> <li>▪ Consultation with stakeholders (i.e. government agencies, landholders etc) in relation to the possible existence of heritage sites, as necessary.</li> <li>▪ Heritage report forms completed for any sites or artefacts identified, and report forms forward to the Department of State Aboriginal Affairs (DOSAA).</li> <li>▪ Survey records are kept and are available for auditing.</li> <li>▪ Areas requiring remediation which lie outside previously surveyed sites should be surveyed in accordance with company heritage clearance procedures.</li> </ul> <p><i>Note:</i> Where a negotiated agreement or determination for heritage clearance is in place, compliance with the negotiated agreement or determination takes precedence over the above criteria.</p>	<ul style="list-style-type: none"> <li>▪ Proposed well sites and access tracks have been surveyed and any sites of Aboriginal and non-Aboriginal heritage identified.</li> <li>▪ Any identified cultural and heritage sites have been avoided.</li> </ul>	<p>Construction sites are inspected for cultural heritage sites. Identified sites are avoided. Significant sites are fenced.</p> <p>Identified sites are avoided.</p>
<p><b>Objective 6:</b> Minimise loss of aquifer pressures and avoid aquifer contamination.</p>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ A competent cement bond between aquifer and hydrocarbon reservoirs is demonstrated.</li> </ul> <p>For cases where isolation of these formations is not established, a risk assessment incorporating the use of pressure / permeability / salinity data is undertaken in consultation with DLWBC &amp; AAWCMB to determine if lack of cement or poor bond will cause or has caused damaging crossflow which needs to be remediated.</p>	<p><u>Drilling &amp; Completion Activities</u></p> <ul style="list-style-type: none"> <li>▪ There is no uncontrolled flow to surface (Blow out).</li> <li>▪ Sufficient barriers exist in casing annulus to prevent crossflow between separate aquifers or hydrocarbon reservoirs.</li> <li>▪ Relevant government approval obtained for abandonment of any radioactive tool left downhole.</li> </ul>	<p>There were no instances of uncontrolled flow of fluids to surface.</p> <p>Cross flow between aquifers is the subject of an ongoing review in followup from the Della 20 well crossflow. A cementing assessment was conducted on Della and Moomba wells drilled prior to 1980. Wells were identified for further investigation by temperature logs.</p> <p>Approval was obtained to abandon a radio active tool in the Big Lake #71 well.</p>

Environmental Objectives	Guide to Objectives Achievement	Assessment Criteria	Performance
	<p><u>Producing, Injection and, Inactive Wells</u></p> <ul style="list-style-type: none"> <li>▪ Monitoring programs implemented (eg. Through well logs, pressure measurements, casing integrity measurements and corrosion monitoring programs) to assess condition of casing and cross-flow behind casing.</li> <li>▪ Casing annulus pressures are monitored every 2 years.</li> <li>▪ The condition of the primary casing barrier is adequate.</li> <li>▪ For cases where crossflow is detected, a risk assessment incorporating the use of pressure / permeability / salinity data is undertaken in consultation with DLWBC &amp; AAWCMB to determine if lack of cement or poor bond will cause or has caused damaging crossflow which needs to be remediated.</li> </ul> <p><u>Well Abandonment Activities</u></p> <ul style="list-style-type: none"> <li>▪ Isolation barriers are set in place to ensure that crossflow, contamination or pressure reduction will not occur.</li> </ul>	<p><u>Producing, Injection, Inactive and Abandoned Wells</u></p> <ul style="list-style-type: none"> <li>▪ No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by DWLBC.</li> </ul>	<p>Corrosion monitoring, pressure measurements and casing integrity monitoring programs undertaken on a regular basis. Wells prioritised for remedial action based on condition of casing barriers. Cement bond logs conducted on new wells for baseline indication of cement bond.</p> <p>Discussions about the abandonment of the Korma #1 well and the placement of isolation barriers were ongoing at the close of this reporting period.</p>
<p>Minimise loss of aquifer pressures and avoid aquifer contamination.</p>	<ul style="list-style-type: none"> <li>▪ Barriers will be set to meet or exceed the requirements of applicable standards for the decommissioning and abandonment of water bores and abandonment of petroleum wells.</li> <li>▪ The placement of isolation barriers will in general be to isolate the groups of formations as listed under comments. The number and placement of barriers may be varied from this standard approach on a case-by-case basis by SACB Operator personnel using relevant available data and the SA Cooper Basin Water Pressure and Salinity Module Report (2002), and in consultation with DWLBC.</li> </ul>		

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 7:</b> Minimise disturbance to native vegetation and native fauna.</p>	<p><u>Well Lease and Access Track Construction and Restoration</u></p> <ul style="list-style-type: none"> <li>▪ Proposed well sites, camp sites, access tracks and borrow pit sites have been assessed for rare, vulnerable and endangered flora and fauna species before the commencement of construction.</li> <li>▪ Consider alternate routes during planning phase to minimise environmental impacts</li> <li>▪ Facilities (e.g. borrow pits, well cellars) are designed and constructed as far as practicable to minimise fauna entrapment.</li> <li>▪ Sumps and mud pits are fenced as appropriate to minimise wildlife access</li> <li>▪ Assessment records are kept and are available for auditing.</li> <li>▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body</li> <li>▪ Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders.</li> </ul> <p><u>Waste Management</u></p> <ul style="list-style-type: none"> <li>▪ Covered bins are provided for the collection and storage of wastes.</li> <li>▪ All loads of rubbish are covered during transport to the central waste facility.</li> <li>▪ Pits are not established in locations, which pose an unacceptable hazard to stock or wildlife.</li> </ul>	<p><u>Well Lease and Access Track Construction and Restoration</u></p> <ul style="list-style-type: none"> <li>▪ Any sites with rare, vulnerable and endangered flora and fauna have been identified and avoided.</li> <li>▪ 0, +1 or +2 GAS criteria are attained for “Minimise impacts on vegetation” objective as listed in <a href="#">Appendix 2</a>, during well lease and access track site selection and construction and for “Re-establish natural vegetation on abandoned well sites and access track” objective in <a href="#">Appendix 4</a>.</li> </ul> <p><u>Borrow Pits Construction and Restoration</u></p> <ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for “Minimise impacts on vegetation” objective as listed in <a href="#">Appendix 4</a> during borrow pit site selection and construction, and “Minimise Impact on Vegetation” objective in <a href="#">Appendix 5</a> for borrow pit restoration.</li> </ul> <p><u>Waste Management</u></p> <ul style="list-style-type: none"> <li>▪ Refer to assessment criteria for Objective 11.</li> </ul> <p><u>Fuel and Chemical Storage and Management</u></p> <ul style="list-style-type: none"> <li>▪ Refer to assessment criteria for Objectives 2 and 4.</li> </ul>	<p>Study undertaken to determine habitats for rare, vulnerable and endangered species. Areas identified are avoided.</p> <p>Vegetation impacts are minimised during well lease access and construction by scouting surveys prior to the entry of construction machinery. Wherever possible, significant vegetation is avoided.</p> <p>Borrow pit site selection provides for the avoidance of vegetation impacts. Borrow pits are restored on an ongoing basis to allow natural vegetation regrowth to recommence. Where necessary, borrow pits are reopened to minimise vegetation impacts.</p>

Environmental Objectives	Guide to Objectives Achievement	Assessment Criteria	Performance
<p><b>Objective 8:</b> Minimise air pollution and greenhouse gas emissions.</p>	<p><u>Well Testing</u></p> <ul style="list-style-type: none"> <li>▪ Conduct well testing in accordance with appropriate industry accepted standards.</li> <li>▪ Continually review and improve operations.</li> <li>▪ Appropriate emergency response procedures are in place for the case of a gas leak.</li> </ul> <p><u>Well Blowdown</u></p> <ul style="list-style-type: none"> <li>▪ Blowdown carried out in accordance with industry accepted standards / good production practice.</li> <li>▪ Any well that is consistently blown down is identified for a small ID tubing or plunger lift installation to minimise blow downs on that well.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Compliance with EPA requirements.</li> </ul>	<p>Blowdown (vent) tanks being trialled to provide for the separation and recovery of wellbore fluids and the venting of gas. A Prototype flare tank also developed for trial. Emergency response procedures are in place, are regularly tested and improvements identified are included in the plans.</p> <p>Siphon string installations progressed to improve wellbore hydraulics.</p>
<p><b>Objective 9:</b> Maintain and enhance partnerships with the Cooper Basin community.</p>	<ul style="list-style-type: none"> <li>▪ Relevant affected parties are notified and consulted on proposed activities.</li> <li>▪ Forward development plans are presented to the local community.</li> <li>▪ Local community projects and events are sponsored and supported where appropriate.</li> <li>▪ Industry membership of appropriate regional land management committees and boards i.e. the Lake Eyre Basin Consultative Council, Marree Soil Conservation Board, and Catchment Committees.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No unresolved reasonable complaints from the community.</li> </ul>	<p>Relevant parties are notified and consulted on proposed activities. There were no complaints, concerns or issues left unresolved.</p> <p>Local community events and activities are actively supported.</p> <p>Membership and active participation is made to regional management committees and Boards.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 10:</b> Avoid or minimise disturbance to stakeholders and/or associated infrastructure</p>	<ul style="list-style-type: none"> <li>▪ Induction for all employees and contractors covers pastoral, conservation, legislation and infrastructure issues.</li> <li>▪ Relevant stakeholders are notified prior to survey and construction of well sites, camp sites and access tracks and undertaking of operations (pursuant to Petroleum Regulations). Borrow pits left open (unrestored) if requested by landholder and upon receipt of letter of transfer of responsibility to landholder.</li> <li>▪ Gates or cattle grids are installed to a standard, consistent with pastoral infrastructure in fences where crossings are required for access.</li> <li>▪ All gates left in the condition in which they were found (ie. open/closed).</li> <li>▪ Potential sources of contamination are fenced as appropriate to prevent stock access.</li> <li>▪ System is in place for logging landholder complaints to ensure that issues are addressed as appropriate.</li> <li>▪ Requirements of the Cattle Care and Organic Beef accreditation programs are complied with.</li> <li>▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No reasonable stakeholder complaints left unresolved.</li> </ul>	<p>The importance of developing and maintaining good relationships with landholders is stressed to all employees and contractors. Relevant stakeholders are notified of and consulted about projects and are provided with information, maps etc.</p> <p>3 Borrow pits were formally transferred to landholders.</p> <p>Grids, fences, gates installed are to a standard acceptable to the landholder.</p> <p>All gates are left “as found”.</p> <p>Landholder complaints and requests are logged to ensure closeout.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 11:</b> Optimise waste reduction and recovery.</p>	<ul style="list-style-type: none"> <li>▪ Bulk chemical and oil purchasing and use of “bulki bins” or other storage tanks in place for large volume items.</li> </ul>	<ul style="list-style-type: none"> <li>▪ With the exception of drilling fluids, drill cuttings and other fluids disposed during well clean-up, and sewage wastes, all wastes to be disposed of at an EPA licensed facility in accordance with EPA Licence conditions.</li> <li>▪ Attainment of GAS criteria for “Site left in clean, tidy and safe condition after final clean-up” objective during well site restoration (refer <a href="#">Appendix 4</a>).</li> <li>▪ Attainment of GAS criteria for “Site left in clean, tidy and safe condition” objective during borrow pit restoration (refer <a href="#">Appendix 5</a>).</li> </ul>	<p>Chemicals, cement &amp; inhibitors are purchased in bulk containers. Waste material is disposed of at EPA Approved facilities.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 12:</b> Remediate and rehabilitate operational areas to agreed standards.</p>	<p>Rehabilitation/ abandonment plans for surface activities will be developed in consultation with relevant stakeholders</p> <p><u>Well Site and Access Track Restoration</u></p> <ul style="list-style-type: none"> <li>▪ Compacted soil areas have been ripped (except on gibber and tablelands) and soil profile and contours are reinstated following completion of operations.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No unresolved reasonable stakeholder complaints.</li> </ul> <p><u>Contaminated Site Remediation</u></p> <ul style="list-style-type: none"> <li>▪ Contaminated sites are remediated in accordance with criteria developed with the principles of the National Environment Protection Measure for Contaminated sites and in consultation with the EPA.</li> </ul> <p><u>Well Site and Access Track Restoration</u></p> <ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for (refer <a href="#">Appendix 4</a>):               <ul style="list-style-type: none"> <li>- “minimise visual impact of abandoned well sites”</li> <li>- “minimise visual impact of abandoned access tracks”</li> <li>- “re-establish natural vegetation on abandoned well sites and access tracks”</li> </ul> </li> </ul> <p><u>Borrow Pit Restoration</u></p> <ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for (refer <a href="#">Appendix 5</a>):               <ul style="list-style-type: none"> <li>- “minimise impact on vegetation”</li> <li>- “minimise impact on soil”</li> <li>- “Minimise visual impacts”</li> </ul> </li> </ul> <p>▪ <i>Note:</i> Well abandonment issues addressed under objective 6.</p>	<p>No complaints raised by stakeholders.</p>

### 13. PRODUCTION FACILITY OPERATIONS

In October 2003, the revised *Statement of Environmental Objectives (SEO) – Production and Processing Operations* was approved. With the Petroleum Act and Regulations, this SEO provides objectives, information and guidance for the achievement of acceptable practice in natural gas production and processing operations.

