2013 Annual Report of South Australian Cooper Basin Joint Venture Operations

This report has been prepared in accordance with the requirements of the Petroleum and Geothermal Energy Act 2000 and the Petroleum and Geothermal Energy Regulations 2013 and covers all of the operations conducted for the SA Cooper Basin Joint Venture by Santos Ltd during the period January 1 – December 31 2013.

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1. INTRODUCTION

This report covers the activities conducted in the South Australian section of the Cooper Basin (SACB) by Santos Ltd as Operator for the South Australian Cooper Basin Joint Venture (SACBJV).

This report covers the period 1 January 2013 – 31 December 2013.

This report covers:
- SACBJV exploration, production and processing operations.
- Pipelines operated under Pipeline Licences #5 (Ballera to Moomba), #9 (Stokes to Mettika) and #15 (Moon to Kerna).
- Emergency response exercises conducted during 2013.
- The hydrocarbon liquids pumping station at the head of the Moomba – Port Bonython liquids pipeline.

This report does not cover but the systems and procedures are applied equally to:
- PPLs 206, 208 & 215 which are located in the SACB and where Santos Ltd is the Operator for a joint venture other than the SACBJV.
- PL 17, the SA section of the Jackson to Moomba Oil Pipeline.
- PEL 114 and associated PPLs 225, 226 and 227 which are located in the SACB and are held 100% and operated by Santos Ltd.

This report does not cover:
- the liquids pipeline from Moomba to Port Bonython.
- any facilities owned or operated by other third parties.

This Annual Report for all activity was prepared considering the relevant Statements of Environmental Objectives (SEO).

2. EXECUTIVE SUMMARY

During 2013, there were no incidents or accidents reported associated with Santos activities which involved any member of the public or third parties.

In 2013 there were thirty five Serious Incidents (as defined by the Act and the Regulations and relevant SEO) and which were reported to DMITRE in accordance with the requirements of the legislation applicable to SACBJV activity.

There were 63 reportable environmental incidents, of which 76% were negligible and 24% minor.

During 2013, there were:

- 76.3 petajoules (PJ) of sales gas produced into the Moomba - Adelaide and Moomba – Sydney gas pipelines.
- 10.7 PJs of ethane produced into the Moomba – Sydney ethane pipeline.
- 252 mL of gas condensate produced to Port Bonython.
- 11.872 mm Barrels (BBLS) of crude oil exported to Port Bonython.

During 2013, the following Seismic Surveys were conducted:
- a CPSAN13B 3D Seismic Survey (Gaschnitz 3D) recorded in Santos PPL's 17, 80 & 101, and
- CPSAN13C Micro Seismic Survey (Cowralli Micro Seismic) recorded in Santos PPL's 6, 91 & 140 and PEL 513.

A total of 37 wells were drilled by the SACBJV. All were cased and suspended for later completion. There were also 4 wells drilled in PEL 114 by Santos.

There were 122 individual workover operations conducted during 2013. Of these 2 were for PEL 114. This involved 64 Fracture Stimulation operations. Workover activities included casing repair, down-hole pump installation/repair, well completion or re-completion, Integrity repairs, water well conversion and perforation operations. At the end of this reporting period there were a total of 534 oil (228 producing) and 1124 gas or gas/oil (544 producing) Santos operated wells. 953 wells (producing, inactive or suspended) were subject to casing annulus pressure testing.

During this period, there were 244.53 km of flowline constructed, made up of 28 individual flowlines. Of the 244.53 km constructed, 3.84 km was Glass Reinforced Epoxy (GRE) line, 69.45 km of steel line, 170.00 km was High Density Polyethylene (HDPE) and 1.24 km was External Upset Tubing Connection (EUE).

Close cooperation and liaison was maintained with landholders and third party exploration companies in the SACB.

Santos continued to actively support local community activities across the areas where hydrocarbon exploration and production activities take place.

3. SUMMARY OF REGULATED ACTIVITIES

The following *Regulated Activities* were conducted by the SACBJV under the various petroleum licences during 2013:

- Exploration for and appraisal of petroleum.
- Road, track, borrow pit and well lease construction.
- Seismic line construction.
- Seismic survey.
- Well drilling operations.
- Water injection / water flood operations to enhance production.
- Operations associated with the production of petroleum, including construction, maintenance, repair and operation of pipelines, plant and facilities, camps, airstrips and associated infrastructure.
- Gas and oil processing operations.
- Storage of natural gas in underground reservoirs.
- Disposal of produced formation water.
- Operation of licensed transmission pipelines.

4. PERFORMANCE

The activities covered by this report are administered in accordance with the Petroleum and Geothermal Energy Act 2000, the Petroleum and Geothermal Energy Regulations 2013 and relevant SEO's.

4.1 PROVISION OF DATA

As a result of the previous increased focus on the provision of timely and accurate data to DMITRE, data was generally provided to DMITRE during the reporting period in a complete and timely fashion.

4.2 PIPELINE MANAGEMENT

Santos field pipelines are designed in accordance with AS2885 and engineering standards. Operation and Maintenance of pipelines is managed by the Santos Pipeline Asset Management System which sets standards for integrity management and design life review to ensure EHS risks are ALARP.

Individual Integrity Management Plans (IMP) are in place for each pipeline in the Santos operated network. These IMPs indicate the activities and frequencies of inspections required to manage integrity of each asset, based on estimated risk analysis.

4.3 QUARTERLY PERFORMANCE MEETINGS

Quarterly performance meetings between Santos and DMITRE continued during 2013. The dates of these meetings are listed in Appendix 1.

5. INCIDENTS

During 2013, there were no incidents or accidents reported associated with Santos activities which involved any member of the public or third parties.

Third Party Incidents

(1) Nil.

In 2013 there were thirty five (35) Serious Incidents (as defined by the Act and the Regulations and relevant SEO) and which were reported to DMITRE in accordance with the requirements of the legislation applicable to SACBJV activity.

5.1 SERIOUS REPORTABLE INCIDENTS

Serious Reportable Incidents have been reported to DMITRE during 2013. Some of these incidents were also reported to other regulatory agencies, such as the SA EPA and SafeWork SA.

In the interest of sharing safety information and developing uniform safety approaches, Santos issued invitations to third party exploration and production operators to participate in the regular Santos/Contractor safety meetings.

Pipeline Integrity Incidents

(1) On the 10th January 2013, it was reported that a pinhole corrosion leak had been identified on the Moomba #119 flowline.

(2) On the 19th January 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake GS flowline.

(3) On the 26th January 2013, it was reported that a pinhole corrosion leak had been identified on the Merrimelia Oil trunkline.

(4) On the 22nd February 2013, it was reported that a pinhole corrosion leak had been identified on the Gidgealpa #20 flowline.

(5) On the 9th March 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake #11 flowline.

(6) On the 19th March 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake #34 flowline.

(7) On the 19th March 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake G3 flowline.

(8) On the 11th April 2013, it was reported that a pinhole corrosion leak had been identified on the Merrimelia #10 flowline.

(9) On the 17th May 2013, it was reported that a pinhole corrosion leak had been identified on the Moomba #48 flowline.

(10) On the 28th May 2013, it was reported that a pinhole corrosion leak had been identified on the Pondrinie #14 flowline.

(11) On the 25th June 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake G5 flowline.

(12) On the 26th June 2013, it was reported that a pinhole corrosion leak had been identified on the Derrylin #2 flowline.

(13) On the 27th July 2013, it was reported that a pinhole corrosion leak had been identified on the Moomba #104 flowline.

(14) On the 27th July 2013, a pinhole corrosion leak was identified on the Moomba to Gidgealpa trunkline.

(15) On the 28th July 2013, it was reported that a pinhole corrosion leak had been identified on the Moomba #119 flowline.

(16) On the 28th July 2013, it was reported that a pinhole corrosion leak had been identified on the Moonanga #1 flowline.

(17) On the 9th August 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake #84 flowline.

(18) On the 22nd August 2013, it was reported that a pinhole corrosion leak had been identified on the Moomba #190 flowline.

(19) On the 26th August 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake G2 flowline.

(20) On the 27th August 2013, it was reported that a pinhole corrosion leak had been identified on the Big Lake #20 flowline.

(21) On the 18th September 2013, it was reported that a pinhole corrosion leak had been identified on the Biala #11 flowline.

(22) On the 18th December 2013, it was reported that a pinhole corrosion leak had been identified on the Bimbaya flowline.

Facility Integrity Incidents

(23) On the 21st January 2013, it was reported that a pinhole corrosion leak had been identified on the Meranji #3 fuel gas line.

(24) On the 28th January 2013, it was reported that a pinhole corrosion leak had been identified on a Gidgealpa Oil Satellite fuel gas line.

(25) On the 2nd February 2013, a pinhole corrosion leak was identified on the Biala Multi Port Valve manifold spool.

(26) On the 7th March 2013, a pinhole corrosion leak was identified on the Tirrawarra Satellite underground pipework from the slug catcher to the coalesce.

(27) On the 13th March 2013, a pinhole corrosion leak was identified on the Tirrawarra Satellite recovered oil tank rundown line.

(28) On the 17th April 2013, a pinhole corrosion leak was identified on the Tirrawarra Satellite underground pipework from the slug catcher to the coalescer.

(29) On the 24th April 2013, a plastic plug was blown out of a compressor cylinder at the Tirrawarra Satellite.

(30) On the 1st June 2013, a pinhole corrosion leak was identified on the Moomba North Compressor discharge piping.

(31) On the 19th July 2013, a pinhole corrosion leak was identified on the Biala #1 multiport valve manifold.

(32) On the 5th August 2013, a gas jack hold stud failure at Moomba #103.

(33) On the 1st December 2013, a pinhole corrosion leak was identified on the Biala #1 multiport valve manifold.

(34) On the 24th December 2013, a pinhole corrosion leak was identified on the Jena #25 multiport valve manifold.

Drilling Operations Incident

(35) Santos reported an incident on one of its contracted drilling rigs that occurred on 28 April 2013. During the course of rig operations, the iron roughneck was accidently activated. The result was two contractor employees being caught by the iron roughneck on the rig floor resulting in injuries.

Persuasive Measures

On 27 June 2013 Santos were issued with a notice of non-compliance for undertaking an activity, the construction of 4 flowlines, without providing the Minister with sufficient notice as required by Section 74(3)(b) of the Act. The notice of non-compliance also referred to the construction of a 5th flowline for which Santos did not distribute notice of entry letters to the relevant owners of land as is required by Section 61 of the Act. Following investigation, DMITRE were satisfied that these incidents did not culminate in any material harm to the landowners or the public and that Santos have improved internal processes to prevent reoccurrence of such incidents.

On 12th September 2013 a notice of non-compliance was issued to Santos for the non-compliant submission of a serious incident report. A serious incident report was due for submission 3 months after the occurrence of the serious incident on Saxon Rig 188 described in Section 4.6, per Regulation 32(2)(b). In DMITRE's view the report was non-compliant per Regulation 32(4). DMITRE subsequently requested further information and a re-submission of the serious incident report. Santos has since responded and the information provided is currently being reviewed.

5.2 REPORTABLE ENVIRONMENTAL INCIDENTS

Environmental incidents are reported to DMITRE in accordance with the *Petroleum and Geothermal Energy Act 2000* within specified time frames. Incidences are defined as serious or reportable.

Reportable incidents are reported to DMITRE at the Quarterly Performance meetings listed in Appendix 1. A reportable incident is an incident (other than a serious incident) arising from activities conducted under a licence classified under the regulations as a reportable incident. In accordance with Regulation 32(1), the following are classified as reportable incidents:

- an escape of petroleum, a processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape; and
- an incident identified as a reportable incident under the relevant statement of environmental objectives.

A serious environmental incident is an incident arising from activities conducted under the licence in which:

- serious environmental damage occurs or an imminent risk of serious environmental damage arises; or
- Some other event or circumstance occurs or arises that results in the incident falling within a classification of serious incidents under the regulations or a relevant statement of environmental objectives.

There were no serious environmental incidents and 63 reportable environmental incidents recorded during the period.

Appendix 2 provides an analysis of reports issued at the Quarterly Performance meetings. The consequence of these incidents, according to the classification guide developed by Santos, ranged from Negligible (76%), Minor (24%) and Moderate (0%).

In 2013, 63 incidents were reported to DMITRE, compared to 66 in 2012.