During 2003, the pipeline, flowline and trunkline network delivered natural gas, Ethane, Condensate and Crude Oil to the Moomba Plant resulting in the export volumes listed in the Table below,

Sales Gas	Ethane	LPG	Condensate	Crude Oil
(PJ)	(PJ)	(Kt)	(mL)	(mm BBLS)
179.65	13.82	409.6	557	3.3

#### Production facility construction, operation, restoration and abandonment activities – 2003

During 2003, the following major projects were commenced or were progressed,

##### Moomba Plant

- Moomba Plant Asset Control Enhancement System project (ACE).  
The project to replace the Moomba Plant control system continued during 2003. The physical cutover to the new system commenced in the latter part of 2003, where the control systems in the Utilities area, Crude Stabilisation Plant, Benfield trains 1 and 2 and the A LRP Train were cutover. This project will continue to completion, which is scheduled for the third quarter, 2004.
- Major Plant Inspections
- Pipework replacement, commenced in 2002.
- High Voltage Electrical System upgrade, commenced in 2002.

There was one incident reported associated with plant facilities. This incident, which occurred on 24.1.2003 when a coupon being cut from a flare header to facilitate the installation of a stopple, was dislodged and entered the gas stream, resulting in damage to the plant flare header. This incident was reported to PIRSA as a serious incident.

##### Field Production Facilities

Field production projects completed in 2003 are listed in Appendix 6a.

## Production Forecast – 2004

The estimated gas and liquids production and export volumes from the Moomba Plant for 2004 are as listed below,

Sales Gas (PJ)	149.3
Ethane (PJ)	10.1
LPG (Kt)	221
Condensate (kbbbls)	2573
Crude Oil (kbbbls)	3.6

### 2004 Gas Storage Estimates

Opening Storage (PJ) Sales Gas + ethane	50.5
Net Storage Injection / (Withdrawal) (PJ)	(14.0)
<b>Total Closing Sales Gas and Ethane Storage (PJ)</b>	<b>36.0</b>

Major facility projects planned for 2004 are listed in Appendix 6b.

## Produced Formation Water Disposal

Produced Formation Water (PFW) continued to be a focus during 2003. Environmental Management plans will be developed for all PFW disposal systems during 2004.

## Pipeline Construction, Operation and Monitoring

During the reporting period the Cathodic Protection (CP) units and pipeline voltage potentials in the Cooper Basin were monitored bi-monthly for all protected pipelines. A full performance survey along the entire length of all protected pipelines was in progress at the end of 2003.

Batch treatment of gas and oil trunklines and gathering lines was completed in accordance with Santos' Integrity Management Plans with the exception of some small gathering lines that could not be treated due to faulty pig barrel isolation valves.

Pipeline right of ways were inspected during the annual Cathodic Protection surveys of protected pipelines and specific right of way inspections were undertaken on above ground oil pipelines without CP installed. Corrosion inhibitor was injected into all raw gas pipelines at wells and satellite stations. Inhibitor pumps were monitored and maintained at intervals ranging from monthly to three monthly as prescribed by Santos' Integrity Management Plan.

Water samples were obtained from flowlines for residual amine and dissolved iron analysis, with the results used to optimise the corrosion inhibitor injection

rates on gas pipelines. A maintenance improvement and performance upgrade program for corrosion inhibitor injection facilities commenced in 2003 which resulted in an increase in the average on-line availability of these facilities.

During 2003, the Keleary Oil Trunkline was temporarily de-rated as an interim measure until an In-Line Inspection (ILI) could be completed. Following the tool inspection run in September, a review of ILI results indicated the pipeline is fit for services at the de-rated Maximum Allowable Operating Pressure (MAOP). An upgrade program will be implemented in 2004 to restore the pipeline to the required MAOP.

During 2003, pipelines and flow lines were constructed to connect new wells to the production system, as listed in [Appendix 7](#). Various inspections, repairs and testing was undertaken on pipelines as listed in [Appendix 8](#).

The Tirrawarra Oil Trunkline was decommissioned and preparations made for abandonment activity, which commenced late in 2003. This will be completed in early 2004. Other minor pipelines and sections were abandoned, as listed in [Appendix 8](#).

A new Pipeline Management System was implemented during 2003 for the management of pipeline integrity, maintenance and operation. This is directed at ensuring compliance with AS2885. This management system is supported by a dedicated Pipeline Asset Management team reporting to the new position of Pipeline Superintendent. The framework and system requirements were prepared for a new Pipeline Integrity Database to support the Management System and provide the heart of the pipeline task management and records management system. The Pipeline Integrity Database is expected to be in use by mid 2004.

Unique Integrity Management Plans were developed for significant pipelines following an analysis of threats to those pipelines. Generic Integrity Management Plans were developed for groups of less significant "sister" pipelines.

A number of risk assessments were undertaken on a number of pipelines, listed in [Appendix 8](#) during 2003, as required under the Pipeline Management System.

An audit of Santos' compliance with AS2885 was undertaken by Hadow Pipeline Operations Services on behalf of Primary Industries and Resources South Australia. This audit provided recommendations for the Pipeline Management System.

Santos commissioned a third party follow-up audit of the Santos' Pipeline Management System in November 2003. This audit reviewed closeout of the 2002 audit and the systems and procedures put in place since that audit. The audit concluded Santos had made fundamental improvements in the management of the pipeline network and that a focus is maintained on measuring implementation of its systems in order to demonstrate compliance

with AS2885. Santos has completed all actions raised in the 2002 audit and a summary of the actions implemented was provided to PIRSA.

Pipeline Integrity Review and Risk Workshops were conducted in April 2003 for the pipelines listed in [Appendix 8](#). This process will be continued during 2004 and PIRSA Officers have been invited to observe.

### Licensed Pipelines

This report also covers the Licensed Pipelines covered by Pipeline License Numbers 5 (Ballera to Moomba), 9 (Stokes to Mettika). A new License, No. 15 was issued early in 2003 for the Moon (Queensland) to Kerna (South Australia) flowline.

A detailed review and risk assessment was conducted on the Ballera to Moomba raw natural gas trunkline. This review considered all aspects of the pipeline, with a particular focus on third party interference and environmental influences.

A cathodic protection survey was completed on the Ballera to Moomba gas line in March 2003. Bi-monthly monitoring of the CP system and pipeline potential voltage surveys found the pipeline to be satisfactorily protected. Data collected from an electrical resistance monitoring probe confirms the corrosion mitigation systems on this line are effective.

Monitoring on the Stokes to Mettika line identified the level of cathodic protection to be below requirements. An upgrade to the protection system is planned for 2004. The new Moon to Kerna line was found to be satisfactorily protected.

Close consultation was maintained throughout the year with other independent exploration companies in order to minimise the risk of interference to infrastructure, including pipelines. Maps highlighting the pipeline network and all infrastructure installations were provided to all third party exploration companies and pastoralists.

There were no incidents recorded on any of the Licensed Pipelines.

Product transported through Licensed pipelines in 2003 was,

	<b>Sales Gas (PJ)</b>	<b>Ethane (PJ)</b>	<b>LPG (Kt)</b>	<b>Cond (mL)</b>
<b>Ballera to Moomba</b>	45.7	5.4	109.6	215.6
<b>Stokes to Mettika</b>	11.7	1.7	30.82	40.2
<b>Moon to Kerna</b>	1.4	0.2	1.5	1.1

## Reportable Environmental Incidents

Environmental incidents are reported to PIRSA in accordance with the Petroleum legislation.

Serious incidents are reported promptly to PIRSA and followed up by written reports within a 3 month period. Reportable incidents are reported to PIRSA at the Quarterly Compliance meetings listed in [Appendix 2](#). These incidents are subsequently listed on the PIRSA Web-site.

[Appendix 3](#) provides a summary of the reportable environmental incidents, which ranged from oil and chemical spills, produced formation water spills and off road driving. The consequence of these incidents ranged from *Noticeable* (77%) to 23% *Important*.

A *Noticeable* incident is an incident with minimal impact to the environment, typically with an uncontained hydrocarbon volume less than 200 litres to land. There were no *Serious* environmental incidents recorded during the period. Causal factors included *design factors, human factors, mechanical failure to procedural issues*.

## Road and Wellsite Lease and Access Construction and Restoration

A large network of roads is maintained in order to provide access to production sites and to drilling locations. Roads are maintained to agreed standards, dependant upon the frequency of use.

Access to drilling locations and the wellsite area is constructed following the scouting of individual locations to identify a route which has the least environmental impact. A total of 113 Km of access road was constructed during 2003 and 16 Km of road was restored.

Site restoration work was completed at 3 previously abandoned wells - Terrace #1, Aratna #1 and Gudnuki #2.

There were 131 borrow pits constructed during 2003, to provide fill for well lease and road construction, and 32 borrow pits were restored. In three instances, following approaches by land holders, borrow pit were transferred to the land holder.

The drilling sites scouted, constructed, backfilled and restored are listed in Appendix 9.

Performance against the Production and Processing SEO is described in the following Table.

**Environmental Objectives and Performance – Production and Processing**

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b><u>Objective 1</u></b> Minimise the risk to public and other third parties.</p>	<ul style="list-style-type: none"> <li>▪ All employees and contractor personnel complete a safety induction prior to commencement of work in the field.</li> <li>▪ All employees and contractor personnel undertake a refresher induction every 2 years.</li> <li>▪ Signage in place to warn third parties of access restrictions to operational areas, with particular warnings when potentially dangerous operations are being undertaken.</li> <li>▪ Permit to work systems in place for staff and contractors in dangerous situations.</li> <li>▪ All appropriate PPE (personnel protective equipment) is issued and available as required in accordance with company operating requirements and applicable standards.</li> <li>▪ Effective Emergency Response Plan (ERP) and procedures are in place in the event of a fire or explosion.</li> <li>▪ Annual exercise of ERP.</li> <li>▪ Communication of rig moves and other potential hazards to safety associated with drilling and well operations to potentially affected parties prior to commencement of operations.</li> <li>▪ Reporting systems for recording injuries and accidents in place, and annual; (at minimum) review of records to determine injury trends. Implementation of appropriate corrective actions.</li> <li>▪ Ensuring safety management plans are updated and reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Reasonable measures implemented to ensure no injuries to the public or third parties.</li> </ul>	<p>Induction training is provided to all Santos and contractor Employees Refresher training is provided. Signs are placed to warn the public about the hazards associated with accessing production areas. A Work Permit System, which is regularly audited, is in place. Santos and Contractor personnel are provided the appropriate PPE. Effective emergency response plans exist, which are regularly exercised. Regular emergency exercises are conducted. Communication of potentially hazardous or unusual tasks is made to affected parties prior to being undertaken. Injury and incident recording and reporting systems are maintained. Safety management plans are reviewed and updated regularly.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 2</b> Minimise disturbance and avoid contamination to soil.</p>	<p><u>Construction Activities (eg. pipelines and roads)</u></p> <ul style="list-style-type: none"> <li>▪ Santos operational procedures and guidelines are in place and will be followed for construction activities, for example to conserve soils resources:</li> <li>▪ Consider alternate routes during planning phase to minimise environmental impacts</li> <li>▪ Works are restricted to construction ROW.</li> <li>▪ The need to traverse sensitive land systems and the method of managing the impacts will be justified in accordance with company procedures.</li> <li>▪ Annual audit of construction practices.</li> </ul>	<ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 2 to 5.</li> <li>▪ No unauthorised off-road driving or creation of shortcuts.</li> </ul> <p>No construction activities are carried out on salt lakes, steep tableland land systems or wetlands land systems (as defined in EIR).</p>	<p>Soil disturbance is minimised wherever possible. Rootstock is left intact and top soil is stockpiled for respreading.</p> <p>Offroad driving is actively discouraged. Alternate routes are considered when planning projects. Work is restricted to pipeline ROWs.</p> <p>No construction activity is carried out on salt lakes, steep tablelands or wetland systems.</p> <p>Audit of construction is undertaken, with a high level at compliance.</p>
<p>Minimise disturbance and avoid contamination to soil.</p>	<p><u>Spill Response / Contingency Planning</u></p> <ul style="list-style-type: none"> <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.</li> <li>▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas.</li> <li>▪ Spill response equipment is audited annually.</li> <li>▪ Annual spill response training exercise is undertaken.</li> </ul>		<p>Emergency response procedures for spill response is in place and regularly exercised. Learnings from exercises and actual events are included in Plans. Oil Spill Plans are up-to-date and regularly tested.</p> <p>Spill response equipment and procedures are regularly audited. Regular exercises are conducted.</p>
	<p><u>Oil/Condensate Spills (Pipeline/Road Transport)</u></p> <ul style="list-style-type: none"> <li>▪ Pipelines are compliant with AS2885 pipeline standards</li> <li>▪ Pipeline Management System is reviewed annually.</li> <li>▪ Pipelines are inspected and maintained in accordance with Pipeline Management System</li> <li>▪ Spills or leaks are immediately reported and clean up actions initiated.</li> <li>▪ Records of spill events and corrective actions are maintained in accordance with company procedures.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No spills/leaks outside of areas designed to contain them.</li> <li>▪ Level of hydrocarbon continually decreasing for in situ remediation of spills.</li> <li>▪ Soils remediated to a level as determined by the SHI process.</li> </ul>	<p>Audits conducted resulted in major improvement in line conditions. The number of spills occurring was significantly reduced. The Pipeline Management System was reviewed, and updated. The level of Hydrocarbon at monitored sites continues to decrease. Spills and leaks are reported to PIRSA in accordance with requirements and cleanup actions initiated. Records of spills are maintained.</p>
	<p><u>Produced Formation Water (PFW)</u> A study into development of a Soil Health Index (SHI) for impacted soils and sediments is currently being undertaken. This will ultimately</p>	<ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for goals related to</li> </ul>	<p>Continued development of SHI.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
	assist in the rehabilitation of water disposal/evaporation ponds to a level consistent with appropriate adjacent land uses. The study will also enable an assessment of contaminants of concern in PFW in order to determine disposal criteria.	produced formation water impacts on soil, as listed in Appendix 2 (26-29), 5, 6 and 7 <ul style="list-style-type: none"> <li>▪ PFW contaminant levels are below disposal criteria.</li> <li>▪ PFW EMP developed and objectives achieved.</li> </ul>	
<p><b>Objective 2 cont.</b></p> Minimise disturbance and avoid contamination to soil.	<p><u>Waste Disposal (domestic, sewage and sludges)</u></p> <ul style="list-style-type: none"> <li>▪ Covered bins are provided for the collection and storage of wastes.</li> <li>▪ All loads of rubbish are covered during transport to the central waste facility.</li> <li>▪ Pits are not established in locations, which pose an unacceptable hazard to stock or wildlife.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All domestic wastes are disposed of in accordance with EPA licensing requirements.</li> <li>▪ 0, +1 or +2 GAS criteria for 'Waste material' objective as listed in Appendix 2 (17-19), is attained.</li> <li>▪ No spills or leaks from sewage treatment process and sludge pits.</li> <li>▪ For LTU's contamination confined to designated treatment area.</li> </ul>	Domestic wastes are disposed of in accordance with EPA License Requirements. Audits identified full compliance.  Waste bins etc are covered during transport.  Waste pits are located only at Licensed facilities and are fenced to exclude stock and wildlife.  There were no incidents at sewerage disposal facilities.
<p><b>Objective 3</b></p> Avoid the introduction or spread of pest plants and animals and implement control measures as necessary.	<ul style="list-style-type: none"> <li>▪ Where appropriate, weed and feral animal management strategy are in place (avoidance and control strategies).</li> <li>▪ Vehicle and equipment wash downs will be initiated in accordance with the management strategy.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No weeds or feral animals are introduced to operational areas.</li> </ul>	Weed and feral animal strategies are in place. There is no evidence of the introduction of weeds or feral animals.  Vehicle washing facilities are provided in accordance with the management strategy.  Active support is provided for the management at feral animal control in area.
<p><b>Objective 4</b></p> Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources.	<p><u>Construction Activities (eg. pipelines and roads)</u></p> Constructed activities undertaken are designed and managed to avoid diversion of water flows.	<ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 2 to 5.</li> <li>▪ Construction activities (i.e. access tracks) are located and constructed to maintain pre-existing water flows (i.e. channel contours are maintained on floodplains and at</li> </ul>	Pipeline construction activities rated high in audits using GAS. Some shortfalls identified are being addressed.  Activities are undertaken to ensure no interruption or diversion of water flows.  Natural contours are reinstated.

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
		creek crossings). ▪ No water (surface or groundwater) contamination as a result of production activities.	Known contaminated sites are monitored.

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<b>Objective 4 cont'd</b>	<p><u>Fuel and Chemical Storage, Handling and Transportation</u></p> <ul style="list-style-type: none"> <li>▪ All fuel, oil and chemicals are stored, handled and transported in accordance with appropriate standards.</li> <li>▪ Fuel and chemical storage, handling and transport procedures are reviewed and monitored in audit process.</li> <li>▪ Records of spill events and corrective actions are maintained in accordance with company procedures.</li> <li>▪ Spills or leaks are immediately reported and clean up actions initiated.</li> <li>▪ Logged incidents are reviewed annually to determine areas that may require corrective action to reduce spill volumes in subsequent years (and drive continual improvement).</li> <li>▪ SHI project currently being undertaken will assist in the rehabilitation of spill sites to a level consistent with appropriate adjacent land uses.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No spills/leaks outside of areas designed to contain them.</li> <li>▪ Soils remediated to a level as determined by the SHI process.</li> <li>▪ No water (surface or groundwater) contamination as a result of production activities.</li> </ul>	<p>Spills occurred outside areas designed to contain them as reported at quarterly meetings.</p> <p>Soil removed to land farm in some instances to eliminate contamination. No spill is likely to have impacted ground water.</p> <p>Records of spills are maintained.</p> <p>Spills are reported in accordance with legislative and company requirements. Incident registers are reviewed to ensure ongoing improvement.</p>
<p>Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.</p>	<p><u>Spill Response / Contingency Planning</u></p> <ul style="list-style-type: none"> <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.</li> <li>▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas.</li> <li>▪ Spill response equipment is audited annually.</li> <li>▪ Annual spill response training exercise is undertaken.</li> </ul>		<ul style="list-style-type: none"> <li>• Oil/chemical spill plans and equipment are in place.</li> <li>• Plans are up to date.</li> <li>• Refer Objective 2.</li> <li>• Cooper Creek spill study completed. Draft report provided to PIRSA.</li> </ul>
	<p><u>Oil/Condensate Spills (Pipeline/Road Transport)</u></p> <ul style="list-style-type: none"> <li>▪ Pipelines are compliant with AS2885 pipeline standards</li> <li>▪ Pipeline Management System is reviewed annually.</li> <li>▪ Pipelines are inspected and maintained in accordance with Pipeline Management System</li> <li>▪ Spills or leaks are immediately reported and clean up actions initiated.</li> <li>▪ Records of spill events and corrective actions are maintained in</li> </ul>	<ul style="list-style-type: none"> <li>▪ No spills/leaks outside of areas designed to contain them.</li> <li>▪ Level of hydrocarbon continually decreasing for in situ remediation of spills.</li> <li>▪ Soils remediated to a level as determined by the SHI process.</li> </ul>	<ul style="list-style-type: none"> <li>• Significant work undertaken to ensure full compliance.</li> <li>• Leaks from pipeline and facilities are reported as in Attachment 3.</li> <li>• Hydrocarbon levels at spill sites are progressively decreasing.</li> <li>• Refer Objective 2 above.</li> </ul>