In 2013, the total volume of fluids released to an area not designed to contain them was 327,980 L compared with 289,400 L in 2012. Of this total volume, the volume of hydrocarbons released in 2013 was 36,870 L compared with 26,510 L in 2012.

Incident investigations found that monitoring and maintenance accounted for 90% of the root causes for incidents, 5% were the result of design issues, 3% due to environmental factors and 2% were legacy spills.

5.2.1 Summary Of Actions To Prevent Recurrence

A strong focus on reporting of minor environmental incidents in 2013 including those not involving hydrocarbon continued. A number of investigation corrective actions have been implemented and include:

- Assessment of pipeline tape coating integrity and re-coating (with yellow jacket) where required.
- Development plan for the prioritisation and abandonment of mothballed/suspended flowlines.
- Investigation to identify a suitable cold cutting tool to remove pipeline sleeves and enable inspection, re-coating and the installation of concrete culverts.
- Development plan for the management and reduction of pipeline dead legs.

5.3 NOTIFIABLE WORK RELATED INJURY OR DANGEROUS OCCURRENCE

Notifiable Work-related Injuries or Dangerous Occurrences required to be reported to SafeWork SA are also reported to DMITRE.

There was no Immediately Notifiable Work-related Injury reported during 2013, there were 35 events classified as Reportable to DMITRE and no Notifiable Dangerous Occurrences reported Safe Work SA.

At the Quarterly performance meetings these incidents are also reported.
Appendix 2 provides an analysis of those reports.

The root cause of these incidents was Monitoring and Maintenance.

6. MONITORING/STUDIES

6.1 MONITORING

6.1.1 SEO Compliance

In 2013 there was an ongoing focus on the prevention of hydrocarbon releases through the implementation of integrity management plans. These plans included auditing and monitoring to assess conformance with Santos environmental hazard standards and procedures and the effectiveness of the standards in the field.

From November 2012 to February 2013 a pilot trial and associated monitoring program to evaluate the effectiveness of in-situ treatment of hydrocarbon impacted soils was undertaken at the Moomba landfarm. Results of the pilot trial were positive and in December 2013 approval to treat all remnant/legacy material at the Moomba landfarm was provided by the SA Environment Protection Authority.

6.1.2 SEO Review

The scheduled 5 year review of the Santos Statement of Environmental Objectives (SEO) for Drilling and Well Operations (DWO) commenced in December 2013 and will be submitted to DMITRE for consultation in June 2014 and Gazetted in December 2014. In late 2013 DMITRE requested Santos undertake a detailed risk assessment of its fracture stimulation activities in the Cooper Basin to demonstrate compliance with the existing SEO DWO. A draft Environmental Assessment Report (EAR) was subsequently developed and details the strategies and control measures employed by Santos to manage potential risks to the environment associated with conventional and unconventional fracture stimulation activities in the Cooper Basin to As Low As Reasonably Practicable (ALARP). The Draft EAR was submitted to DMITRE on 28 January 2014 to be finalised following detailed internal and DMITRE review.

6.1.3 Produced Formation Water Pond Upgrades

In 2013 Santos placed a high priority on the upgrade and maintenance of its higher risks Produced Formation Water (PFW) ponds. The ponds targeted as part of this program on environmental risk included:

- Gidgealpa Gas Evaporation Ponds 1 and 2;
- Tirrawarra Evaporation Pond;
- Merrimelia Gas Interceptor and Holding Ponds;
- Bookabourdie Interceptor and Pump Out Pond;
- Della Interceptor Pond;
- Moomba Northern Interceptor Pond; and
- Moomba Southern Interceptor Pond.

Assessment of potential ponds for a 2014 campaign began in Q4 2013.

6.2 STUDIES

6.2.1 Water Strategy

In 2013, a high level water balance study to characterise supply, demand and management of Santos Cooper Basin water resources was undertaken in an effort to identify opportunities for improving existing management. The outcomes of water balance were tabled, and a series of internal workshops with relevant stakeholders held to identify strategies to maximise utilisation and beneficial re-use. The recommendations to come out of the water strategy have been endorsed by Santos and will form the basis for future water planning.

6.2.2 Produced Formation Water Pond Investigative Program

Following the 2012 investigative drilling program which identified low level environmental impact at some sites in the Cooper Basin, beneficial use and Screening Risk Assessments (SRA) for each site were implemented. Actions for ongoing management will be identified in early 2014 once the outcome of SRAs is known.

6.2.3 Sludge Management

Construction of the new sludge processing plant in Moomba began in Q3 2012. The plant began the commissioning phase in Q2 2013 and reached practical completion in December 2013. During the commissioning phase, the plant was able to accept and process sludge generated as part of Santos' Cooper Basin operations. Recovered crude oil was sent back into the Moomba Plant to be combined with the oil transported to Port Bonython for commercial sale.

6.2.4 Waste Management

Following construction and completion of Cell 1A at the Moomba Waste Management Facility (WMF) in February 2012, Cell 1B received operational approval from the SA EPA in December 2013.

Approval to treat legacy material at the Moomba landfarm was received from EPA in December 2013. Approval for in-situ treatment will fast-track the concept and development phase of the planned full scale facility to be constructed at the historical site. Design and construction of the specialised facility at Moomba will promote active treatment and management of Santos and 3rd party generated contaminated soil and potentially provide a source of fill material that could be beneficially re-used for construction and or other purposes.

6.2.5 Environmental Sensitivity Profile (ESP)

In 2013, a project to develop an environmental sensitivity 'heat map' of the Cooper Basin for implementation as a GIS layer was undertaken. Developed in conjunction with external consultants with specialist GIS capabilities, the ESP provides a sensitivity weighting of operational areas based on the potential environmental risk posed to particular receptors.
The intranet based GIS model was completed and implemented for internal and limited external use in Q3/Q4 2013. The ESP is used as a tool to inform internal environmental approvals, desktop assessments for proposed/new infrastructure, and for prioritising maintenance or inspections on existing infrastructure based on its location and associated environmental sensitivity. Santos Pipeline and Plant Integrity teams are actively using the ESP to assist with integrity assessment programs.

6.2.6 Cooper Basin Borrow Pit Study

In 2013 DMITRE commissioned specialist consultants to undertake an assessment of existing Cooper Basin borrow pits. The intent of the study was to expand on the current understanding of potential long term impacts to the environment associated with borrow pit installation and operation. As part of the study, DMITRE and specialists consultants visited a sample set of existing Cooper Basin borrow pits as well as Santos pits under construction. Site visits and consultation with Santos Field Services and earth moving contractors provided valuable insight into the practical development and operation of borrow pits in the Cooper Basin.

6.2.7 Abandonment of Glass Reinforced Epoxy Flowlines

This year saw the initiation of the abandonment of the first Glass Reinforced Epoxy (GRE) flowline within Santos' Cooper Basin operations. As this was the first occasion of the abandonment and rehabilitation of a flowline made of this material, DMITRE was instrumental in initiating research into the environmental impact of abandoning GRE lines in situ compared to complete removal.
Upon presentation of a detailed risk assessment, DMITRE were satisfied that the most beneficial outcome for the environment is to leave GRE lines in situ once abandoned using the same process as steel lines.

7. MANAGEMENT SYSTEM

7.1 ENVIRONMENT, HEALTH & SAFETY MANAGEMENT SYSTEM (EHSMS)

The EHSMS contains management standards, health and safety hazard standards and environmental hazard standards. The management standards provide a framework for the sustainable achievement of acceptable EHS outcomes, whilst the hazard standards provide a clear process for control of hazards that are specific to Santos' business.

A major review project to conduct a systemic, critical review and redesign of the Santos Environment, Health and Safety Management System (EHSMS) commenced in 2013.

The new Work Health Safety Act and Regulations have been incorporated into the EHSMS and the project will conclude in 2015.

A structured process was implemented to ensure appropriate consultation and feedback into the revised standards could be considered from all facets of the organisation.

Ongoing monitoring and review of the EHSMS continued throughout the organisation during 2013. The level of performance was communicated in the DMITRE bi-annual Health and Safety Management System Self-Assessment. Management standards performance was further validated by the use of internal auditors to monitor improvement initiatives highlighted by the EHSMS audit and assessment program.

7.1.1 Management Standards

Further implementation of management standards continued throughout 2013. Process safety (the prevention of high consequence/low frequency events involving sudden loss process fluids/gasses) standards continue to be embedded into the business. Process Safety data continues to be collected and analysed. Trending information is fed back through the monthly Eastern Australia Leadership EHS Committee.

There were 7 management standards amended and updated in 2013 – EHSMS05 EHS Responsibility & Accountability, EHSMS07 Consultation & Communication, EHSMS09 Managing EHS Risks, EHSMS10 Contractor Management, EHSMS13 Emergency Preparedness, EHSMS15 Incident Investigation & Response, EHSMS16 EHS Audits & Inspections.

A significant review of Managing EHS Risks was completed during 2013 with some key changes including the introduction of a new Operational Risk Matrix which aligns with the corporate 6x6 risk matrix, the inclusion of process safety consequences in the Operational Risk Matrix, a greater focus on risk control assurance and governance, Stepback and JHA requirement incorporated into the larger Standard and How To Guide, Hazard Studies incorporated in the larger standard.

To support the revised Standard, a new electronic Significant Hazard Risk Register module was also commissioned into EHS Toolbox providing a central data capture and reporting tool, accessible across the organisation.

7.1.2 Hazard Standards

As part of the EHSMS Redesign Project, 5 hazard standards were revised and updated; HSHS02 Land Transportation, HSHS03 Air Transportation, HSHS07 Working at Height, HSHS16 Lifting Equipment and HSHS18 Confined Spaces

The review of HSHS08 Chemical Management commenced in Sept 2013 to significantly simplify the requirements in accordance with legislation and consolidate all sub standards (HSHS08.1 Asbestos, HSHS08.2 SMF etc.) into the larger standard. HSHS08 is due for release and rollout during Q1/2014.

The Health and Wellbeing Program continued to be a focus for Santos (supported by the HSHS04 Health & Wellbeing) with significant focus on workforce health awareness and work/life balance.

A specific program is in place for high risk individuals, staff who were assessed at having 5 health risks from previous health check (health checks are conducted every 2 years), this included personal health coaching (this commenced in 2010).

Most of our SA sites have on site gym facilities which are manned by lifestyle coordinators and show an increased attendance for our staff over the last few years.

Santos also supports our employees by way of entrance fees into community events such as, Nissan Triathlon (Santos were the winners of the 2012 highest corporate participation), City to Bay and the BUPA challenge (an event in the Santos World Tour Down Under).

The health and wellbeing program also supports our employees with the ups and downs of everyday life through our Employee Assistance Program, whereby employees can seek professional and confidential counselling to help them resolve or better cope with personal or work problems that may be affecting their work or overall wellbeing. Resilience training for employees continued through 2013.

Drug (urine) and alcohol testing continued in 2013 with employees and contractors at all locations being subject to random, for cause and post incident testing.

A fatigue management program was implemented in 2009, including awareness programs, self-management tools and reporting protocols. Fatigue Management Plans continue to be developed and used throughout EABU as required.

In 2013, sites continued to identify and focus on their 'top 5' hazards standards. These standards were aligned with their Significant Hazard Risk Register, to ensure a constant site-based focus on the most significant hazards. During 2013, sites continued to review and update their Significant Hazard Risk Registers and their 'top 10' risks and controls were reported back through the monthly Eastern Australia Leadership EHS Committee.

Work is now underway to transition existing Significant Hazard Risk Registers into the EHS Toolbox module.

7.1.3 Training and Awareness

A new program was launched in 2010 to raise the awareness of high risk safety activities (The Santos Lifesaver Program). Santos developed a number of Santos DVD-s to educate the workforce on the lifesaver topic. The program also contains a toolbox talk, promotional material (displays, posters, sticker, and screen saver), quiz, workplace inspection and audit.

Following the 2012 'break' in the program to rollout the EHS Fundamentals during 2012, the Santos Lifesaver Program was relaunched for 2013 with 9 key topics delivered during 2013; Pressure, Excavation, Hydrocarbons, Electricity, Driving Vehicles, Working at Heights, Confined Space Entry, Working in the Heat and Lifting / Dropped Objects.

This program continues to be successful in raising the level of awareness and continues to attract a good level of site / activity participation in the associated activities.

It's important to note that the repeatability of this program will, over time, embed a level of awareness to enhance our safety culture and ensure new team members are routinely on-boarded through the process.