	accordance with company procedures.		
	<p><u>Produced Formation Water (PFW)</u>                  A study into development of a Soil Health Index (SHI) for impacted soils and sediments is currently being undertaken. This will ultimately assist in the rehabilitation of water disposal/evaporation ponds to a level consistent with appropriate adjacent land uses.                  The study will also enable an assessment of contaminants of concern in PFW in order to determine disposal criteria.</p>	<ul style="list-style-type: none"> <li>▪ 0, +1 or +2 GAS criteria are attained for goals related to produced formation water impacts on soil, as listed in Appendix 2 (26-29), 5 and 6.</li> <li>▪ PFW contaminant levels are below disposal criteria.</li> </ul>	<ul style="list-style-type: none"> <li>• Continued development at SHI. There was no overall monitoring during 2003 due to SHI activity.</li> <li>• The Northern Evap Pond EMP was developed. Detailed Risk Assessment of PFW ponds undertaken.</li> </ul>
Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	<p><u>Produced Formation Water (PFW)</u>                  Review status of PFW facilities and develop an Environmental Management Plan (EMP) to achieve the objectives of the SA EPA Environment Protection (Water Quality) Policy, 2003, as appropriate.</p>	<ul style="list-style-type: none"> <li>▪ PFW EMP developed and objectives achieved.</li> </ul>	Draft PFW EMP developed.
	<p><u>Waste Disposal (domestic, sewage and sludges)</u></p> <ul style="list-style-type: none"> <li>▪ Covered bins are provided for the collection and storage of wastes.</li> <li>▪ All loads of rubbish are covered during transport to the central waste facility.</li> <li>▪ Pits are not established in locations, which pose an unacceptable hazard to stock or wildlife.</li> </ul>	<ul style="list-style-type: none"> <li>▪ All domestic wastes are disposed of in accordance with EPA licensing requirements.</li> <li>▪ 0, +1 or +2 GAS criteria for 'Waste material' objective as listed in Appendix 2 (17-19), is attained.</li> <li>▪ No spills or leaks from sewage treatment process and sludge pits.</li> </ul> <p>For LTU's contamination confined to designated treatment area.</p>	<p>All domestic waste disposed of in accordance with EPA License requirements.</p> <p>No spills or leaks from sewage treatment facilities or sludge pits. Monitoring demonstrated no contamination beyond treatment area.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 5</b></p> <p>Avoid disturbance to sites of known cultural and heritage significance.</p>	<ul style="list-style-type: none"> <li>▪ Consultation with stakeholders (i.e. government agencies, stakeholders etc) in relation to the possible existence of heritage sites, as necessary.</li> <li>▪ Heritage report forms completed for any sites or artefacts identified, and report forms forward to the Department of State Aboriginal Affairs (DOSAA).</li> <li>▪ Survey records are kept and are available for auditing.</li> <li>▪ Areas requiring remediation which lie outside previously surveyed sites should be surveyed in accordance with company heritage clearance procedures.</li> </ul> <p><u>Note:</u> Where a negotiated agreement or determination for heritage clearance is in place, compliance with the negotiated agreement or determination takes precedence over the above criteria.</p>	<ul style="list-style-type: none"> <li>▪ Proposed construction sites and access tracks have been surveyed and any sites of Aboriginal and non-Aboriginal heritage identified.</li> <li>▪ Any identified cultural and heritage sites have been avoided.</li> <li>▪ 0, +1 or +2 GAS criteria are attained for 'Aboriginal Heritage', as per Appendix 2 (30-31).</li> </ul>	<p>Construction sites are surveyed and inspected for cultural heritage sites. Identified sites are flagged and avoided. Significant sites identified are fenced. Identified sites are avoided.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 6</b></p> <p>Minimise loss of aquifer pressures and avoid aquifer contamination.</p>	<p>The volume/flow of water used by the Moomba Plant is continuously monitored to ensure appropriate management.</p> <p>Water usage is continuously monitored, reviewed and management strategies implemented to minimise wastage.</p> <p>Review water licensing requirements and allocation plans.</p>	<ul style="list-style-type: none"> <li>▪ There is no uncontrolled flow to the surface (i.e. no free flowing bores).</li> </ul> <p><u>Note:</u> The Drilling and Well Operations EIR and SEO provide detailed discussion on aquifer issues.</p>	<p>There are no uncontrolled flows from water bores.</p> <p>Water from bores is metered and monitored. Water use is reviewed to minimise usage where possible.</p> <p>Applications were submitted during the period for water licenses</p>
<p><b>Objective 7:</b></p> <p>Minimise disturbance to native vegetation and native fauna.</p>	<p><u>Construction Activities</u></p> <ul style="list-style-type: none"> <li>▪ Proposed construction areas have been assessed for rare, vulnerable and endangered flora and fauna species before the commencement of construction.</li> <li>▪ Consider alternate routes during planning phase to minimise environmental impacts</li> </ul>	<ul style="list-style-type: none"> <li>▪ Any sites of rare, vulnerable and endangered flora and fauna have been identified, flagged and subsequently avoided.</li> <li>▪ 0, +1 or +2 GAS criteria for 'Minimise impacts on vegetation'</li> </ul>	<p>Study undertaken to review implications of exploration and production activities on rare, vulnerable and endangered species and habitat. Habitat areas are avoided.</p> <p>Where necessary, alternative access</p>

	<ul style="list-style-type: none"> <li>Assessment records are kept and are available for auditing.</li> </ul>	<p>objective are attained as listed in Appendix 2 to 4 and 6 during site selection and construction.</p>	<p>routes are used to minimise environmental impact. Routes are weaved to avoid vegetation.</p>
	<p><u>Borrow Pits</u></p> <ul style="list-style-type: none"> <li>Pits are not established in locations which pose an unacceptable hazard to stock or wildlife (i.e. not within 50m of any roads or access tracks, well leases or other plant and equipment).</li> <li>Borrow pits are restored as soon as practicable after material extraction is complete to a standard consistent with the surrounding land use.</li> <li>Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders</li> <li>In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body.</li> </ul>	<ul style="list-style-type: none"> <li>0, +1 or +2 GAS criteria for 'Minimise impacts on vegetation' objective, as listed in <a href="#">Appendix 4</a> are attained during site selection and construction.</li> </ul>	<p>Borrow pits are located to minimise impact on stock, wildlife and vegetation.</p> <p>Borrow pits are restored as soon as is practicable after use.</p> <p>Where appropriate, borrow pits are restored to minimise water holding capacity</p> <p>In Conservation reserves, excavations are restored in agreement with the responsible Agency.</p>
<p><b>Objective 7 cont:</b></p> <p>Minimise disturbance to native vegetation and native fauna.</p>	<p><u>Fuel and Chemical Storage and Management</u></p>	<p>Refer to assessment criteria for objectives 2 and 4.</p>	<p>See Objective 2 and 4. All refuelling is undertaken away from water courses.</p>
	<p><u>Waste Management</u></p> <ul style="list-style-type: none"> <li>Covered bins are provided for the collection and storage of wastes.</li> <li>All loads of rubbish are covered during transport to the central waste facility.</li> <li>Pits are not established in locations, which pose an unacceptable hazard to stock or wildlife.</li> <li>PFW pits are fenced as appropriate to minimise wildlife access.</li> </ul>	<p>Refer to assessment criteria for objectives 2, 4 and 11.</p>	<p>Waste is covered during storage and transport. Disposal pits are constructed only at Licensed facilities. Where appropriate, PFW pits are fenced to minimise wildlife access.</p>
<p><b>Objective 8:</b></p> <p>Minimise air pollution and greenhouse gas emissions.</p>	<ul style="list-style-type: none"> <li>Conduct production operations in accordance with appropriate industry accepted standards.</li> <li>Continually review and improve operations.</li> <li>Appropriate emergency response procedures are in place for the case of a gas leak.</li> </ul>	<p><u>Gathering Systems/Satellite Facilities/Moomba Plant</u></p> <ul style="list-style-type: none"> <li>Compliance with EPA requirements.</li> </ul>	<p>Dark smoke emissions are monitored and reported to the SA EPA.</p> <ul style="list-style-type: none"> <li>Emergency response procedures are maintained.</li> </ul>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 9:</b> Maintain and enhance partnerships with the Cooper Basin community.</p>	<ul style="list-style-type: none"> <li>▪ Relevant affected parties are notified and consulted on proposed activities.</li> <li>▪ Forward development plans are presented to the local community.</li> <li>▪ Local community projects and events are sponsored and supported where appropriate.</li> </ul> <p>Industry membership of appropriate regional land management committees and boards i.e. the Lake Eyre Basin Consultative Council, Marree Soil Conservation Board, and Catchment Committees.</p>	<p>No reasonable stakeholder complaints left unresolved.</p>	<p>Relevant parties are notified of proposed activities and future development plans. Local community events and projects are actively supported. Santos maintains active representation on relevant local committees and boards. Emergency assistance is provided to landholders, tourists and third parties.</p>
<p><b>Objective 10:</b> Avoid or minimise disturbance to stakeholders and/or associated infrastructure.</p>	<ul style="list-style-type: none"> <li>▪ Induction for all employees and contractors covers pastoral, conservation, legislation and infrastructure issues.</li> <li>▪ Relevant stakeholder is notified prior to survey and construction of well sites, camp sites and access tracks and undertaking of operations (pursuant to Petroleum Regulations). Borrow pits left open (unrestored) if requested by stakeholder and upon receipt of letter of transfer of responsibility to stakeholder.</li> <li>▪ Gates or cattle grids are installed to a standard, consistent with pastoral infrastructure in fences where crossings are required for access.</li> <li>▪ All gates left in the condition in which they were found (i.e. open/closed).</li> <li>▪ Potential sources of contamination are fenced as appropriate to prevent stock access.</li> <li>▪ System is in place for logging stakeholder complaints to ensure that issues are addressed as appropriate.</li> <li>▪ Requirements of the Cattle Care and Organic Beef accreditation programs are complied with.</li> <li>▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No unresolved reasonable stakeholder complaints.</li> </ul>	<p>All company and contractor employees are advised of the requirements in respect of pastoral interests. Relevant stakeholders are advised of construction activities prior to commencement. Borrow pits are left unrestored where agreements are established. Gates are left “as found”.</p> <p>Where necessary, areas of potential contamination are fenced to prevent stock access. A system is in place to record stakeholder complaints. No such complaints were recorded in 2003. Cattle management systems (cattle care) are recognised and complied with.</p>

<p><b>Objective 11:</b> Optimise waste reduction and recovery.</p>	<p>Chemical and oil is purchased in bulk. 'Bulki bins' or other storage tanks are in place for large volume items. Fencing around waste disposal facility is regularly inspected and maintained.</p>	<ul style="list-style-type: none"> <li>▪ All domestic wastes are disposed of in accordance with EPA licensing requirements.</li> <li>▪ 0, +1 or +2 GAS criteria for 'Waste material' objective as listed in Appendix 2 (17-19), is attained.</li> <li>▪ No spills or leaks from sewage treatment process and sludge pits.</li> <li>▪ For LTU's contamination confined to designated treatment area.</li> </ul>	<p>Refer Objective 4 above. Integrated Waste Management contract put in place covering the collection, transport, segregation and disposal of waste, including recycling.</p> <p>Septic tank systems are regularly emptied and cleaned.</p>
<p><b>Objective 12:</b> Remediate and rehabilitate operational areas to agreed standards.</p>	<p>Rehabilitation/ abandonment plans for surface activities will be developed in consultation with relevant stakeholders</p> <p><u>Construction Site and Access Track Restoration</u> Compacted soil areas have been ripped (except on gibber and tablelands) and soil profile and contours are reinstated following completion of operations.</p>	<p>No unresolved reasonable stakeholder complaints.</p> <p><u>Contaminated Site Remediation</u></p> <ul style="list-style-type: none"> <li>▪ Contaminated sites are remediated in accordance with criteria developed with the principles of the National Environment Protection Measure for Contaminated sites and in consultation with the EPA.</li> </ul> <p><u>Construction Site and Access Track Restoration</u></p> <ul style="list-style-type: none"> <li>▪ The attainment of 0, +1 or +2 GAS criteria for (refer Appendices 2&amp;3):             <ul style="list-style-type: none"> <li>- "minimise visual impact of abandoned well sites"</li> <li>- "minimise visual impact of abandoned access tracks"</li> <li>- "re-establish natural vegetation on abandoned well sites and access tracks"</li> <li>- <u>Borrow Pit Restoration</u></li> <li>- The attainment of 0, +1 or +2 GAS criteria for (refer <a href="#">Appendix 5</a>):</li> <li>- "minimise impact on vegetation"</li> <li>- "minimise impact on soil"</li> <li>- "minimise visual impacts"</li> </ul> </li> </ul>	<p>No stakeholder complaints are unresolved.</p> <p>Spill sites are monitored as reported under Objective 2.</p> <p>Access tracks are restored in accordance with restoration guidelines.</p> <p>A total of 131 borrow pits were constructed. 32 of these were restored and 3 assigned to landholders.</p>

Environmental Objectives	Guide to How Objectives Can Be Achieved	Assessment Criteria	Performance
<p><b>Objective 13:</b> Minimise as far as reasonably practicable interruptions to natural gas supply.</p>	<ul style="list-style-type: none"> <li>▪ Adequate contingencies are in place which seek to address a prudent level of security of supply in the case of short and unforeseen interruption events (eg. adequate gas storage).</li> <li>▪ Pipelines are designed, operated and maintained in accordance with AS 2885.</li> <li>▪ Plant and equipment are designed, operated and maintained in accordance with appropriate industry accepted standards.</li> <li>▪ Emergency Response Plan (ERP) and procedures are in place and exercised.</li> <li>▪ Results and recommendations of plant and facility hazard reviews, including the five (5) yearly Fitness for Purpose assessment, are appropriately addressed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No interruptions to natural gas supply which caused significant social disruption</li> </ul>	<p>As reported earlier in this report, there was one incident on 24.1.03 which had the potential to disrupt security of gas supply. This was handled promptly, without significant impact.</p>

**14. STATEMENT OF PROPOSED EXPENDITURE, 2004.**

**Commercial in Confidence**

## 15. GLOSSARY OF TERMS

CBU	Central Business Unit
DAAR	Department of State Aboriginal Affairs & Reconciliation
DST	Drill stem test
EHSMS	Environment Health and Safety Management System
EIR	Environmental Impact Report, prepared in accordance with Section 97 of the <i>Petroleum Act 2000</i> and Regulation 10.
EPA	Environment Protection Authority.
EPBC	Environment Protection and Biodiversity Conservation Act (1999)
ERP	Emergency response procedures
GAB	Great Artesian Basin
GAS	Goal attainment scaling
KPI	Key performance indicator
NASAA	National Association Sustainable Agriculture Australia
NEPM	National Environment Protection Measures (Assessment of Contaminated Sites)
OBE	Organic Beef Exporters
PEL	Petroleum exploration licence
PIRSA	Primary Industries and Resources South Australia
PPE	Personal protective equipment
PPL	Petroleum production licence
PTW	Permit To Work
ROW	Right of Way (for pipelines)
SACB	South Australian Cooper Basin
SACBJV	South Australian Cooper Basin Joint Venture
SACOME	South Australian Chamber of Mines and Energy
SEO	Statement of Environmental Objectives prepared in accordance with Section 99 and 100 of the <i>Petroleum Act 2000</i> and Regulations 12 and 13.
SHI	Soil Health Index
WOPRA	Whole of Plant Risk Assessment.