7.2 AUDITS, INSPECTION AND REVIEW PROCESSES

The following summarises some of the Audit and Review processes used to determine system conformance, effectiveness and fitness for purpose.

Santos effectively mandates a three tiered approach to Audit, Inspection and Review;

1. On site workplace inspections; statutory testing of equipment; work permit and JHA reviews as well as measuring compliance with operating documentation.
2. During 2013 Asset Managers were responsible for ensuring Self EHS Audits were conducted within their area of responsibility (on site). A risk based approached is used to determine the required audits against EHS Management System Standards. These audits are conducted in accordance with AS/NZS ISO 19011:2003.
3. The Internal Corporate Audit Program continued during 2013 and ~20 Audits completed. A balance of internal and external Lead Auditors was responsible for the delivery of the Audits and Progress Reviews.

Results of Inspections, Reviews, Audits and Progress Reviews were tabled at Eastern Australia Leadership and Site EHS Committee Meetings for discussion and tracking of actions. A number of detailed presentations were also made to communicate the learnings from these activities across the business.

Audit findings were also presented at the Environment, Health, Safety and Sustainability Board Meeting.

In 2013, we continued to report, investigate and record any High Potential Incidents (HiPos) that occurred within the company. A HiPo is defined as any incident that had potential to result in a fatality. Tracking and reporting HiPos continues to provide the company with another avenue to learn from incidents and improve our overall safety performance. Results and presentation are reported to senior management on a regular basis.

7.2.1 Performance Based Audits

In 2013, two Legislative and Regulatory Performance Audits were conducted:

No	Audit Title	Act/Reg #
1	Work Permit – Various sites	WHS Act
2	Lifting – Various sites	WHS Act

7.2.2 Pipelines

Management of pipeline integrity occurs by targeting pipeline systems and associated equipment which are high risk or near the end of design life (Risk Based Inspection - RBI - approach). Main targets of Pipeline Integrity Management are:

- Redirection of pipeline operating risks to ALARP
- Address safety risks
- Maintain integrity of ageing pipeline network
- Standards compliance
- AIMS (Asset Integrity Management System) compliance

AIMS is the framework used within Pipeline Integrity to provide effective through-life integrity management of pipeline assets to meet operational availability, as well as achieving statutory and corporate compliance with Safety, Health and Environment.

7.2.3 Sustainability Report

Santos released its first annual sustainability publication in late 2004, making public its commitment to long-term sustainability as an energy company. At that time, Santos adopted sustainability as a core value and committed to continually improving its performance in this area.

Since then, Santos has implemented a framework in which the company measures performance across a comprehensive suite of indicators in the environment, community, our people and economic domains.

Santos publishes its annual verified Sustainability Report in March each year. This document reports against Santos' sustainability targets and provides further detail on policy, procedures and performance across the four domains of sustainability.

8. REASONABLY FORESEEABLE THREATS

Reasonably foreseeable threats, those that reasonably present, or may present, a hazard to the facilities or activities, continued to be reviewed and reduced by a number of initiatives.

These initiatives included:

- Close liaison continues with 3rd parties exploring and producing in the Cooper Basin to manage the risk of 3rd party impact on pipelines.
- Work to expand the EHS Management System's focus on Process Safety, targeting potential low-frequency, high-consequence events such as loss of containment. The Moomba Plant and Cooper Basin Production both underwent external audits against Santos EHSMS including the PSM standards during 2008. During 2009, 2010 and 2011, formal progress reviews were undertaken against the audit recommendations. Progress reviews may also identify new improvement opportunities as part of continuous improvement. Most non-conformances have been completed and closed. A full re-audit of the Moomba plant was carried out in 2012, and a partial re-audit of SA Upstream Gas and Cooper Basin Oil operations was undertaken in 2013; Process safety management components are scheduled for re-audit in 2014.
- Completion of a Formal Safety Assessment (FSA) of the Moomba Gas Plant. The FSA is a key source of process safety risk information for the Moomba Gas Plant and recommendations were commenced in 2011 with actions to be ongoing for 3-5 years. Information from the FSA will also be a significant input into the safety case for Moomba which is being developed as required by Major Hazard Facilities regulations.
- Communications with other parties operating in the area are maintained to manage threats posed to the facilities, in particular to high pressure natural gas pipelines, to as low as reasonably practicable (ALARP). This includes pastoralists, on whose properties the operational

activities are conducted. Information on infrastructure, including pipeline maps and information, is provided and regularly updated.
- Security situation has continued to be monitored and close liaison continues to be maintained with State and Federal authorities responsible for managing this issue. Appropriate relationships have been established with key response agencies.
- Participating in the development of common drilling industry standards, practices and procedures. A key component of this is the Wellsite Permit to Work System that Santos continues to provide leadership for, including providing the deputy chair for the newly formed industry association structured to manage the System going forward. Santos also received an Enduring Membership (life time member for free) at the end of 2013 to recognise the support and leadership to industry in permit to work.

8.1 RISK ASSESSMENT

Santos undertook 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 reasonably practicable (ALARP). Risk assessments are undertaken in line with EHSMS09 Managing EHE Risks.

There were also a number of projects identified in previous risk assessments which continued to be progressed during 2013. These projects are addressed in this report.

8.1.1 Whole Of Plant Risk Assessment (WOPRA) And Formal Safety Assessment (FSA)

WOPRA was a systematic whole of plant risk assessment process with strong emphasis on work group participation. Its structure was intended to be compatible with the anticipated Major Hazard Facility requirements.

Assessments were completed for the Moomba Gas Plant and the Moomba South Central Gas Satellite.

Focus of the WOPRAs was on actions associated with the top 10 Hazards for the Moomba plant and the top 5 Hazards at the Moomba South Central Satellite. Priority action items were issued and stewarded. The WOPRA processes are complete.

In 2009, a Formal Safety Assessment (FSA) of Moomba Gas Plant commenced in line with the requirements of EHSMS09 Hazard Identification, Risk Assessment and Control and to build on the WOPRA study. Following a pilot study started in 2009, the remainder of the Moomba Plant was reviewed in 2010. The potential risk reduction opportunities identified are in the process of further analysis and commencement of actions in order to maintain risk as low as reasonably practicable (ALARP). Projects and implementation plans will be instigated as part of this process over an anticipated 3-5 year period. The risk and control information will also be an important basis for the Safety Case which is being developed in accordance with MHF regulations.

8.1.2 Pipelines

Detailed risk assessments are completed for new pipelines and a risk based design life review process has been implemented for pipelines in operation. A key risk mitigator is the effective completion of the activities required by the Integrity Management Plans (IMPs). Risk reviews throughout the operating life of the pipeline are determined through the pipeline risk based inspection process. Individual Integrity Management Plans are in place for each pipeline that forms part of the Santos network.

The performance of the pipeline integrity management system is reported via monthly KPIs, IMP compliance reports and is discussed with individual asset owners and management at forums such as the weekly/monthly asset performance reviews and quarterly Operations Governance meetings. Additionally, Santos compliance to AS2885.3 was subject to an independent and comprehensive audit during 2013 that identified some improvements, resulting in an audit action plan.

The monthly KPI’s measure a wide range of metrics and result in a summary report. Metrics include;

Risk Profile; Hazards & Threats (8 measures); Pipeline Health; Mitigation reliability; Integrity Incidents; Assurance Plan Compliance (Monitoring (5 measures), Mitigation (5 measures), Inspection (7 measures)).

A number of risk assessments were undertaken on key pipelines, listed Appendix 8, as required under the Pipeline Management System.

8.1.3 Significant Hazard Risk Registers

A requirement of Santos EHSMS9 Managing EHS Risks is for operating sites to develop and maintain a Significant Hazard Risk Register (SHRR). The SHRRs record risks with an inherent risk rating of 3 or higher (from Santos' Risk Rating tool). Information is consolidated from various EHS and process safety risk assessment processes. SHRRs are used to:

- Identify the major EHS hazards to be included in EHS inductions.
- Prioritise resources for the auditing/monitoring of key controls.
- Assist with the development of site/function EHS inspection, monitoring and audit programs.
- Assist with the development of annual EHS Improvement Plans
  SHRRs are periodically reviewed and updated to maintain currency and to improve their effectiveness for managing risks. During 2013, the SHRR for the Moomba Gas Plant was reviewed during three separate workshops. The combined SHRR for Upstream Gas Operations and Cooper Basin Oil operations is scheduled for 2-yearly review in 2014. The top items from SHRRs are reviewed in rotation by the Eastern Australia Business Unit EHS Committee meeting.

8.1.4 New Pipelines

A total of 35 new pipelines (oil & gas) were constructed in South Australia in 2013.

8.1.5 Security

Security related activities within Cooper Basin continued effectively through 2013 with the following key activities:

- Planning commenced regarding the integration of security arrangements relevant to the Major Hazard Facility legislation (program to occur in 2014).
- New Corporate standard for Emergency Preparedness released in March 2013.
- Emergency response plans and structures for Cooper Basin have been re-written to align with new Santos Corporate standards and internal structures within Eastern Australia Business Unit.
- Port Bonython conducted an exercise involving SAPOL and Metropolitan Fire Services support.
- SAPOL Critical Infrastructure Support Group liaised with Santos regarding the potential for protest activity with new Shale gas operations.
- Liaison network with the various Federal and State agencies responsible for security related issues were maintained.

8.1.6 HAZOP

There were 7 HAZOPs conducted for the Moomba Plant, and SA Cooper Basin production facilities and pipelines in 2013.

9. EMERGENCY RESPONSE

9.1 EMERGENCY RESPONSE CAPABILITY

Santos maintains a dedicated emergency response crew at Moomba. This consists of fully trained Emergency Officers (fire crew) and medical response personnel together with a large inventory of emergency response equipment, material and vehicles.

9.2 EMERGENCY RESPONSE PROCEDURES

Santos has developed a Crisis Management Plan that will replace the current Santos Incident Management Plan (SIMP) when the revised EHSMS13 is released as part of the EHSMS

Improvement Plan. The SCMP has been developed to reflect the national and international growth of Santos.

The Moomba and SWQ Emergency Plans have undergone a major review and re-write in 2013 incorporating both plans into one “Cooper Basin Emergency Response Plan”. The plan is in final review due to be released February 2014.

Detailed, scenario based emergency response procedures have been developed and implemented under the Santos Incident Management Plan to guide personnel in emergency incident response.

Emergency response drills are regularly held in order to continuously update plans and maintain a high degree of readiness among personnel.

In the event of the emergency response procedures being used in response to an actual event, a debrief of all relevant parties is conducted in order to ensure learning’s are incorporated into the plans.

A Business Impact Assessment (IA) has been conducted for Moomba and Adelaide-based infrastructure in accordance with new Business Continuity Planning arrangements for Santos.

9.3 EMERGENCY RESPONSE DRILLS

A listing of drills held during 2013 is contained in Appendix 3.

Emergency Services conducted a number of Drills, Exercises and Desktop Exercises in 2013 including Evacuation Drills, Muster Point Training, Operational Exercises, EOC Training and Exercises, SAR Exercises and CSE Training and Rescue Rehearsals etc.

An agreement with DMITRE provides for a summary within this report with regard to the requirements of Reg 31 (5) of the Petroleum and Geothermal Energy Regulations 2013, the preparation and submission of a report after a drill.

The drills held during 2013 demonstrated the adequacy of the emergency response procedures and the competency of personnel to execute the procedures. A summary of outcomes, and any identified deficiencies and the remedial action proposed or taken is provided in the listing in Appendix 3. The following provides some additional detail on the more significant response drill Santos conducted, or participated in, during 2013.

A number of emergency response exercises were conducted during 2013 to test the adequacy of the emergency response procedures and the competency of personnel to execute the procedures.

On 28 September 2013, a Moomba major plant emergency response exercise was conducted to test procedures for responding to a process emergency, and extended to a consideration of crisis management arrangements in the event of a more serious incident arising. The size and scope of the exercise was designed to ensure that all resources immediately available were utilised and/or considered, and it identified opportunities to improve emergency response training and radio communications during an emergency situation.

9.3.1 Overview Of Significant Response Drills

Moomba Plant Major Exercise

The 2013 Major plant exercise for the Moomba plant was an operational exercise (OPREX) designed to analyse the effectiveness of established emergency response procedures, strategic decisions made by the Emergency Response Team within the EOC and tactics employed by the combatants at the location of the emergency. Under review will also be the effectiveness of evacuation procedures for a major hazardous facility.

Incident Scenario

Two maintenance contractors arrive at Gate 10 and prepare to swipe in entry to the Plant. They observe a white cloud, approximately the size of a vehicle, emanating from the pipework at the base of the Nitrogen storage vessels and a Process Operator lying motionless on the roadway to the

North of the Nitrogen storage area. One maintenance contractor raises the alarm and the second contractor goes to render assistance to the collapsed Process Operator.

Whilst raising the alarm, the first maintenance contractor observes the other contractor collapse to the ground near the Process Operator. Both the Process Operator and the maintenance contractor are lying motionless and their gas detectors are in alarm.

Both casualties will be simulated with training manikins to mitigate any casualty handling issues and will be found to be deceased.

There were eight defined objectives for the exercise to be measured against.

- To validate the effectiveness of the current Moomba Emergency Plan, Emergency Response Procedures and the Moomba Plant Contingency Pre-Plan.
- Measure the effectiveness of call, receive and dispatch procedures and relevant notifications.
- Measure the effectiveness of first response capabilities and training.
- To employ HAZMAT and rescue tactics to provide continuous improvement opportunities for Emergency Services Officers and Process Personnel.
- Provide the opportunity to practise casualty assessment, treatment and transportation.
- To present the Moomba Emergency Response Team with a scenario that will require the implementation of the Moomba Emergency Plan, strategic management and support of the emergency.
- Manage any environmental concerns from the emergency.
- Identify any weakness in the plans, procedures and training so actions can be assigned to rectify any potential issues.

Emergency Operations Centre Exercises

A number of EOC exercises were conducted throughout 2013 covering both the primary EOC and the alternate EOC.

These exercises were designed to practise established emergency response procedures and individual roles and responsibilities within the Emergency Operations Centre during the time of an incident.

There were a number of objectives detailed for each individual exercise which was reported directly against in the associated exercise debriefs and reports.

In addition the Moomba EOC was initiated and fully operational during the Moomba Plant Major Exercise.

Cooper Basin Camp Evacuation Exercises

Camp evacuation exercises were also conducted across Santos sites including a night exercise at the Moomba FC47 and newly opened 60/70 Operations Camps. This exercise was designated as an OPREX as per the 2013 Cooper Basin Emergency Exercise Schedule, which is a requirement under EHSMS13 – Emergency Preparedness. The night exercise presented a set of circumstances not able to be accomplished during day time exercises namely a full camp of greater than 700 personnel and evacuation of communal areas such as the Wet Mess and recreation facilities whilst fully occupied etc.

There were four defined objectives for the Moomba FC 47/60/70 Operations Camp Night Exercise to be measured against

- Assess the effectiveness of evacuation procedures for the FC 47/60/70 camp.
- Practice and assess the operation of the Muster point at the FC 47/60/70 camp.
- Practice and assess procedures for activation of the multiple manual siren activation points.
- Practice and assess procedures for clearance of the FC47/60/70 accommodation vans within acceptable time frames (40 minutes).
- Provide a skills maintenance training opportunity for Spotless and Santos camp personnel.

Tirrawarra

This exercise will be an Operational Exercise (OPREX), designed to practice established emergency response procedures and individuals skills in relation to Communications, Search & Rescue Procedures, Vehicle accident management and casualty management as required by EHSMS 13 EMERGENCY PREPAREDNESS.

The aim of this exercise is to practise and refine emergency management arrangements in the event of an incident occurring within the Tirrawarra Environs and or field.

Scenario

At 09:00 hours Saturday Moomba Communications are contacted via radio by an operator working in the Tirrawarra field, reporting an accident involving a Santos vehicle with casualties.

Search and rescue procedures are activated by Moomba Communications from the information provided by the caller. The Caller will provide GPS coordinates of the accident location.
All Santos Emergency response procedures are to follow.

Objectives

- Assess onsite staffs ability to manage an Emergency Situation.
- Provide a training opportunity for the OFA on site.
- To assess the effectiveness of raising the alarm through to Moomba Communications.
- Assess staff's ability to safely render assistance during a vehicle accident.
- Provide an opportunity for Heli-West to practice Search and Rescue procedures.

Limestone creek – Medical

This exercise will be an operational exercise (OPREX), designed to practice established emergency response procedures and individual skills in relation to a response to a medical emergency in the Limestone Creek production satellite as required by EHSMS 13 EMERGENCY PREPAREDNESS.

Scenario

The Area operator will be told that his work colleague is experiencing tightness in the chest, he has shallow breathing and requires First Aid and monitoring until RFDS arrive on site. After being cared for by his work colleague, he falls unconscious and stops breathing.

Objectives

- To practice and assess the appropriate notifications and information transfer from the Limestone Creek site back to the Moomba Communications Centre in the event of such an emergency taking place.
- Provide a skills maintenance opportunity for Production Department personnel in First Aid treatment of the patient prior to RFDS arriving on site.
- Skills maintenance on the use of onsite Defibrillator.

Moomba Aerodrome Emergency Exercise (DISCEX)

This exercise is a discussion exercise designed to extract high levels of knowledge from more experienced personnel and enlighten new personnel of company policies in the event of emergencies, equipment locations, roles and responsibilities, first aid and emergency control. This exercise is a requirement of EHSMS 13 EMERGENCY PREPARDNESS.

Civil Aviation Safety Authority (CASA) regulation 139.215
EHSMS 13 EMERGENCY PREPAREDNESS.

CASA regulations require a full scale Aerodrome Emergency Exercise at intervals not exceeding 24 months.

Scenario

Flight NC11 has landed in Moomba and taxied onto the apron and parked with its nose pointing to the East. Ground staff are in the process of placing the stairs into position and the luggage trolleys have been brought alongside in preparation for unloading baggage.

The refueller truck has stopped in position to add fuel to the starboard wing tank. The portable scaffold has been positioned and the pressure connector has been attached to the underside of the wing. The earth strap is connected to the aircraft and the supply hose from the truck is then connected to the portable scaffold. The refueller commences to pump fuel into the aircraft and notices what appears to be fuel leaking from the connection into the portable scaffold.

He moves forward to investigate and as he does so, an o-ring fails, spraying jet-A1 onto the refueller and towards the rear of the hot outboard turbine. A flash fire occurs, engulfing the refueller and the failed connector. The refueller is able to ESD the refuelling operation and the fire is quickly extinguished by ground staff using DCP extinguishers. The refueller suffers second degree burns to hands, forearms and chest, with first degree burns to face and suspected injury to respiratory organs.

Damage is sustained to the refuelling connections and there are visible scorch marks on the nacelle. Dry Chemical powder is visible on the nacelle and compressor blades.

None of the 72 persons on board have disembarked the aircraft but many have observed what has just occurred.

The temperature at the Moomba Aerodrome is 38 degrees with a South East wind 10 km/h gusting to 20 km/h.

Objectives

- To evaluate the situation at hand and promptly notify the correct personnel.
- Ensure correct on site personnel are informed and responded as required.
- Ensure all relevant communications are made to Santos management and Government agencies.
- Develop an incident action plan and plan for business continuity.
- Manage medical requirements and evacuation plans.
- Consider all other flow on effects from the immediate emergency.

9.4 EMERGENCY RESPONSE

In addition to planned drills, the Moomba emergency response resources were activated on a number of occasions in 2013. The majority of these were in response to Alarm Calls or as a precaution following a minor incident. The more significant response events that resulted in activation of the Moomba ERP included:

Small Grass Fire base of the HP Flare 05/02/2013
Truck Fire Innamincka Rd 18/03/2013
Crude Tanker Fire 24/08/2013 (Non Santos Related)
28 Moomba environs incidents (Majority Non Santos Related) included Medical Assists, Truck Brake Fire, Vehicle Accidents, Aircraft accidents and 3rd party Search & Rescue.

In addition there were a couple of incidents in SWQ requiring full implementation of the Santos ERP including the Moomba EOC Santos IMT and CMT.

Bushfires continued throughout 2013 in the Cooper Basin.
Unusually high levels of native vegetation resulting from two consecutive wet seasons 2009-2011 with above average rainfall have led to a number of large bushfires throughout the Cooper Basin. Santos emergency resources were deployed for these fires to protect Santos assets and assist pastoralists as requested. No Santos assets have been damaged during these fire emergencies.

In all cases, the response systems operated effectively.

Santos helps within the general community by assisting with Vehicle Accidents, Aircraft Accidents, Medivacs, Search and Rescues and response to activated Emergency Position Indicating Radio Beacons (EPIRB's). Santos also provides emergency assistance at community events.

9.4.1 Emergency Response Equipment

The equipment for a well-site incident was reviewed and evaluated. CUDD Well Control were involved in this process and recommended an increase in the standby equipment held in the Cooper Basin. This recommendation was accepted and the equipment sourced and is stored in Jackson

10. GENERAL

10.1 LOCAL COMMUNITY INVOLVEMENT

During this reporting period, Santos continued to be actively involved with the local community associated with various events and issues which impact this community. This involvement ranged from facilitating and participating in local sporting and fund-raising events, to active involvement in various local Committees and groups, such as:

- "Local" events
    - Innamincka races.
    - Cooper Cup
- Emergency and other assistance to local community
- Cooper Creek Catchment Committees
- South Australia Arid Lands Natural Resources Management Board, and
- Active support of RFDS

11. SEISMIC EXPLORATION

During 2013, the following seismic activity was carried out:

- CPSAN13B 3D Seismic Survey (Gaschnitz 3D) recorded in Santos PPL's 17, 80 & 101.
- CPSAN13C Micro Seismic Survey (Cowralli Micro Seismic) recorded in Santos PPL's 6, 91 & 140 and PEL 513.

11.1 Summary of Activities

The **CPSAN13B 3D Seismic Survey (Gaschnitz 3D)** totalled 122.88 sq km of which all was acquired in the SACBJV PPLs. The breakdown of square kilometres in each Licence is provided in Appendix 9.

The CPSAN13B Gaschnitz 3D seismic survey was recorded in the semi-arid region of northeast South Australia, immediately south / south west of the Cooper Creek. Two distinct landforms dominate the area covered by the survey. To the south and the west, the predominant landform is that of dune field. To the north and north east, the predominant landform is floodplain.

The dune field is characterised by a series of north – south trending, sub-parallel dunes separated by swales that vary from a hundred to over a thousand metres in width. Dunes are buff/orange in colour and most are asymmetrically in shape with a steep eastern slope. They range in height from 5m to 30m above the general base level.

The floodplain consists of heavy grey clay with minor to massive crabhole development.

The survey was entirely within the Gidgealpa Pastoral Lease, and overlapped both Dieri and Yandruwahnda / Yawarrawarrka Native Title Claims. Separate Cultural heritage clearances were conducted by a team of representatives of the Dieri and Yandruwahnda / Yawarrawarrka people working in a pre-clearance mode, that is, the entire survey area was inspected prior to the commencement of any Santos operations.

Cultural Heritage clearance Dieri:	17th May – 20th May 2013
Cultural Heritage clearance YY:	25th May – 29th May 2013
Line preparation:	5th July – 20th July 2013

Surveying/Pegging:	6th July – 19th July 2013
Recording period (inc layout/pickup):	27th July – 8th August 2013
Restoration:	20th November 2013

The CPSAN13C Micro Seismic Survey (Cowralli Micro Seismic) totalled 42.24 linear km of which 39.50km was acquired in the SACBJV PPLs and 2.74km was acquired in PEL 513. The breakdown of linear kilometres in each Licence is provided in Appendix 9.

The CPSAN13C Cowralli Micro Seismic survey was recorded in the semi-arid region of northeast South Australia, approximately 30km northwest of the Moomba Gas facility and 8km north of the Gidgealpa Gas Satellite.

The survey area falls within a dune field land system. The dune field is characterised by a series of north – south trending, sub-parallel dunes separated by swales that vary from a hundred to several thousand metres in width. Dunes are buff/orange in colour and most are asymmetrically in shape with a steep eastern slope. They range in height from 5m to 20m above the general base level.

The survey was entirely within the Gidgealpa Pastoral Lease, and the Dieri Native Title Claim. A cultural heritage clearance was conducted by a team of representatives of the Dieri people working in a pre-clearance mode, that is, the entire survey area was inspected prior to the commencement of any Santos operations.