**16. APPENDICES**

Appendix 1	List of Geological Reports and Data
Appendix 2	Meetings with PIRSA, 2003.
Appendix 3	Incidents, including Reportable Incidents.
Appendix 4	Work Over Summary, 2003.
Appendix 5	Casing Integrity
Appendix 6a	Engineering Projects, 2003.
6b	Engineering Projects (planned), 2004.
Appendix 7	2003 Flowlines
Appendix 8	Pipeline Inspection, Testing & Repair, 2003
Appendix 9	Well Lease Scouting and Construction
Appendix 10	Wells Drilled, 2003.

## 2003 Reports In Accordance With Reg 34 - 45

Reg #	Routine Yes / No	Report Title	Comment
33	Yes	Annual Report - 2002	
34	Yes	Geophysical Progress Report	No Geophysical projects conducted.
35	Yes	Geophysical Operations Report – Recording	No Geophysical projects conducted
		Geophysical Operations report – Re-processing	
36	Yes	Geophysical Interpretation Report – Recording	
	Yes	Geophysical Interpretation Report – Re-processing	
37	Yes	Geophysical Data	
38	Yes	Daily Drilling Reports	
39	Yes	Wireline Logs – Drilling	
	Yes	Wireline Logs – completions	
40	Yes	Well Completion Reports	
41	Yes	Quarterly Cased Hole report	
42	Yes	Well Test Analysis Report	
43	Yes	Petroleum Reservoir Fluid Analysis Report	
44	Yes	Downhole Diagrams	
45	Yes	Production Reports	

PIRSA will be satisfied that Regulation 33 (2) (e) has been complied with if a list of all technical geological reports and data (including those reports required by Regulations 34 to 45) is submitted. This list should include all interpretive geological and reserve reports. This arrangement may be reviewed at any time by PIRSA, but no change will be required unless at least 2 months notice has been given prior to the required submission date for the Annual Report. A copy of this Statement indicating the limitation to the listing should be included in the relevant section of the Annual Report. (From PIRSA correspondence dated 16.8.02).

## 2003 Reports In Accordance With Reg 33 (2) (e)

Reg #	Routine Yes / No	Report Title	Comment
33 (2) e	Yes	Proved + Probable Reserves Data, YE 2002.	
33 (2) e	No	Dullingari Complex Water Levels.	
33 (2) e	No	Chronostratigraphic Correlation Project	SA only version in preparation for PIRSA.
33 (2) e	No	High-end Geophysical Appraisal – Moomba North	

PIRSA will be satisfied that Regulation 33 (2) (e) has been complied with if a list of all technical geological reports and data (including those reports required by Regulations 34 to 45) is submitted. This list should include all interpretive geological and reserve reports. This arrangement may be reviewed at any time by PIRSA, but no change will be required unless at least 2 months notice has been given prior to the required submission date for the Annual Report. A copy of this Statement indicating the limitation to the listing should be included in the relevant section of the Annual Report. (From PIRSA correspondence dated 16.8.02).

## PIRSA MEETINGS

Over and above the significant reporting requirement to PIRSA associated with the conduct of operations in the Cooper Basin under the Petroleum Act (2000) and Petroleum Regulations (2000), a series of regular meetings are held with PIRSA at quarterly intervals, to review compliance.

These meetings included the following:

1. Preliminary 2004 Development Plan Presentation		22 December 2003
2. 2003 Development Plan Presentation		28 April 2003
3. Quarterly Santos/PIRSA Compliance Meeting	4 <sup>th</sup> Quarter, 2002	7 February, 2003
	1 <sup>st</sup> Quarter, 2003	1 May 2003
	2 <sup>nd</sup> Quarter, 2003	1 August 2003
	3 <sup>rd</sup> Quarter, 2003	17 October 2003

**Reportable Environmental Incidents**

<b>Total Incidents 84</b>	<b>% of Total Incidents</b>	<b>Comments</b>
<b>Location</b> Plant	17	
Field	82	Inc. beam pump packer failure.
Camp	1	
<b>Spills – Oil</b>	65	
- Condensate.	12	
- PFW	12	
- Chemical	8	
- Other	3	
<b>Causal Factors</b>		
Design	6	
Corrosion	19	
Mechanical Fail	49	Inc failure of beam pump rod packers.
Procedural	6	
Human Factors	18	Tank overflow, drains left open.
Other	2	
<b>Consequence</b>		
Serious	0	
Important	23	
Noticeable	77	
<b>Risk - Moderate</b>	10	
Low	90	
High	0	

## 2003 – Well Workover Summary

#	WELL	WELL #	START DATE	END DATE	WORKOVER ACTIVITY	Fracture Stimulated
1	MOOMBA	35	1-Jan-03	3-Jan-03	SIPHON STRING INSTALLATION	NO
2	MOOMBA	49	4-Jan-03	7-Jan-03	SIPHON STRING INSTALLATION	NO
3	MOOMBA	42	8-Jan-03	9-Jan-03	SIPHON STRING INSTALLATION	NO
4	MOOMBA	20	10-Jan-03	12-Jan-03	SIPHON STRING INSTALLATION	NO
5	MERRIMELIA	39	10-Feb-03	11-Feb-03	SIPHON STRING INSTALLATION	NO
6	KANOWANA	5	13-Feb-03	15-Feb-03	SIPHON STRING INSTALLATION	NO
7	MOOMBA	23	13-Jan-03	14-Jan-03	SIPHON STRING INSTALLATION	NO
8	BIG LAKE	60	8-Jan-03	16-Jan-03	SINGLE COMPLETION	YES
9	JENA	7	15-Jan-03	23-Jan-03	ZONE CHANGE	NO
10	MARABOOKA	5	16-Jan-03	23-Jan-03	SINGLE COMPLETION	NO
11	DULLINGARI NORTH	8	16-Jan-03	17-Jan-03	SIPHON STRING INSTALLATION	NO
12	TOOLACHEE	44	18-Jan-03	20-Jan-03	SIPHON STRING INSTALLATION	NO
13	KERNA	7	21-Jan-03	24-Jan-03	SIPHON STRING INSTALLATION	NO
14	JENA	2	24-Jan-03	30-Jan-03	ZONE CHANGE	NO
15	McLEOD	1	24-Jan-03	6-Feb-03	CONVERT TO WATERWELL FOR GEODYNAMICS	NO
16	MERANJI	17	27-Jan-03	30-Jan-03	SIPHON STRING INSTALLATION	NO
17	MERANJI	19	31-Jan-03	2-Feb-03	SIPHON STRING INSTALLATION	NO
18	MERANJI	21	4-Feb-03	5-Feb-03	SIPHON STRING INSTALLATION	NO
19	BIALA	6	4-Feb-03	7-Feb-03	RECOMPLETION FOR FRACTURE STIMULATION	YES
20	MERANJI	22	6-Feb-03	9-Feb-03	SIPHON STRING INSTALLATION	NO
21	BIALA	5	8-Feb-03	10-Feb-03	PUMP REPAIR	NO
22	CROWSNEST	3	9-Feb-03	11-Feb-03	SINGLE COMPLETION	NO
23	BOBS WELL	1	12-Feb-03	22-Feb-03	SINGLE RECOMPLETION POST FRAC	YES
24	ULANDI	5	13-Feb-03	15-Feb-03	RECOMPLETION FOR FRACTURE STIMULATION	YES
25	SWAN LAKE	6	16-Feb-03	1-Mar-03	MILL PLUG	YES (2002)
26	JENA	5	16-Feb-03	7-Mar-03	RECOMPLETION FOR FRACTURE STIMULATION	YES
27	JENA	2	8-Mar-03	9-Mar-03	PUMP REPAIR	NO
28	JENA	6	9-Mar-03	11-Mar-03	RECOMPLETION FOR FRACTURE STIMULATION	YES
29	JENA	6	10-Mar-03	11-Mar-03	PUMP REPAIR	NO
30	MOOMBA	165	13-Mar-03	21-Mar-03	TANDEM COMPLETION	NO
31	ULANDI	5	14-Mar-03	15-Mar-03	SINGLE RECOMPLETION POST FRAC	YES
32	BIALA	6	16-Mar-03	18-Mar-03	SINGLE RECOMPLETION POST FRAC	YES
33	JENA	5	18-Mar-03	20-Mar-03	SINGLE RECOMPLETION POST FRAC	YES
34	MERANJI	6	21-Mar-03	28-Mar-03	WATER SHUT OFF	NO
35	DELLA	23	22-Mar-03	1-Apr-03	SINGLE COMPLETION	NO
36	MERANJI	11	29-Mar-03	9-Apr-03	WATER SHUTOFF	NO
37	STRZELECKI	5	1-Apr-03	26-Apr-03	SINGLE RECOMPLETION (OIL & GAS)	NO
38	MERANJI	3	10-Apr-03	26-Apr-03	WATER SHUT OFF	NO
39	DELLA	24	27-Apr-03	30-Apr-03	SINGLE COMPLETION	NO
40	JENA	9	27-Apr-03	1-May-03	PUMP REPAIR	NO
41	JENA	4	3-May-03	9-May-03	SINGLE RECOMPLETION FOR FRAC (WATER INJECTION)	YES
42	MERANJI	11	8-May-03	9-May-03	PUMP REPAIR	NO
43	LIMESTONE CREEK	3	9-May-03	11-May-03	SINGLE RECOMPLETION	NO
44	ALWYN	3	12-May-03	15-May-03	SINGLE RECOMPLETION FOR FRAC	YES
45	BIALA	7	15-May-03	20-May-03	SINGLE RECOMPLETION FOR FRAC	YES
46	BIALA	9	21-May-03	22-May-03	SINGLE RECOMPLETION	YES (2002)
47	MOOMBA	153DW1	22-May-03	24-May-03	PUMP REPAIR	NO

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48	BIALA	3	23-May-03	29-May-03	SINGLE RECOMPLETION FOR FRAC	YES
49	JENA	1	25-May-03	29-May-03	PUMP REPAIR	NO
50	ALWYN	5	30-May-03	2-Jun-03	SINGLE COMPLETION FOR FRAC	YES
51	BIALA	8	30-May-03	7-Jun-03	SINGLE RECOMPLETION	YES (2002)
52	ALWYN	3	7-Jun-03	9-Jun-03	SINGLE RECOMPLETION POST FRAC	YES
53	JENA	4	9-Jun-03	14-Jun-03	SINGLE RECOMPLETION FOR WATER INJECTION	YES
54	BIALA	3	14-Jun-03	16-Jun-03	SINGLE RECOMPLETION	YES
55	PELICAN	11	17-Jun-03	21-Jun-03	SINGLE COMPLETION	NO
56	ALWYN	5	22-Jun-03	24-Jun-03	SINGLE RECOMPLETION POST FRAC	YES
57	LIMESTONE CREEK	9	24-Jun-03	29-Jun-03	SINGLE RECOMPLETION FOR FRAC	YES
58	CALADAN	3	25-Jun-03	30-Jun-03	SINGLE COMPLETION	NO
59	ULANDI	3	30-Jun-03	4-Jul-03	PUMP REPAIR	NO
60	JENA	14	2-Jul-03	12-Jul-03	SINGLE RECOMPLETION	YES
61	PONDRINIE	14DW	4-Jul-03	7-Jul-03	SIPHON STRING INSTALLATION	NO
62	BIALA	3	4-Jul-03	7-Jul-03	PUMP REPAIR	
63	MERANJI	12	8-Jul-03	14-Jul-03	SINGLE RECOMPLETION	NO
64	MERANJI	23	9-Jul-03	26-Jul-03	FISHING OPERATION	YES (2001)
65	BIALA	8	12-Jul-03	16-Jul-03	SINGLE RECOMPLETION	YES (2002)
66	MOOMBA	104	15-Jul-03	21-Jul-03	ESP REPAIR	NO
67	JENA	15	17-Jul-03	19-Jul-03	SINGLE COMPLETION	NO
68	JENA	16	20-Jul-03	22-Jul-03	SINGLE COMPLETION FOR FRAC	YES
69	ALWYN	6	22-Jul-03	25-Jul-03	SINGLE COMPLETION	NO
70	ALWYN EAST	1	26-Jul-03	1-Sep-03	SINGLE COMPLETION FOR FRAC	YES
71	JENA	12	27-Jul-03	4-Aug-03	PUMP REPAIR	NO
72	PELICAN	9	2-Aug-03	6-Aug-03	SINGLE COMPLETION	NO
73	PELICAN	8	5-Aug-03	11-Aug-03	SINGLE COMPLETION	NO
74	BIALA	10	12-Aug-03	19-Aug-03	SINGLE COMPLETION	NO
75	DARALINGIE	1	12-Aug-03	11-Oct-03	SINGLE RECOMPLETION	YES
76	ULANDI	9	12-Aug-03	20-Sep-03	SINGLE COMPLETION	YES
77	ULANDI	7	29-Aug-03	1-Sep-03	SINGLE COMPLETION	YES
78	JENA	10	06-Sep-03	09-Sep-03	PUMP REPAIR	NO
79	ULANDI	8	9-Sep-03	14-Sep-03	SINGLE COMPLETION	YES
80	ULANDI	12	14-Sep-03	20-Sep-03	SINGLE COMPLETION	YES
81	GIDGEALPA	44	20-Sep-03	29-Sep-03	ESP REPAIR	NO
82	LIMESTONE CREEK	9	21-Sep-03	24-Sep-03	SINGLE RECOMPLETION FOR FRAC	YES
83	GIDGEALPA	21	24-Sep-03	24-Sep-03	JEP PUMP REPAIR	NO
84	BIALA	3	25-Sep-03	29-Sep-03	SINGLE RECOMPLETION	YES
85	ULANDI	13	30-Sep-03	02-Oct-03	SINGLE COMPLETION	YES
86	PELICAN	11	30-Sep-03	8-Oct-03	SINGLE RECOMPLETION	NO
87	PELICAN	8	30-Sep-03	01-Oct-03	JET PUMP REPAIR	NO
88	ULANDI	10	03-Oct-03	06-Oct-03	SINGLE COMPLETION	YES
89	ULANDI	14	03-Oct-03	06-Oct-03	SINGLE COMPLETION	YES
90	PELICAN	12	9-Oct-03	14-Oct-03	SINGLE COMPLETION	NO
91	PELICAN	10	14-Oct-03	19-Oct-03	SINGLE COMPLETION	YES
92	MOORARI	3	14Oct-03	26-Dec-03	SINGLE RECOMPLETION	NO
93	COWRALLI	6	20-Oct-03	24-Oct-03	SINGLE COMPLETION	YES
94	COWRALLI	7	25-Oct-03	28-Oct-03	SINGLE COMPLETION	YES
95	MERRIMELIA	43	24-Oct-03	4-Nov-03	SINGLE COMPLETION	NO
96	MOOMBA	104	29-Oct-03	3-Nov-03	ESP REPAIR	NO
97	JENA	13	4-Nov-03	7-Nov-03	SUSPENSION	YES (1996)
98	WAUKATANNA	2	4-Nov-03	9-Nov-03	SIPHON STRING INSTALLATION	YES (1999)
99	JEAN	17	8-Nov-03	12-Nov-03	SINGLE COMPLETION	YES
100	MOOMBA	100	10-Nov-03	12-Nov-03	SIPHON STRING INSTALLATION	YES (2001)
101	MOOMBA	101	13-Nov-03	16-Nov-03	SIPHNO STRING INSTALLATION	YES (1988)

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102	JENA	19	13-Nov-03	17-Nov-03	SINGLE COMPLETION	YES
103	MOOMBA	7	17-Nov-03	19-Nov-03	SIPHON STRING INSTALLATION	YES (1988)
104	JENA	18	17-Nov-03	21-Nov-03	SINGLE COMPLETION	YES
105	MOOMBA	144	20-Nov-03	22-Nov-03	SIPHON STRING INSTALLATION	YES (2001)
106	DULLINGARI NORTH	19	22-Nov-03	30-Nov-03	SINGLE COMPLETION	YES
107	ALWYN	5	22-Nov-03	24-Nov-03	JET PUMP REPAIR	NO
108	MUDERA	7	23-Nov-03	13-Dec-03	SINGLE COMPLETION	NO
109	BIALA	9	24-Nov-03	29-Nov-03	RUN ISOLATION TOOL	YES (2002)
110	BIALA	11	29-Nov-03	4-Dec-03	SINGLE COMPLETION	NO
111	MERRIMELIA	24	2-Dec-03	7-Dec-03	SINGLE RECOMPLETION	YES
112	ULANDI	12	4-Dec-03	12-Dec-03	SINGLE RECOMPLETION	YES
113	MERRIMELIA	26	7-Dec-03	12-Dec-03	SINGLE RECOMPLETION	YES
114	MERRIMELIA	30	12-Dec-03	18-Dec-03	SOMG;E RECP;ETOPM	YES
115	ULANDI	2	13-Dec-03	14-Dec-03	PUMP REPAIR	NO
116	FICUS	1	12-Dec-03	14-Dec-03	SIPHON STRING INSTALLATION	YES
117	DULLINGARI	57	18-Dec-3	22-Dec-03	SINGLE COMPLETION	NO
118	JENA	12	20-Dec-03	21-Dec-03	PUMP REPAIR	NO
119	JENA	1	22-Dec-03	26-Dec-03	PUMP REPAIR	NO
120	GIDGEALPA	14	26-Dec-03		SINGLE RECOMPLETION	NO
121	MOOMBA	161	27-Dec-03	5-Jan-03	PUMP REPAIR	NO

## 2003 = FRACTURE STIMULATION SUMMARY

#	WELL	WELL #	START DATE	END DATE	
1	BIG LAKE	69	16-Jan-03	19-Jan-03	FRACTURE STIMULATION
2	DULLINGARI NORTH	16	24-Jan-03	29-Jan-03	FRACTURE STIMULATION
3	DULLINGARI NORTH	16	13-Feb-03	16-Feb-03	FRACTURE STIMULATION
4	COWRALI	4	11-Mar-03	14-Mar-03	FRACTURE STIMULATION
5	MERANJI NORTH	2	26-Apr-03	29-Apr-03	FRACTURE STIMULATION
6	MOOMBA	169	1-May-03	2-May-03	FRACTURE STIMULATION
7	NEPHRITE SOUTH	3	12-May-03	16-May-03	FRACTURE STIMULATION
8	BIG LAKE	71	20-May-03	24-May-03	FRACTURE STIMULATION
9	BIG LAKE	62	25-May-03	27-May-03	FRACTURE STIMULATION
10	TINDILPIE	3	28-May-03	2-Jun-03	FRACTURE STIMULATION
11	NEPHRITE SOUTH	3	10-Jun-03	14-Jun-03	FRACTURE STIMULATION
12	TINDILPIE	4	16-Jun-03	20-Jun-03	FRACTURE STIMULATION
13	NEPHRITE SOUTH	3	21-Jun-03	25-Jun-03	FRACTURE STIMULATION (RE-FRAC)
14	BIG LAKE	71	26-Jun-03	30-Jun-03	FRACTURE STIMULATION
15	BIG LAKE	71	13-Jul-03	16-Jul-03	FRACTURE STIMULATION
16	MOOMBA	170	5-Jul-03	10-Jul-03	FRACTURE STIMULATION
17	BIG LAKE	72	9-Jul-03	12-Jul-03	FRACTURE STIMULATION
18	MOOMBA	173	20-Jul-03	23-Jul-03	FRACTURE STIMULATION
19	MOOMBA	172	24-Jul-03	27-Jul-03	FRACTURE STIMULATION
20	MOOMBA	173	01-Sep-03	07-Sep-03	FRACTURE STIMULATION
21	MOOMBA	171	24-Aug-03	27-Aug-03	FRACTURE STIMULATION
22	SCRUBBY CREEK	1	3-Nov-03	5-Nov-03	FRACTURE STIMULATION
23	FICUS	1	28-Oct-03	1-Nov-03	FRACTURE STIMULATION
24	BIG LAKE	75	27-Nov-03	11-Dec-03	FRACTURE STIMULATION

**Well Summary – Producing & Suspended Wells**

As at 31/12/03

		Gas	Oil	Oil / Gas
1	Number of Wells in Production	502	122	50
2	Number of Wells – Inactive	543		
3	Number of Wells – Suspended	63	22	3
4	Number of Wells – Casing Annuli Pressure Tested	628	45	27
	- Number of Wells – Can be blown down	188	26	16
	- Number of Wells – On Plunger Lift	13	1	
	- Number of Wells – Cannot be blown down	16	3	4
	- High Risk	3		
	- Medium Risk	13	3	4
	- Low Risk			
5	Number of Wells - Casing Integrity Monitoring	414	35	9
6	Number of Wells- Corrosion Monitoring	432	18	9
7	Number of Wells - Repairs Undertaken	3	1	0
8	Number of Wells - Plugged and Abandoned	3	4	0
9	Number of Wells – Plugged and Suspended	19	20	1
10	Number of Wells – Tested for Crossflow	32	2	
	- Number of Wells, ongoing monitoring	-	-	-
	- Number of Wells, remedial activities	-	-	-
11	Casing Integrity Scores			
	- High	22	0	2
	- Intermediate	51	1	1
	- Low	190	7	8
	- Negligible	144	7	1
	<b>Total</b>	<b>407</b>	<b>15</b>	<b>12</b>
12	Number of Wells Abandoned 2003	-	-	-
	Number of Wells to be Abandoned 2004	1	5	

11	<b>Casing Integrity</b>	<b>Total</b>
	- Pressure found on Surface Annulus indicating Production or Intermediate Csg leaking to SA	93
	- Pressure found on Intermediate Casing Annulus indicating Production Csg leaking to Intermediate Annulus	65
	- Pressure found on PCA indicating Tubing leaking to Production Annulus	220