Cultural Heritage clearance Dieri:	20th – 22nd September 2013
Line preparation:	15th –17th October 2013
Surveying/Pegging:	15th – 17th October 2013
Recording period (inc layout/pickup):	17th October – 20th November 2013
Restoration:	20th – 21st November 2013

11.2 Restoration

Restoration on the CPSAN13B Gaschnitz 3D was conducted in two parts. Fence line access and roads where restored where required, primarily to remove visible wheel tracks. Additional restoration of road verges and lines adjacent roads was undertaken in mid-November following evidence that third parties were accessing the lines from public roads.

Restoration on the CPSAN13C Cowralli Micro Seismic Survey was conducted immediately after recording operations were completed. Only minimal work was required and was limited to scarifying compacted and deeply rutted sections of seismic lines.

11.3 SIGNIFICANT OPERATIONS PROPOSED FOR 2014

- Moomba North Micro Seismic Survey
- Roswell Micro Seismic Survey
- Aurora Tilt Meter Survey

11.4 ENVIRONMENTAL MONITORING

The following is a brief summary of the standards followed and Environmental Monitoring Points set up and revisited.

11.4.1 Standards

- SA Cooper Basin & Arid Regions, Statement of Environmental Objectives: Geophysical Operations July 2012
- A Cooper Basin & Arid Regions, Environmental Impact Report: Geophysical operations July 2012
- Dozer Manual - Environmental Procedures for Seismic Line Preparation Nov 1998
- Goal Attainment System (GAS) – included in the SEO July 2012
- Environmental Procedures for the Management of Aboriginal
- Heritage Sites 1998.

11.4.2 Environmental Monitoring Points Set Up

Proposed Gaschnitz 3D environmental monitoring point (EMP) locations were located from the aerial map / programme overlay. The final location of each EMP however was determined by the Santos site representatives upon a ground inspection and accessibility. The locations are governed by the objective of monitoring terrain and vegetation impact. The five EMPs are located near roads to provide current and future access without any detrimental impact upon the landscape.

CPSAN13B (Gaschnitz 3D)
Five EMPs were established and recorded within the 3D survey area.

EMP #	Surveyed East	Surveyed North	Location	Comments
EMP #1	416765	6924453	R1176 : S5015.5	Floodplain / dune boundary
EMP #2	420365	6921653	R1120 : S5087.5	floodplain
EMP #3	423965	6922453	R1136 : S5159.5	Floodplain / dune boundary
EMP #4	425366	6926835	R1224 : S5207.5	Floodplain / creek / vegetation
EMP #5	427162	6916452	R1016 : S5223.5	Dunes / dune boundary

The EMP report for Gaschnitz 3D was delivered to DMITRE 27/11/13.

11.4.3 Environmental Monitoring Points Revisits

Santos has the practice of revisiting EMP locations at irregular intervals until the sites have recovered to a level that is not discernible from the surrounding terrain.

During 2013, there were five 3D surveys re-visited within SA:

CPSAN12	Greater Leleptian 3D	18/7/13
SA983D	MEI 3D Extn	21/7/13
CPSN09	Tallerangie 3D	23/7/13
CPSN07	Tirrawarra 3D	21/7/13
CPSN07B	Spencer/Kiana/Muteroo 3D	18/7/13

The updated EMP reports have not yet been completed.

11.4.4 Environmental Report Forms

Environmental Report Forms (ERFs) are produced by the field crew members to highlight field practices. Reports are forwarded through the Santos Environment Department.

No ERFs were produced during the reporting period.

Environmental Objectives and Performance – Geophysical Operations SEO

Environmental Objective	Assessment Criteria	Guide to How Objectives can be Achieved	Performance 2013 Report Period
Objective 1: Minimise the visual impact of operations.	**Campsite and survey line preparation** • Proposed survey lines and campsites have been appropriately located and prepared to minimise the visual impact. • The attainment of 0, +1 or +2 GAS criteria for 'visual impact' objective listed in Appendix 3.	• Pre-survey planning has been undertaken to minimise visibility of operations and records are available for audit. • Maximise use of vegetation or land forms to disguise operations. • Offset sand dune crest cuts along the length of the survey line to minimise visibility. • Avoid extensive side cuts on dune flanks. • Lessen visual impact of uphole cuttings, where they contrast with the surface, e.g. by use of appropriate colouring agents. • Avoid cutting sand dunes facing tourist access tracks. • All litter is to be disposed of correctly.	• Five EMPs (Objective 3 & Section 11) were recorded and are included in the final EMP report. • Line preparation & survey crews camped at an existing camp site for Gaschnitz 3D. Recording crew camped at a previously cleared area for a road works borrow pit. • Sand dune crests lightly cut with sand spread for recovery. No dune cuts visible from public roads. (GAS = -1, no -2 scores). Some vegetation removed for access, principally cut above ground or squashed with root stock retained. No rehabilitation is expected although ongoing monitoring will be undertaken. • 10 upholes drilled. No impact. • All rubbish removed from lines.

Environmental Objective	Assessment Criteria	Guide to How Objectives can be Achieved	Performance 2013 Report Period
Objective 2: Minimise disturbance to and contamination of soil resources.	**<u>Campsite & survey line preparation</u>** • Attainment of 0, +1 or +2 GAS criteria for 'Minimise impacts to land surface' objective, as listed in Appendix 3. • Proposed survey lines and campsites have been appropriately located and prepared to minimise the disturbance to soil resources. **<u>Fuel Storage and Handling</u>** No refuelling occurs outside designated refuelling/servicing areas. Spills or leaks are immediately reported and clean up actions initiated. Records of spill events and corrective actions are maintained in accordance with company procedures. Appropriate spill response equipment is available on site.	• Pre-survey planning has been undertaken to minimise impacts of operations and records are available for audit. • Survey line preparation techniques are monitored and documented to minimise soil disturbance, particularly in gibber and floodplain/wetland terrains. • Gibber mantle has not been removed in gibber and tableland land systems. • Gibber surface is not ripped at campsites. • Any requirement to traverse sensitive land systems and the method of managing the impacts should be justified in accordance with company procedures. Any records should be available for audit. • There is no evidence of off-road driving or creation of shortcuts. • No survey line or access track preparation is carried out on salt lakes. • Areas subject to inundation have been assessed for conduciveness to support vehicles. • Oil spills areas have been ripped to an appropriate depth.	• No cases of soil contamination reported. • Line preparation / survey crews and recording crews camped at an existing disturbed site. • Only minimal rehab was required on completion- no drainage pits had been dug, no wheel ruts visible after restoration. • No fuel spills reported. • Bulk fuel storage kept away from camp.

Environmental Objective	Assessment Criteria	Guide to How Objectives can be Achieved	Performance 2013 Report Period
Objective 3: Minimise disturbance to native vegetation and fauna.	**Campsite and survey line preparation** • The attainment of 0, +1 or +2 GAS criteria for 'Impact on native vegetation' objective listed in Appendix 3. • No mature trees are removed. • Vehicle access to survey lines is to be via existing access tracks or pre-existing survey lines, except where they have rehabilitated. Other temporary access tracks may be utilised where such use is likely to result in less environmental impact than other options. **Fuel and Chemical Storage and Management** Refer to assessment criteria for objective. **Fire Danger Season restrictions & education** All personnel are fully informed on the fire danger season and associated restrictions.	• Terrain and vegetation is considered in planning stage when designing layout of the survey. • Records of vegetation clearance/habitat disturbance are kept and available for auditing. • Appropriately trained and experienced personnel have scouted proposed survey lines access tracks and campsites. • Native vegetation clearance has been minimised and the conservation needs of particular species have been considered. • Campsites are established in locations where the preparation of a new access track is not necessary. Waste Management • Covered bins are provided for the collection and storage of wastes. • All loads of rubbish are covered during transport to the central waste facility. **Fire Danger Season restrictions & education** • Include Fire Season education as part of the induction.	• Line preparation / survey crews and recording crews camped at an existing disturbed site. • Only minimal rehab was required on completion- no drainage pits had been dug, no wheel ruts visible on line after restoration. • Waste stored in covered bins on camp and transported to Moomba for disposal. • Fire risk was extreme on prospect. Fire risk addressed during planning and daily at toolbox meetings. No fire incidents occurred as a result of survey. • Five EMPs established. Final report delivered 27/11/13. GAS scores included within the EMP report.
Objective 4: Avoid disturbance to sites of cultural and heritage significance.	The following is one possible procedure to achieve the objective: • Appropriately trained and experienced cultural/heritage advisors have scouted proposed survey line locations and access tracks. • The operator has a mechanism in place to appropriately report and respond to any sites discovered during survey operations. • Any sites identified have been flagged and subsequently avoided. ***Note:*** Where a negotiated agreement or determination for heritage is in place, compliance with the negotiated agreement or determination takes precedence over the above criteria. The EIR details this possible procedure.	The possible procedure may well be achieved by the following; • Documents and/or reports of scouting for cultural/heritage are available for audit. • Environmental Report Forms (ERF) to be completed for any sites or artefacts identified. • The ERFs relating to Aboriginal sites are forwarded to Department for Aboriginal Affairs and Reconciliation (DAARE). ***Note***: Where a negotiated agreement or determination for heritage is in place, provisions may include that appropriately trained and experienced cultural/heritage advisors will carry out a Work Area Clearance (WAC) and produce a report for sites of cultural and heritage significance before commencement of line preparation. This provision will take precedence over the above guideline. The EIR details these criteria for the possible procedure.	• Cultural Heritage clearance was completed by the Dieri & YY people. The entire survey area was pre-cleared. • A 50m corridor (25m either side of the programmed line) was cleared on the design access line location. Experienced dozer operators were used - all well versed in spotting sites as a backup. • Multiple Sites were recorded and flagged off, particularly around the various waterholes. Detour routes were made around the sites. • No non-conformance occurred.

Environmental Objective	Assessment Criteria	Guide to How Objectives can be Achieved	Performance 2013 Report Period
Objective 5: Minimise disturbance to livestock, pastoral infrastructure and landholders.	• The attainment of 0, +1 or +2 GAS criteria for 'Impact on infrastructure' objective listed in Appendix 3. • No reasonable concerns raised by stakeholders are left unresolved. • The extent to which the relevant sections of the Petroleum Act and Regulations have been followed and implemented and in particular in relation to landowner liaison and notification.	• Relevant landowners and occupiers are notified prior to survey of preparation of campsites, preparation of survey lines and undertaking of operations (pursuant to the Petroleum Regulations). • Compliance with requirements of the Cattle Care and Organic Beef accreditation programmes. • System is in place for logging landholder complaints to ensure that issues are addressed as appropriate. • Seismic sources are not to operate within 20 m of any pipeline, utility, installation or building. This distance may need to be larger for explosive-sources, pending size of explosive used. • Damage to station tracks is avoided. • Operations in wet weather are not allowed. • All gates are left in the condition in which they were found (i.e. open/closed). • When necessary, all fences are restored to satisfaction of landowner/managers. • Induction for all employees and contractors covers pastoral, conservation, legislation and infrastructure issues.	• Gidgealpa were officially permitted and then contacted prior to survey commencement. • Comprehensive start up meeting/induction held on crew prior to work commencing. • No problems for landholders. • Non operational zone around infrastructure set at 50m. • Gates/Grid left as found.
Objective 6: Avoid the introduction or spread of exotic species and implement control measures as necessary.	• Weeds or feral animals are not introduced into, or spread, in operational areas.	• All vehicles and equipment appropriately cleaned prior to entering the Cooper Basin. • Vehicles and equipment are to be cleaned when moving from areas within the Cooper Basin where weeds are present. • Cleaning carried out in accordance with specified company procedures and accepted practices. • Records of vehicle and equipment cleaning are kept and available for auditing. • Records of detection, monitoring or eradication of exotic weed or other pest or noxious species introduced by industry activities are kept and are available for audit.	• Crew mobilised from within Cooper Basin for projects. • No exotic weeds in previous survey area.

Environmental Objective	Assessment Criteria	Guide to How Objectives can be Achieved	Performance 2013 Report Period
Objective 7: Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources.	**Campsite and survey line preparation** • Campsites and survey lines/traverses are located and constructed to avoid diversion of water flows. • The attainment of 0, +1 or +2 GAS criteria for 'disturbance to land surface' objective listed in Appendix 3. • No uncontrolled flows to surface from aquifers intersected in upholes/shallow boreholes. • There is no unnecessary interference with natural drainage features. **Fuel Storage and Handling** • No spills occur outside of areas designed to contain them. • Refuelling occurs at least 1km from watercourses or sensitive ecological environments (wetlands). • Appropriate spill response equipment is available on site. • Spills or leaks are immediately reported and clean up actions initiated promptly.	• All access through watercourses area carefully assessed to determine the locations of least impact to channels and creek banks. • Any artesian flows are to be immediately plugged and monitored to ensure effectiveness of plug(s). • Any required remediation work carried out as soon as possible after completion of all activities • If any contamination from spillage of oils or fuel occurs during vehicular operations, immediate effective clean-up procedures must be employed.	• Line preparation / survey crews and recording crews camped at an existing disturbed site. • Prospect area was floodplain with sand dunes. Particular attention was paid to line preparation around watercourses. Santos conducted and environment audit during the survey and the crew were complimented on their work around the watercourses. No water courses impacted. • No soil contamination was reported to have occurred.
Objective 8: Optimise waste reduction and recovery.	• Wastes are segregated, burnt or transported to an Environment Protection Authority (EPA) approved waste disposal facility for recycling or burial in accordance with approved procedures. • 0, +1 or +2 GAS criteria are attained for 'Negligible survey markers and rubbish in situ' objective listed in Appendix 3.	• Production of waste is minimised by purchasing biodegradable or recyclable materials where practical.	• Waste transported to Moomba. • GAS audit indicated all rubbish, pin flags and pegs were collected and removed from the area.

12. DRILLING AND WELL OPERATIONS

12.1 WELLSITE, CAMPSITE, BORROW PIT and ACCESS TRACK CONSTRUCTION & RESTORATION

During this reporting period, 30 wellsite leases were either constructed (5 of these leases were multi-well pads) or in the processes of being constructed which included 57.65 km of new tracks to provide access to these sites. A total of 57 borrow pits were necessary to provide fill for the tracks and leases.

The drilling sites scouted, constructed, backfilled and restored are listed in Appendix 4.

Partial restoration of drilling leases was carried out on 31 well pads during 2013. 4.5km of track and 3 borrow pits were restored. No borrow pits were sought by landholders.

Close consultation was maintained with pastoral lessees and National Parks rangers to ensure their interests and any issues raised remained high in consideration when conducting petroleum activities.

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

12.2 DRILLING OPERATIONS

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.

A total of 37 wells were drilled by the SACBJV. All were cased and suspended for later completion. There were also 4 wells drilled in PEL 114 by Santos.

A list of wells drilled by the SACBJV and Santos in 2013 is provided in Appendix 11.

12.3 DRILLING ACTIVITY – 2014

The major activity planned for 2014 (numbers indicated are only approximate) includes the following:

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

12.4 WELL COMPLETION, WORKOVER, PRODUCTION, SUSPENSION and ABANDONMENT

There were 127 individual workover operations conducted during 2013. This involved 64 Fracture Stimulation operations. Workover activities included pump repairs, well completion or re-completion, Integrity repairs, and conversions. These activities are listed in Appendix 5.

At the end of this reporting period there were a total of 534 oil (228 producing) and 1124 gas or gas/oil (544 producing) Santos operated wells. 953 wells (producing, inactive or suspended) were subject to casing annulus pressure testing. Appendix 6 provides additional details.

12.4.1 Monitoring of Wells

Monitoring of well casing annuli pressure continued. Available data was reviewed and risk assessments completed to determine the best means to effectively mitigate the risk of these wells. The number of high, substantial and moderate risk wells is as follows:

- One well is rated as a Level 4 (High risk), Muteroo 4.
- 79 wells were rated as Level 3 (Substantial risk).
- 459 wells were rated as Level 2 (Moderate risk).

Appendix 6 provides additional details.

12.5 WELL TESTING, COMPLETION and WORKOVER ACTIVITY – 2014

The corrosion monitoring and annulus pressure testing program will continue in 2014, testing both oil and gas wells.

12.6 WELL/LEASE ABANDONMENT

One lease abandonment is planned for 2014, Pirraminta 1.

12.7 DOWNHOLE WELL ABANDONMENT – 2013

One well was abandoned in 2013, Pirraminta 1.

12.8 DOWNHOLE WELL ABANDONMENT – 2014

There are 2 downhole abandonments planned for in the 2014 work program.

Environmental Objectives and Performance – Drilling and Well Operations SEO

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 1: Minimise the risk to public and other third parties.	• Reasonable measures implemented to ensure no injuries to the public or third parties.	▪ All employees and contractor personnel complete a safety induction prior to commencement of work in the field. ▪ All employees and contractor personnel undertake a refresher induction every 2 years. ▪ Signage in place to warn third parties of access restrictions to operational areas, with particular warnings when potentially dangerous operations are being undertaken. ▪ Necessary measures (e.g. signage/fencing) taken to prevent the public accessing the wellhead equipment or waste relating to a given well. ▪ Demobilisation inspections undertaken at random to ensure that backfilling and waste removal requirements are met. ▪ Permit to work systems in place for staff and contractors in dangerous situations. ▪ All appropriate PPE (personnel protective equipment) is issued and available as required in accordance with company operating requirements and applicable standards. ▪ Effective Emergency Response Plan (ERP) and procedures are in place in the event of a fire or explosion; Annual exercise of ERP. ▪ 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. ▪ Compliance with relevant speed restrictions on access roads and tracks. ▪ 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. ▪ Ensuring safety management plans are updated and reviewed. ▪ Wastewater disposal in accordance with Objective 11.	There were no injuries to the public or any third parties arising from Drilling and Well operations in 2013. All Santos and Santos Contract employees attend a compulsory safety induction prior to commencing work. Refresher training is provided at regular intervals. Signs are installed at strategic locations in the operating area to deter the public from accessing drilling and production areas and when potentially hazardous tasks are undertaken. A specific Wellsite Permit-to-Work system is used to manage workplace / worksite safety. Personnel are provided with the relevant, approved PPE when undertaking potentially hazardous tasks. Emergency Response Plans and procedures are in place. These procedures are regularly exercised with identified improvements included into the ERPs. Relevant parties are advised of potentially hazardous operations before they are undertaken. An electronic accident and incident recording system is used to report and monitor accidents, incidents and trends. Safety Management Plans, including KPIs, have been developed and introduced by Santos and its contractors. These are regularly reviewed and updated.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 2: Minimise disturbance and avoid contamination to soil.	Well Site and Access Track Construction ▪ 0, +1 or +2 GAS criteria are attained for "Minimise impacts on soil" objective as listed in Appendix 1 Table A1 and "To minimise the visual impact" as listed in Appendix 1 Table A2. ▪ No unauthorised off-road driving or creation of shortcuts. ▪ No construction activities are carried out on salt lakes or steep tableland slopes (as defined in EIR).	Well Site and Access Track Construction ▪ Consider alternate routes during planning phase to minimise environmental impacts. ▪ Use existing routes / disturbed ground where practicable. ▪ Gibber mantle on access tracks and well sites (excluding sumps) is not removed where possible, only rolled, in gibber and tableland land systems. Gibber mantle reinstated where appropriate during restoration. ▪ Topsoil stockpiled (including gibber mantle) from sump construction and respread (and gibber recompacted) on abandonment. ▪ The need to traverse sensitive land systems and the methods of managing the impacts must be justified in accordance with company procedures, recorded and available for auditing.	Soil disturbance is minimised wherever possible. Rootstock is left intact and topsoil is stockpiled for respreading during site restoration. Managing off-road driving is done by inductions and regular communications to all Santos related personnel. Alternate routes are considered in planning. Work is restricted to ROW. No construction activity is carried out on salt lakes, steep tablelands or wetland systems during times of flow or inundation. Audits of construction activities are undertaken and there is a high level of confidence in environmental performance. .
	Borrow pit construction and restoration ▪ 0, +1 or +2 GAS criteria are attained for "Minimise visual impacts', and "Minimise impact on soil" objectives as listed in Appendix 1 Table A3.	Borrow pit construction and restoration ▪ Existing borrow pits to be re-used where practicable. ▪ Siting of new borrow pits to avoid sloped areas and gibber as far as practicable. ▪ Topsoil stockpiled (including gibber mantle) and respread on abandonment (gibber to be recompacted).	Installation of new borrow pits is minimised by reusing suitable existing borrow pits where practicable. Where borrow pits are exhausted restoration works are undertaken to meet relevant GAS criteria.
	Production Testing/Well Blowdowns ▪ No soil contamination as a result of production testing or well blowdown operations.	Production Testing / Well Blowdowns ▪ If appropriate use: - impermeable or clay lined flare pit to flare / contain hydrocarbons. - flare tanks.	Gas wells post fracture stimulation activities remained largely steady with dry gas wells typically flowing between 4 to 5 days to atmosphere (flaring where possible). Liquids rich gas wells were flowed for similar periods, however separators were used to capture liquids and flare gas. Various types of separators are being trialled the intention being to capture all produced fluids from completion clean up.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 2 cont: Minimise disturbance and avoid contamination to soil.	Fuel and Chemical Storage and Handling ▪ No spills/leaks outside of areas designed to contain them. ▪ Level of hydrocarbon continually decreasing for in situ remediation of spills. ▪ Soils remediated to a level as determined by the SHI process. ▪ Also refer to Objective 12. Waste Disposal (domestic, sewage and sludges) ▪ All domestic wastes are disposed of in accordance with EPA licensing requirements. ▪ 0, +1 or +2 GAS criteria are attained for "Site to be left in a clean and tidy condition" objective listed in Appendix 1 Table A2. ▪ No spills or leaks from sewage treatment processing. ▪ Refer to Assessment Criteria for Objective 11.	Fuel and Chemical Storage and Handling ▪ All fuel, oil and chemical storages bunded in accordance with the appropriate standards and guidelines e.g. EPA guideline *080/07 Bunding and Spill Management*. ▪ Records of spill events and corrective actions maintained in accordance with company procedures. ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ 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). ▪ Chemical and fuel storage procedures, including signage, are reviewed and monitored in audit process. Spill Response / Contingency Planning ▪ Results of emergency response procedures carried out in accordance with Regulation 31 show that an 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. ▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas. ▪ Spill response equipment is audited annually. ▪ Annual spill response training exercise / rehearsal is undertaken. ▪ Spills or leaks are immediately reported and clean up actions initiated. Waste Disposal (domestic, sewage and sludges) ▪ Covered bins are provided for the collection and storage of wastes. ▪ All loads of rubbish are covered during transport to the central waste facility. ▪ Approved transportable Aerated Wastewater Treatment Plants (AWTPs) used for rigs/camps (once approved AWTPs are available from a supplier suitable to Santos[1]). Interim controls for management of sewage effluent (developed in consultation with the Department of Health) implemented[1]. ▪ Use of permanent septic systems with camps where possible ▪ Refer to Objective 11.	No spills occurred outside areas designed to contain them. SACBJV learnings from Incidents were reviewed to enable improvement strategies to be identified and are applied to other Santos operated PEL and PPLs. No impacts to shallow groundwater were identified. 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. Domestic wastes are disposed of in accordance with EPA License Requirements. Audits indicate good waste management practice. All waste containers are covered during Transport. New landfill cell completed and approved by EPA. Landfill cells are located only at Authorised facilities and are fenced to prohibit stock and wildlife access. There were no reportable incidents associated with sewage management equipment or facilities.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 3: Avoid the introduction or spread of pest plants and animals and implement control measures as necessary.	▪ No weeds or feral animals are introduced to, or spread in, operational areas as a consequence of activities.	▪ Where appropriate a weed and feral animal management strategy is in place (avoidance and control strategies). ▪ Rig and vehicle wash downs are initiated in accordance with the management strategy.	Weed and feral animal strategies are in place. There is limited evidence of the introduction of weeds or feral animals. Vehicles and rig equipment is managed in accordance with site specific pest plant management strategy.
Objective 4: Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	Well Lease and Access Track Construction ▪ Well sites 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). Drilling Mud Sumps and Flare Pits ▪ No overflow of drill cuttings, muds and other drilling fluids from mud sumps. ▪ No waste material disposal to sumps and flare pits. Well Heads (Oil and Gas Systems) ▪ No leaks/spills outside of areas designed to contain them.	Well Lease and Access Track Construction ▪ Sensitive land systems (e.g. wetlands) avoided wherever possible. Where activities are undertaken in or near these areas, appropriate review, assessment and mitigation measures are in place to ensure that surface water flows are maintained and contamination of surface water and groundwater is avoided. Drilling Mud Sumps and Flare Pits ▪ 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. Well Heads (Oil and Gas Systems) ▪ Where appropriate, imperviously lined well cellars are installed on oil wells. ▪ Bunds / containment devices are installed on gas well skids. ▪ Well heads shut in and chemicals removed prior to flood events. ▪ Jet pumps are installed within containment device with an adequately sized containment sump.	Drainage channels are maintained and or diverted to minimise impacts to natural drainage patterns associated with well leases, access tracks and road construction. Work programs are modified to avoid periods of flooding and other seasonal influences and variations. No overflow of drilling mud sumps occurred. No waste material is disposed of in drilling mud sumps or flare pits. Automatic shutdown of wellhead pumps investigated and devices continue to be progressively fitted to all beam pumps to shutdown pump if Polished rod packer fails. Hi-Lo devices are fitted to all new gas well completions for automatic shutdown, and existing wells are under review with retrofitting of hi-lo devices as required. Jet-pumps are installed with 9M3 sumps.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 4 cont Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	Well Blowdown/Production Testing ▪ No water (surface or groundwater) contamination as a result of production testing or well blowdown operations. Fuel/Chemical Storage and Handling ▪ No water (surface or groundwater) contamination as a result of fuel or chemical storage and handling.	Well Blowdown/Production Testing ▪ Activity is conducted in accordance with accepted industry standards / good oilfield practice. ▪ If appropriate use: - impermeable / clay lined flare pit - flare tanks - separators - supervision. Fuel and Chemical Storage and Handling ▪ All fuel, oil and chemical storages bunded in accordance with the appropriate standards (e.g. AS 1940 and EPA guideline *080/07 Bunding and Spill Management*). ▪ Records of spill events and corrective actions maintained in accordance with company procedures. ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ 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). ▪ Chemical and fuel storage procedures, including signage, are reviewed and monitored in audit process. Waste Management ▪ Refer to Objective 11. Spill Response / Contingency Planning ▪ 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. ▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas. ▪ Spill response equipment is audited annually. ▪ Annual spill response training exercise / rehearsal is undertaken.	See Objective 2 above. Records of spills are maintained. Spills which occurred outside areas designed to contain them are reported at quarterly meetings. Spills are reported in accordance with legislative requirements. Incident registers are reviewed to determine areas requiring improvement and to ensure ongoing improvement. Hydrocarbon contaminated soils were removed to authorised Cooper Basin temporary land farms. No impacts to shallow groundwater were identified. Emergency response procedures for spill response are in place and regularly exercised. Learnings from exercises and actual events are included in Plans. Oil Spill Plans are up-to-date. Spill response equipment and procedures are checked as part of everyday operations and are included in the audit schedule.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 5: Avoid disturbance to sites of cultural and heritage significance.	▪ Proposed well sites and access tracks have been surveyed and any sites of Aboriginal and non-Aboriginal heritage identified. ▪ *Any identified cultural and heritage sites have been avoided.*	▪ Consultation with stakeholders (i.e. government agencies, landholders etc) in relation to the possible existence of heritage sites, as necessary. ▪ Heritage report forms completed for any sites or artefacts identified, and report forms forwarded to the Aboriginal Heritage Branch, Aboriginal Affairs and Reconciliation Division (AARD). ▪ Survey records are kept and are available for auditing. ▪ Areas requiring remediation which lie outside previously surveyed sites should be surveyed in accordance with company heritage clearance procedures. ▪ A procedure is in place for the appropriate response to any sites discovered during drilling activities. Note: 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.	Construction sites are inspected for cultural heritage sites. Identified sites are avoided. Significant sites are fenced. Identified sites are avoided.
Objective 6: Minimise loss of aquifer pressures and avoid aquifer contamination.	Drilling & Completion Activities ▪ There is no uncontrolled flow to surface (blow out). ▪ Sufficient barriers exist in casing annulus to prevent crossflow between separate aquifers or hydrocarbon reservoirs. ▪ Relevant government approval obtained for abandonment of any radioactive tool left downhole.	Drilling & Completion Activities ▪ A competent cement bond between aquifer and hydrocarbon reservoirs is demonstrated. ▪ 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 & SAALNRM Board to determine if lack of cement or poor bond will cause or has caused damaging crossflow which needs to be remediated.	There were no well bore failures reported in 2013.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 6 Cont: Minimise loss of aquifer pressures and avoid aquifer contamination	Producing, Injection, Inactive and Abandoned Wells • No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by DFW.	Producing, Injection and Inactive Wells ▪ Monitoring programs implemented (e.g. through well logs, pressure measurements, casing integrity measurements and corrosion monitoring programs) to assess condition of casing and cross-flow behind casing. ▪ Casing annulus pressures are monitored every 2 years. ▪ The condition of the primary casing barrier is adequate. ▪ For cases where crossflow is detected, a risk assessment incorporating the use of pressure / permeability / salinity data is undertaken in consultation with DFW & SAALNRM Board to determine if lack of cement or poor bond will cause or has caused damaging crossflow which needs to be remediated. Well Abandonment Activities ▪ Isolation barriers are set in place to ensure that crossflow, contamination or pressure reduction will not occur. ▪ 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. 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 Santos personnel using relevant available data and the SA Cooper Basin Water Pressure and Salinity Module Report (2002), and in consultation with DFW.	Corrosion monitoring, pressure measurements and casing integrity monitoring programs are undertaken in accordance with industry best practice and Santos operational procedures to determine competency and condition of well containment barriers. Wells are prioritised for workover or rig-less intervention based on condition of well barriers. Cement bond logs are run on new wells for baseline assessment of cement bond integrity.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 7: Minimise disturbance to native vegetation and native fauna.	Well Lease and Access Track Construction and Restoration ▪ Any sites with rare, vulnerable and endangered flora and fauna have been identified and avoided. ▪ 0, +1 or +2 GAS criteria are attained for "Minimise impact on vegetation" objective as listed in Appendix 1 Table A1 and "The revegetation of indigenous species" objective as listed in Appendix 1 Table A2, during well lease and access track site selection and construction and restoration. Borrow Pit Construction and Restoration ▪ 0, +1 or +2 GAS criteria are attained for "Minimise impacts on vegetation" objectives as listed in Appendix 1 Table A3 during borrow pit site selection, construction, and restoration. Waste Management ▪ Refer to assessment criteria for Objective 11. Fuel and Chemical Storage and Handling • Refer to assessment criteria for Objectives 2 and 4.	Well Lease and Access Track Construction and Restoration ▪ 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. ▪ Consider alternate routes during planning phase to minimise environmental impacts. ▪ Sensitive land systems (e.g. wetlands) avoided wherever possible. Where activities are undertaken in these areas (i.e. no practicable alternative), appropriate review, assessment and mitigation measures are in place. ▪ Facilities (e.g. borrow pits, well cellars) are designed and constructed as far as practicable to minimise fauna entrapment. ▪ Sumps and mud pits are fenced as appropriate to minimise wildlife access. ▪ Assessment records are kept and are available for auditing. ▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body. ▪ Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders. Waste Management ▪ Covered bins are provided for the collection and storage of putrescible wastes. ▪ All loads of rubbish are covered during transport to the central waste facility. ▪ Refer to Objective 11. Fuel and Chemical Storage and Handling ▪ Refer to Objectives 2 & 4. Fauna Management ▪ No domestic pets allowed at camps or worksites. Feeding of wildlife (e.g. dingoes) is not permitted.	Prior to all new lease builds, an ecological assessment is undertaken to evaluate the environmental sensitivity of the proposed lease site as well as access roads and borrow pits. Where borrow pits are exhausted, restoration works are undertaken to meet relevant GAS criteria.