The abandoned wells were P&A after drilling having failed to intersect hydrocarbons. These wells were Verona 2, Marabiika East 1, Moomba 166, Packsaddle 6, Moomba 174, Korma 1

## 2003 ANNUAL REPORT - SA COOPER BASIN OPERATIONS

## 2003 PRODUCTION FACILITY PROJECTS

#	Project	Project Description	Location	Start Date	Comp Date
1	ROC Software Management	Modifications to improve the management and tracking of the software within Moomba field RTUs.	Field	Nov-01	Nov-03
2	Gas Wellhead PSV Upgrade Implementation	Remediation of Moomba field well head PSV's to ensure compliance with AS 1271 .	Field	Sep-01	Aug-03
3	Moomba South Central & Big Lake Lube & Seal Oil Coalescers	Replacement of the existing turbine and compressor seal oil coalescing filters on the 6 compressor sets at Moomba South Central and Big Lake.	Field	Aug-02	Dec-03
4	Gas Pipeline Refurbishment - 2003	Recoating or replacement of various sections of the gas pipeline system.	Field	Oct-03	Dec-03
5	Gidgealpa Gas Flare KO Drum Liquids Recovery	Install a larger pump and update the controls to recover condensate from the Gidgealpa flare system.	Field	Mar-02	Apr-03
6	Tirrawarra Trunkline Conversion	Convert the Tirrawarra DN200 second raw gas trunkline (old Ethane line) to oil service.	Field	Jan-00	Nov-03
7	Tirrawarra 6 & 8 Compressors Re-cylindering & Ethane Re-Direction	Modifications to achieve re-direction of the ethane backflow production to LP compression stage at Tirrawarra. Re-cylindering of No 6 & 8 compressors for general LP service.	Field	Sep-02	May-03
8	Moomba Plant PSV Mods	Supply and install new PSVs on various items of equipment within the Moomba Process Plant.	Plant	Oct-99	Dec-03
9	Mba Switchroom #1 MCC	Upgrades to the switchboards and air conditioning system of Moomba #1 switchroom.	Plant	Jan-03	Apr-03
10	Moomba DPCU Compressor Upgrade	Upgrade of 'Ex' compressor motors, starters, cables, MCC's, instrumentation, cable trays, skids, SCADA, field devices and PLC's to improve safety and reliability of EEHA equipment.	Plant	Oct-01	Apr-03
11	Pelican Facility Upgrade	Upgrade metering, dewatering facilities and oil inlet lines at Meranji satellite, to receive oil from new Pelican wells.	Field	Jan-03	Oct-03
13	JALBU Waterflood	Install a pumping system for water injection, to increase oil recovery in Jena Murta reservoir.	Field	Nov-02	Jun-03

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**2004 PRODUCTION FACILITY PROJECTS – PROPOSED**

#	Project	Project Description	Location	Start Date	Target Compl Date
1	Moomba Hazardous Area Remediation	Ongoing program to upgrade hazardous area compliance for the Moomba Plant.	Plant	Dec-02	Jun-04
2	Moomba Treated Water Supply	Replace existing RO plant in Moomba with a unit of greater capacity to enable the flash evaporators to be decommissioned.	Plant	Aug-03	Jan-04
3	Bookabourdie Compression Upgrade	Re-cylindering of Bookabourdie #3/#4 compressors to provide increased power utilisation and reconfiguration of the Tirrawarra satellite to make better use of its compression capacity.	Field	Dec-02	Mar-04
4	JALBU 10 Well Development	Modifications to the Limestone Creek facility to accommodate the JALBU Waterflood project.	Field	Jan-03	Mar-04
5	Limestone Creek Satellite Upgrade	De-bottleneck the satellite facilities and address a number of safety, environmental and operability issues raised via Block Oil facilities audit.	Field	Nov-02	Mar-04
7	Moomba Area Platforms, Walkways, Stairways & Ladders Safety Review	Risk based review and upgrade to various platforms, walkways, stairways & ladders within the Moomba plant when assessed against AS1657.	Plant	Sep-03	Mar-04
8	Moomba Plant Cable Ladder Upgrade	Refurbishment and/or replacement of cable ladder in various areas of Moomba Plant	Plant	Oct-03	Mar-04
9	Moomba HV Distribution Upgrade	Establishment of an additional High Voltage Switchroom to accommodate the 11kV equipment which will replace the 3.3kV.	Plant	Dec-00	May-04
10	Moomba Amenities - Camp Switchboard Upgrade	Improve integrity/capacity of main camp electrical distribution boards	Plant	Dec-03	May-04
11	Moomba & Pt Bonython "Whole of Plant" Risk Assessment	Risk assessment of Moomba, Moomba South and Port Bonython facilities.	Plant	Apr-02	Jun-04
12	Merrimelia & Tirrawarra Gas Satellite Environmental Improvements	Various improvements to drainage and skimming facilities at Tirrawarra and Merrimelia Oil satellite facilities.	Field	May-02	Jun-04
13	Moomba Stormwater Storage Tank & Surge Pond Upgrade	Upgrade capacity of stormwater system in the Moomba Plant	Plant	Apr-04	Jun-04
14	Tantanna Satellite Upgrade	Simplify the satellite facilities and address a number of safety, environmental and operability issues raised by the Block Oil facilities audit.	Field	Jul-02	Jul-04
15	Merrimelia and Meranji Oil Satellites Upgrade	Simplify the satellite facilities and address a number of safety, environmental and operability issues raised by the Block Oil facilities audit.	Field	Sep-03	Jul-04

14	Tantanna Satellite Upgrade	Simplify the satellite facilities and address a number of safety, environmental and operability issues raised by the Block Oil facilities audit.	Field	Jul-02
15	Merrimelia and Meranji Oil Satellites Upgrade	Simplify the satellite facilities and address a number of safety, environmental and operability issues raised by the Block Oil facilities audit.	Field	Sep-03
16	Moomba Plant Buildings Air Conditioning Upgrade	Upgrade the HVAC systems at marshalling stations 1-5 and the central utilities control room.	Plant	Sep-03
17	Moomba OCC Power Supply and HVAC Upgrade	Moomba Operation Control Centre air conditioning and power supply upgrade	Plant	Dec-03
18	Moomba Salt Bath Heater Upgrade	Improvements to integrity & reliability of salt bath heaters in DPCU #1 and #2 in Moomba Plant	Plant	Nov-03
19	Gidgealpa, Big Lake, Moomba and Moomba South Oil Satellite Upgrade	Simplify the satellite facilities and address a number of safety, environmental and operability issues raised by the Block Oil facilities audit.	Field	Nov-03
20	Moomba Asset Control Enhancement (ACE)	Control system upgrade of Moomba plant.	Plant	Oct-02
21	Moomba Pig Receiver Valve Upgrade	Upgrade of Moomba Pig Receiver isolation valves.	Plant	Dec-03

2003 ANNUAL REPORT - SA COOPER BASIN OPERATIONS

**2004 PRODUCTION FACILITY PROJECTS - PROPOSED**

#	Project	Project Description	Location	Start Date
22	Eastern/Central Gas Satellite Instrument Air Compressor Upgrade	Installation of new instrument air compressors at Della, Dullingari, Toolachee, Kidman, Gidgealpa and Daralingie.	Field	Oct-03
23	Big Lake LP Compression	Installation of new low pressure compression facilities at Big Lake satellite.	Field	Dec-03
24	Big Lake Gas Satellite Utilities Upgrade	Installation of new facilities at Big Lake satellite to improve the integrity of separation, water handling and flare systems.	Field	Nov-03
25	Toolachee Environmental Improvements	Various improvements to the drainage system and skimming facilities at the Toolachee satellite.	Field	Jul-04
26	Della Flare Knock-out Drum	Installation of new facilities at the Della satellite to improve the integrity of the flare system.	Field	Jul-04

## FLOWLINES CONSTRUCTED – 2003

#	From	Diameter (mm)	Steel/GRE	Constructed	Length (metres)	Total km (mth)
1	Big Lake 69	100	Steel	February	300	300
2	Moomba 133	100	Steel	March	5238	
3	Crowsnest 3	100	Steel		1948	
4	Bobs Well 1	100	Steel		2926	
5	Big Lake 60	100	Steel		450	
6	Nephrite South 3	100	Steel		750	
7	Wollgolla 3	100	Steel		300	
8	Biala 6	75	GRE		300	11912
9	Della 23	150	Steel	April	1000	
10	Della 24	150	Steel		600	
11	Moomba 170	100	Steel		650	
12	Moomba 169	100	Steel		333	
13	Big Lake 71	100	Steel		750	
14	Moomba 171	100	Steel		650	
15	Tindilpie 3	100	Steel		311	
16	Moomba 172	100	Steel		471	
17	Tindilpie 4	100	Steel		3150	
18	Strzlecki 5	100	Steel		305	
19	Moomba 173	100	Steel		600	
20	Jena 6	65	GRE		1200	
21	Ulandi 5	65	GRE		1600	11620
22	Goyder 4	100	Steel	May	339	
23	Caladan 3	100	Steel		346	
24	Big Lake 72	100	Steel		600	
25	Cowralli 6	100	Steel		569	
26	Jena 9	65	GRE		1600	3454
27	Beckler Loop Line	150	Steel	June	9000	
28	Cowralli 7	100	Steel		230	
29	Swan Lake Debottleneck	150	Steel		427	
30	Meranji North 2	100	Steel		650	
31	Jena 4	65	GRE		1000	
32	Alwyn 3	65	GRE		750	
33	Biala 3	65	GRE		2875	14932
34	Pelican 8	100	Steel	July	1140	
35	Pelican 9	100	Steel		579	
36	Pelican 10	100	Steel		550	
37	Pelican 11	100	Steel		5000	
38	Alwyn 5	65	GRE		1760	
39	Ulandi 3	75	GRE		1400	
40	Jena 15	65	GRE		2060	12489
41	Doradillo 4	100	Steel	August	1342	1342
42	Cowralli 6	100	Steel	Sept	569	
43	Cowralli 7	100	Steel		230	
44	Jena 16	65	GRE		1380	
45	Alwyn East 1	65	GRE		1330	
46	Jena 10	75	GRE		1100	
47	Alwyn 6	65	GRE		460	5069
48	Dullingari North 19	100	Steel	Oct	840	
49	Ulandi 7	65	GRE		1299	
50	Ulandi 8	65	GRE		406	
51	Ulandi 9	65	GRE		441	
52	Ulandi 12	65	GRE		1335	
53	Ulandi 13	65	GRE		857	

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#	From	Diameter (mm)	Steel/GRE	Constructed	Length (metres)	Total km (mth)
54	Limestone Creek 9	65	GRE		475	
55	Biala 10	65	GRE		1430	7083
56	Ficus 1	100	Steel	November	415	
57	Merrimelia 43	150	Steel		2665	
58	Ulandi 10	65	GRE		1084	
59	Gidgealpa 34	100	Steel		1025	5189
60	Dullingari 57	100	Steel	December	2900	
61	Jena 17	65	GRE		880	
62	Jena 18	65	GRE		900	
63	Jena 19	65	GRE		520	
64	Scrubby Creek 1	100	Steel		786	5986
	<b>Total km</b>					<b>79376</b>
	Total Steel Line					50934
	Total GRE					28442

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## **PIPELINE INSPECTION , TESTING & REPAIR - 2003**

### **Pipeline Coating Inspections**

Dullingari Gas Trunkline  
Big Lake G3 Gas Gathering Line  
Keleary Oil Trunkline  
Burke Gas Trunkline  
Epsilon Gas Trunkline  
Big Lake G4 Gas Gathering Line  
Gidgealpa Raw Water Line  
Kidman Gas Trunkline  
Mawson to Gidgealpa Gas Pipeline  
Moomba North Gathering lines  
Moomba South Central Re-injection Pipeline  
Pondrinie Gas Gathering Line  
Moomba Fire Water Main