Environmental Objectives	Assessment Criteria	Guide to Objectives Achievement	Performance 2013 Report Period
Objective 8: Minimise air pollution and greenhouse gas emissions.	▪ Performance to EPA requirements.	Well Testing ▪ Conduct well testing in accordance with appropriate industry accepted standards. ▪ Continually review and improve operations. ▪ Appropriate emergency response procedures are in place for the case of a gas leak. Well Blowdown ▪ Blowdown carried out in accordance with industry accepted standards / good production practice. ▪ 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.	Well testing activities are continuously reviewed for opportunities to minimise air pollution and greenhouse gas emissions. Emergency response procedures are in place, are regularly tested and improvements identified are incorporated in existing plans.
Objective 9: Maintain and enhance partnerships with the Cooper Basin community.	▪ No unresolved reasonable complaints from the community.	▪ Relevant affected parties are notified and consulted on proposed activities. ▪ Forward development plans are presented to the local community. ▪ Local community projects and events are sponsored and supported where appropriate. ▪ Industry membership of appropriate regional land management committees and boards.	Relevant parties are notified and consulted on proposed activities. There were no complaints, concerns or issues left unresolved. Local community events and activities are actively supported. Membership and active participation is made to regional management committees and Boards.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 10: Avoid or minimise disturbance to stakeholders and/or associated infrastructure.	▪ No reasonable stakeholder complaints left unresolved.	▪ Induction for all employees and contractors covers pastoral, conservation, tourism, legislation and infrastructure issues. ▪ Relevant stakeholders are notified prior to survey and construction of well sites, camp sites and access tracks and undertaking of operations (pursuant to Regulations). Borrow pits left open (unrestored) if requested by landholder and upon receipt of letter of transfer of responsibility to landholder. ▪ Gates or cattle grids are installed to a standard, consistent with pastoral infrastructure in fences where crossings are required for access. ▪ All gates left in the condition in which they were found (i.e. open/closed). ▪ Potential sources of contamination are fenced as appropriate to prevent stock access. ▪ Excavations are located and managed so as not to pose an unacceptable hazard to stock or wildlife. ▪ System is in place for logging landholder complaints to ensure that issues are addressed as appropriate. ▪ Requirements of the Cattle Care and Organic Beef accreditation programs are complied with. ▪ In recognised conservation reserves (e.g. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body (e.g. DEH).	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. No Borrow pits were formally transferred to landholders. Grids, fences, gates installed are to a standard acceptable to the landholder. All gates are left “as found”. In response to concerns regarding potential for contamination of cattle an extensive fencing of facilities program was completed in 2005 and continues to be installed and repaired as required. Landholder complaints and requests are logged to ensure closeout. There were no complaints lodged. Cattle management systems (cattle care) are recognised and complied with.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 11: Optimise waste reduction and recovery.	▪ All wastes to be disposed of at an EPA licensed facility in accordance with EPA Licence conditions, with the exception of drilling fluids, drill cuttings, other fluids disposed during well clean-up and wastewater (see below). ▪ Wastewater (sewage and grey water) disposed of in accordance with the *Public and Environmental Health (Waste Control) Regulations 1995* or to the Department of Health's satisfaction. ▪ Attainment of GAS criteria for "Site to be left in clean, tidy and safe condition" objective during well site restoration. ▪ Attainment of GAS criteria for "Site left in clean and tidy condition" objective during borrow pit restoration.	▪ Chemicals and oil are purchased in bulk. "Bulki bins" or other storage tanks are in place for large volume items. ▪ Covered bins are provided for the collection and storage of putrescible wastes. All loads of rubbish are covered during transport to a licensed waste facility. ▪ Waste streams are segregated on site to maximise opportunities for waste recovery, reuse and recycling. ▪ Coordinate covered waste transportation on backload. ▪ Production of waste is minimised by purchasing specifying reusable, biodegradable or recyclable materials in procurement, where practical. ▪ Drilling fluids, drill cuttings and other fluids are disposed of to sump on the Act licence area. ▪ Waste water (sewage) disposal is where possible in accordance with the *Public and Environmental Health (Waste Control) Regulations 1995* (which require that the waste water disposal system must either comply with the *Standard for the Construction, Installation and Operation of Septic Tank Systems in SA* or be operated to the satisfaction of the Department of Health) and the *Environment Protection (Water Quality) Policy 2003*. ▪ Grey water is disposed of to the sewage treatment system. ▪ Secondary treated sewage wastewater is disposed of onto land well away from any place from which it is reasonably likely to enter any waters, and to minimise spray drift and ponding, in accordance with clause 11 of the *Environment Protection (Water Quality) Policy 2003*.	Wastes area segregated on- site in compartmentalised bins. Chemicals, cement & inhibitors are purchased in bulk containers. All waste is managed in accordance with EPA requirements and disposed of to an approved facility.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 12: Remediate and rehabilitate operational areas to agreed standards.	▪ No unresolved reasonable stakeholder complaints. Contaminated Site Remediation ▪ 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. Well Site and Access Track Restoration ▪ The attainment of 0, +1 or +2 GAS criteria for: - "minimise visual impact of abandoned well sites" - "minimise visual impact of abandoned access tracks" - "re-establish natural vegetation on abandoned well sites and access tracks". Borrow Pit Restoration ▪ The attainment of 0, +1 or +2 GAS criteria for: - "minimise impact on vegetation" - "minimise impact on soil" - "Minimise visual impacts". ▪ *Note:* Well abandonment issues addressed under objective 6.	▪ Rehabilitation/ abandonment plans for surface activities will be developed in consultation with relevant stakeholders. Well Site and Access Track Restoration ▪ Compacted soil areas have been ripped (except on gibber and tablelands) and soil profile and contours are reinstated following completion of operations.	No complaints raised by stakeholders.