### **Integrity Testing**

Big Lake 15 Gas Flowline  
Big Lake 46 Gas Flowline  
Dullingari 4 Oil Flowline  
Merrimelia 16U Oil Flowline  
Merrimelia 16L Oil Flowline  
Meranji Oil Flowline  
Merrimelia 24 Oil Flowline  
Merrimelia 30 Oil Flowline  
Keleary Oil Trunkline

### **Coating Repairs**

Daralingie Gas Trunkline  
Big Lake G3 Gas Gathering Line  
Tirrawarra Oil Trunkline (Formerly the Tirrawarra Ethane Pipeline)  
Toolachee Gas Trunkline  
Moorari to Tirrawarra Gas Gathering Line

**Abandoned Pipelines**

Merrimelia 16U	abandoned in place
Merrimelia 16L	abandoned in place
Meranji 3	abandoned in place
Marsilea 1	above ground section. Removal of pipe outstanding.
Jena 6	pipeline removed
Jena 8	pipeline removed
Jena 9	pipeline removed
Strzelecki 5 oil	abandoned in place
Gidgealpa 34	pipeline removed
Tirrawarra – Moomba Oil line	abandoned in place

**Pipeline Risk Assessments.**

- Malgoona 1 Oil flowline
- Raven 1 Gas flowline
- Raven 2 Gas flowline
- Raven Twin Gas Flowline
- Raven Bypass Flowline
- Big Lake 15 Gas Flowline
- Big Lake 46 Gas Flowline
- Big Lake 63 Gas Flowline
- Daralingie Gas Trunkline
- Strzelecki 9 Oil flowline
- Keleary Oil Trunkline
- Keleary Oil Trunkline
- Dullingari 4 Oil Flowline
- Merrimelia 24 Oil Flowline
- Merrimelia 30 Oil Flowline
- Meranji Oil Flowline
- Ballera to Moomba Trunkline

**Pipeline Integrity / Risk Workshops**

Keleary Oil Trunkline	April
Embarka Swamp Gas Pipelines	April
Embarka Swamp Oil Pipelines	April
Cuttapirrie Gas Gathering Line	April
Bookabourdie Gas Trunkline	April

Central Business Unit

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**Well Drilling Lease Scout, Construct, Backfill and Restoration Activity**

#	Well Name	Well No.	Scout Date	Construct Commence	Well Status	Borrow Pits	Number Restored	Lease Restored	Photos Taken	Road Km	Road Restored	Lease Backfill
73	Ulandi	11	7/07/2003	31/07/2003		1	0	no	Yes	0.5	no	no
74	Ulandi	12	7/07/2003	25/07/2003	Oil	1	0	no	Yes	0.5	no	no
75	Ulandi	13	7/07/2003	26/07/2003	Oil	1	0	no	Yes	0.3	no	no
76	Moomba	172	7/01/2003	16/05/2003		1	0	no	Yes	1.3	no	no
77	Ulandi	14	25/08/2003	2/09/2003	Oil	1	0	no	Yes	0.3	no	no
78	Mudera	7	25/08/2003	22/09/2003	Oil	1	0	no	Yes	0.9	no	no
79	Biala	12	2/09/2003	28/09/2003	Oil	1	0	no	Yes	0.3	no	no
80	Biala	11	14/09/2003	4/10/2003	Oil	1	0	no	Yes	0.6	no	no
81	Jena	18	3/08/2003	28/08/2003	Oil	1	0	no	Yes	1.1	no	no
82	Jena	19	4/08/2003	20/08/2003	Oil	1	0	no	Yes	1	no	no
83	Korma	1	6/05/2003	15/09/2003	P&A	1	0	no	Yes	1.3	no	no
84	Packsaddle	6	21/01/2003	6/07/2003		1	0	no	Yes	0.8	no	no
85	Merrimelia	43	31/07/2003	18/08/2003	Oil	1	0	no	Yes	0.4	no	no
86	Moomba	166	13/02/2003	19/06/2003		1	0	no	Yes	0.7	no	no
87	Moomba	171	15/01/2003	12/03/2003		1	0	no	Yes	0.8	no	no
88	Big Lake	75	18/02/2003	10/06/2003	Gas	4	0	no	Yes	2.6	no	no
89	Merrimelia	44	14/12/2003	Not Drilled		1	0	no	Yes	0.2	no	no
90	Merrimelia	45	17/11/2003	Not Drilled		0	0	no	Yes	0	no	no
91	Big Lake	76	21/11/2003	Not Drilled		1	0	no	Yes	0.5	no	no
92	Gidgealpa	58	22/11/2003	Not Drilled		1	0	no	Yes	1.1	no	no
93	Big Lake	77	23/11/2003	Not Drilled		1	0	no	Yes	0.6	no	no
94	Reg Sprigg	3	24/11/2003	Not Drilled		1	0	no	Yes	0.8	no	no
95	Merrimelia	46	17/11/2003	Not Drilled		0	0	no	Yes	0	no	no

**WELLS DRILLED**

#	WELL NAME	PERMIT / BLOCK	LICENSE	WELL TYPE	TARGET	SPUD DATE	RIG RELEASE	TD (M)	STATUS	COMMENT
1	Verona 2	Patch East	PPL 158	Explt (App)	Gas	17.1.03	2.2.03	3002	P&A	
2	Big Lake 71 ST1/ST2	Moomba	PPL 11	Dev	Gas	8.2.03	26.3.03	3013	C&S	Big Lake 71 was plugged back due to mechanical problems. BL 71 ST1 was initiated at 2541 m and reached a TD of 3030 m. BL 71 ST2 was initiated at 2493 m.
3	Della 23	Napp-Murt	PPL 158	Dev	Gas	13.2.03	1.3.03	2106	C&S	
4	Della 24	Napp-Murt	PPL 158	Dev	Gas	5.3.03	16.3.03	2103	C&S	
5	Marabooka East 1	Napp-Murt	PPL 22	Explt (Exp)	Gas	19.3.03	30.3.03	2216	P&A	
6	Moomba 169 ST1	Moomba	PPL 7	Dev	Gas	21.3.03	13.4.03	2618	C&S	Moomba 169 was plugged back to 2024 m and sidetracked.
7	Dorodillo 4	Murta	PPL 143	Dev	Gas	7.4.03	21.4.03	2655	C&S	
8	Moomba 170	Moomba	PPL 7	Dev	Gas	19.4.03	2.5.03	2605	C&S	
9	Pelican 9	Merri-Inna	PPL 17	Dev	Gas	20.4.03	5.5.03	2724	C&S	
10	Caladan 3	Murta	PPL 81	Dev	Gas	24.4.03	2.5.03	2225	C&S	
11	Moomba 171	Moomba	PPL 7	Dev	Gas	5.5.03	26.5.03	2589	C&S	
12	Big Lake 72	Moomba	PPL 11	Dev	Gas	7.5.03	29.5.03	3088	C&S	
13	Pelican 10	Merri-Inna	PPL 17	Dev	Gas	8.5.03	21.5.03	2742	C&S	
14	Pelican 11	Merri-Inna	PPL 17	Dev	Oil	28.5.03	10.6.03	2075	C&S	
15	Moomba 172	Moomba	PPL 7	Dev	Gas	30.5.03	13.6.03	2026	C&S	
16	Cowralli 6	Patch SW	PPL 91	Dev	Gas	2.6.03	20.6.03	3205	C&S	
17	Moomba 173	Moomba	PPL 7	Dev	Gas	16.6.03	29.6.03	2606	C&S	
18	Pelican 8	Merri-Inna	PPL 17	Dev	Oil	14.6.03	8.7.03	2772	C&S	
19	Jena 15	Napp-Murt	PPL 149	Dev	Oil	12.6.03	21.6.03	1317	C&S	
20	Cowralli 7	Patch SW	PPL 91	Dev	Gas	24.6.03	9.7.03	3234	C&S	
21	Jena 16	Napp-Murt	PPL 149	Dev	Oil	23.6.03	2.7.03	1324	C&S	
22	Alwyn 6	Napp-Murt	PPL 36	Dev	Oil	3.7.03	10.7.03	1320	C&S	
23	Goyder 4	Napp-Murt	PPL 135	Dev	Gas	5.7.03	16.7.03	2115	C&S	
24	Alwyn East 1	Napp-Murt	PPL 36	Dev	Oil	12.7.03	18.7.03	1328	C&S	
25	Moomba 166	Moomba	PPL 8	Dev	Oil	12.7.03	5.8.03	2533	P&A	
26	Big Lake 75	Moomba	PPL 11	Explt (App)	Gas	14.7.03	4.8.03	3228	C&S	
27	Biala 10	Napp-Murt	PPL 30	Explt (App)	Oil	20.7.03	26.7.03	1338	C&S	
28	Ulandi 7	Napp-Murt	PPL 149	Dev	Oil	27.7.03	2.8.03	1315	C&S	
29	Ulandi 8	Napp-Murt	PPL 149	Dev	Oil	2.8.03	7.8.03	1309	C&S	
30	Ulandi 9	Napp-Murt	PPL 149	Dev	Oil	8.8.03	14.8.03	1322	C&S	
31	Packsaddle 6	Merri-Inna	PPL 90	Explt (Exp)	Oil	10.8.03	29.8.03	2233	P&A	
#	WELL NAME	PERMIT / BLOCK	LICENSE	WELL TYPE	TARGET	SPUD DATE	RIG RELEASE	TD (M)	STATUS	COMMENT

## South Australia Cooper Basin Joint Venture

32	Moomba 174	Moomba	PPL 9	Explt (Exp)	Oil	12.8.03	21.8.03	2106	P&A	
33	Ulandi 2	Nappa-Murt	PPL 149	Dev	Oil	16.8.03	21.8.03	1321	C&S	
34	Ulandi 13	Nappa-Murt	PPL 149	Dev	Oil	22.8.03	28.8.03	1319	C&S	
35	Dullingari North 19	Nappa-Murt	PPL 141	Dev	Gas	25.8.03	18.9.03	2636	C&S	
36	Ulandi 10	Nappa-Murt	PPL 149	Dev	Oil	29.8.03	4.9.03	1316	C&S	
37	Pelican 12	Merri-Inna	PPL 17	Dev	Oil	5.9.03	17.9.03	2025	C&S	
38	Ulandi 14	Nappa-Murt	PPL 149	Dev	Oil	5.9.03	9.9.03	1305	C&S	
39	Jena 17	Nappa-Murt	PPL 149	Dev	Oil	10.9.03	16.9.03	1318	C&S	
40	Jena 18	Nappa-Murt	PPL 149	Dev	Oil	17.9.03	25.9.03	1314	C&S	
41	Merrimelia 43	Merri -Inna	PPL 17	Explt (Exp/App)	Oil	21.9.03	9.10.03	2442	C&S	Merrimelia 43 primary objective was NFE for a Birkhead oil zone. Secondary objective was appraisal of pinch out edge of the Toolachee gas sands.
42	Dullingari 57	Toolachee	PPL 12	Explt (App)	Gas	22.9.03	16.10.03	2502	Compl	
43	Jena 19	Nappa-Murt	PPL 149	Dev	Oil	29.9.03	4.10.03	1314	C&S	
44	Biala 12	Nappa-Murt	PPL 30	Dev	Oil	5.10.03	11.10.03	1325	C&S	
45	Biala 11	Nappa-Murt	PPL 30	Dev	Oil	12.10.03	16.10.03	1300	C&S	
46	Mudera 7	Nappa-Murt	PPL 22	Explt (App)	Gas	18.10.03	22.10.03	1063	C&S	
47	Koma 1	Merri-Inna	PPL 151	WC	Gas	15.11.03	10.12.03	2797	P&A	