13. PRODUCTION & PROCESSING FACILITY OPERATIONS

During 2013, there were:

- 76.3 petajoules (PJ) of sales gas produced into the Moomba - Adelaide and Moomba – Sydney gas pipelines.
- 10.7 PJs of ethane produced into the Moomba – Sydney ethane pipeline.
- 252 mL of gas condensate produced to Port Bonython.
- 11.872 mm Barrels (BBLS) of crude oil exported to Port Bonython.

During 2013, 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)
76.3	10.7	195.3	252	11.872

The above Crude Oil includes the following :

	(mm BBLS)
PEL114 (includes PPL 225, 226, 227)	0.089
PPL 225, 226 & 227 (Stimpee, Hoek, Stimpson Jay, Teringie & Frostillicus) (does not include Cartman)	0.087
Derrilyn & Toparoa	0.040
Reg Sprigg West	0.000

13.1 PRODUCTION FACILITY PROJECTS

During 2013 a number of plant and field facility projects were completed and a listing of some of these is provided in Appendix 10a. There are a number of projects that have continued to be progressed or were commenced previously, these are listed in Appendix 10b, as are those that are planned to commence in 2014.

13.1.1 MOOMBA PLANT

In the Moomba Plant, the major activities included:

- Planned shutdowns
  - LRP A Major
  - CO2 Train 5
  - Boiler 9
- DPCU 7 Sieve replacement LP Flare Tip Replacement.

13.2 PRODUCTION FORECAST – 2014

The estimated gas and liquids production and export volumes from the Moomba Plant for 2014 are as listed below:

Sales Gas (PJ) - export	97.2
Ethane (PJ) (Qenos Demand)	10.54
LPG (Kt)	207.8
Condensate (Kbbls)	1813
Crude Oil (Block and Unit) (mm bbls)	4.954

The above Crude Oil includes the following :

	(mm BBLS)
PEL114 (includes PPL 225, 226, 227 for 2012)	0.149
PPL 225, 226 & 227 (Stimpee, Hoek, Stimpson Jay, Teringie & Frostillicus only) (does not include Cartman/Chimmichurri/Chorizo that are part of PEL114)	0.090
Derrilyn & Toparoa	0.058
Reg Sprigg West	0.001
Estimated Third Party Deliveries from Moomba	6.606

2014 Gas Storage Estimates (Moomba and Chookoo)

Opening Storage (PJ) Sales Gas + ethane	49.75
Net Storage Injection / (Withdrawal) (PJ)	13.9
Total Closing Sales Gas and Ethane Storage (PJ)	63.65

13.3 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 protected pipelines. Performance survey along protected pipelines is normally completed on an annual basis as per AS 2885 requirements.

Most batch treatment of gas and oil trunklines and gathering lines, normally carried out on an annual basis, were completed in accordance with Santos' Integrity Management Plans.

Pipeline right of ways, normally inspected during the annual Cathodic Protection were generally completed in line with IMP requirements, except where excessive flooding prevented access.

Corrosion inhibitor was injected into 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. The biocide injection facilities on the major oil transmission lines, to manage microbiological corrosion, have been upgraded to pulse injection systems.

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. In addition samples were taken to determine the source of microbiological induced corrosion (MIC).

MIC continuous improvement program continues to be implemented and improved, with targeted sampling campaigns being conducted to identify bacterial hotspots.

During 2013, pipelines and flowlines 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, a program covering in line inspection of key pipelines was also continued.

13.4 LICENSED PIPELINES

This report also covers the Licensed Pipelines covered by Pipeline Licenses Numbers 5 (Ballera to Moomba), 9 (Stokes to Mettika) and License No. 15 (Moon to Kerna) flowline.

The activities carried out in relation to PL 5, PL 9 and PL 15 are administered in accordance with each pipeline's individual integrity management plan (IMP). The IMPs have been created to ensure each pipelines integrity and compliance with the Petroleum and Geothermal Energy Act (2000), the Petroleum and Geothermal Energy Regulations (2013) and the relevant SEO's.

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

The reporting of Environmental Objectives and Performance – Production and Processing SEO, are covered in detail in this report and are considered to also address the performance in respect to the pipeline SEOs.

Various inspections, repairs and testing were undertaken on the Licensed Pipelines, details specific to each pipeline are as follows:

13.4.1 PL 5 – Ballera to Moomba Pipeline

Internal Corrosion Mitigation

- Continuous inhibitor injection of 10.0ltrs per day (IRN341A target rate, the injector system was monitored monthly).
- The pipeline was operationally pigged on 23rd November 2013.
- The pipeline was batch treated with corrosion inhibitor on 23rd November 2013.
- Pig Launcher treated with corrosion inhibitor on 23rd November 2013; Pig Receiver treated on 3rd November 2013.

External Corrosion Mitigation

- The operation of CP Units associated with the pipeline were checked bi-monthly.
- A complete Cathodic Protection Test Post Potential survey was performed in May 2013 indicating full compliance with the AS 2832 'Off Potential' criteria.

Inspection

- The ROW patrol was performed December 2013. ROW observed to be in good condition.
- Pig Receiver was inspected in June 2013, and found to be in good condition.

13.4.2 PL 9 – Stokes to Mettika Pipeline

Internal Corrosion Mitigation

- Continuous inhibitor injection of 5.0ltrs per day (IRN341A target rate, the injector system was monitored monthly).
  - The pipeline was operationally pigged on six-weekly basis as per the pipelines IMP (100% Compliance for 2013).
  - The pipeline was batch treated with corrosion inhibitor on 1st September 2013.
  - Pig Launcher & Pig Receiver were both treated with corrosion inhibitor on 1st September 2013.

External Corrosion Mitigation

- The operation of CP Units associated with the pipeline were checked bi-monthly.
- A complete Cathodic Protection Test Post Potential survey was performed in March 2013 indicating full compliance with the AS 2832 'Off Potential' criteria.

Inspection

- The ROW patrol was performed March 2013. ROW observed to be in good condition.

13.4.3 PL 15 – Moon to Kerna Pipeline

Internal Corrosion Mitigation

- Continuous inhibitor injection of 2.0ltrs per day (IRN341A target rate, the injector system was monitored monthly).

External Corrosion Mitigation

- The operation of CP Units associated with the pipeline were checked bi-monthly
- A complete Cathodic Protection Test Post Potential survey was performed in June 2013 indicating full compliance with the AS 2832 'Off Potential' criteria.

Inspection

- The ROW patrol was performed June 2013. ROW observed to be in good condition.

Product transported through licensed pipelines in 2013 was:

	Sales Gas (PJ)	Ethane (PJ)	LPG (Kt)	Cond (Ml)
Ballera to Moomba	17.1	2.5	42.5	68.4
Stokes to Mettika	1.0	0.2	2.5	3.1
Moon to Kerna	0.05351	0.00684	0.05621	0.03916

13.5 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, dependent upon application and the frequency of use.

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

13.5.1 Wellsite Lease And Access Construction And Restoration

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 57.65 Km of access

road was constructed during 2013 and 4.5km of road was restored. The drilling sites scouted, constructed, backfilled and restored are listed in Appendix 4.

There were 57 borrow pits constructed during 2013, to provide fill for well lease and related road construction, and 3 borrow pits were restored. No borrow pits were transferred to the land holder.

13.5.2 Road Construction

No major road construction projects were undertaken in 2013, minor roads associated with new drilling leases made up most of the new roads constructed in 2013.

13.6 WATER EXTRACTION FROM COOPER CREEK

In accordance with the Production and Processing SEO water extraction from the Cooper Creek is allowed under specific criteria related to flow in the Cooper Creek, refer objective 4.

During 2013 Santos took no water under this allocation.

Environmental Objectives and Performance – Production and Processing SEO

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 1: Minimise any safety risk to public and other third parties.	• Reasonable measures implemented to ensure no injuries to the public or third parties.	▪ All employees and contractor personnel complete a safety induction prior to commencement of work in the field. ▪ All employees and contractor personnel undertake a refresher induction every 2 years. ▪ Signage in place to warn third parties of access restrictions to operational areas, with particular warnings when potentially dangerous operations are being undertaken. ▪ Necessary measures (e.g. signage/fencing) taken to prevent the public accessing the wellhead equipment or waste relating to a given well. ▪ Demobilisation inspections undertaken at random to ensure that backfilling and waste removal requirements are met. ▪ Permit to work systems in place for staff and contractors in dangerous situations. ▪ All appropriate PPE (personnel protective equipment) is issued and available as required in accordance with company operating requirements and applicable standards. ▪ Effective Emergency Response Plan (ERP) and procedures are in place in the event of a fire or explosion; Annual exercise of ERP. ▪ 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. ▪ Compliance with relevant speed restrictions on access roads and tracks. ▪ 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. ▪ Ensuring safety management plans are updated and reviewed. ▪ Wastewater disposal in accordance with Objective 11.	There were no injuries to the public or any third parties 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 is in place and is regularly audited. Santos and Contractor personnel are provided the appropriate PPE. Effective emergency response plans are in place and are regularly tested. Regular emergency exercises are conducted. Potentially hazardous or unusual tasks are communicated to affected parties prior to being undertaken. Injury and incident recording and reporting systems are maintained and interrogated for trend analysis and improvement opportunities. Safety management plans are reviewed and updated regularly.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period

Objective 2:
Minimise disturbance and avoid contamination to soil.
	Construction Activities (e.g. pipelines and roads)
	▪ No evidence of significant subsoil on surface (colour) on the pipeline ROW following construction.
	▪ No subsidence is evident over pipeline trench.
	▪ At pipeline dune crossings, dune profiles have been restored consistent with surrounding dune profiles.
	▪ No visual evidence of soil compaction following remediation of the pipeline easement (e.g. hard soil, local water pooling).
	▪ The extent of erosion on the ROW is consistent with surrounding land.
	▪ No unauthorised off-road driving or creation of shortcuts.
	▪ No construction activities are carried out on salt lakes or steep tableland slopes (as defined in EIR).
	▪ 0, +1 or +2 GAS criteria are attained for goals related to this objective
		Construction Activities (e.g. pipelines and roads)
		▪ Santos operational procedures and guidelines are in place and will be followed for construction activities, for example to conserve soil resources:
		  ▪ topsoil is stockpiled separately from subsoil and respread during reinstatement
		  ▪ no windrows remain after pipeline construction (except on dunes where some windrows are inevitable after re-profiling but will quickly disappear
		  ▪ if a crown over the pipeline trench is left to alleviate subsidence, periodic breaches are left to avoid channelling water flows down the ROW
		  ▪ areas of compacted soil are ripped
		▪ Consider alternate routes during planning phase to minimise environmental impacts.
		▪ Works are restricted to construction ROW.
		▪ The need to traverse sensitive land systems and the method of managing the impacts must be justified in accordance with company procedures, recorded and available for auditing.
		▪ Annual audit of construction practices.
		Spill Response / Contingency Planning
		▪ Results of emergency response procedures carried out in accordance with Regulation 31 show that an 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.
		▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas.
		▪ Spill response equipment is audited annually.
		▪ Annual spill response training exercise is undertaken.
		▪ Refer to Section 3 “Reporting” for clarification of incident reporting requirements
			Soil disturbance is minimised wherever possible. Rootstock is left intact and top soil is stockpiled for respreading. This is respread during site restoration.
			
			Off-road driving is actively discouraged. Alternate routes are considered in planning. Work is restricted to ROW.
			
			There were four reported incidents involving off-road or off-lease driving during the reporting period. Actions taken to address this included the release of an environmental information bulletin to the relevant teams, discussions at toolbox meetings and inclusion in icebreaker presentations.
			
			No construction activity is carried out on salt Lakes or steep tablelands. Construction activity within wetland systems is avoided where possible. If unavoidable, internal environmental approval conditions that reflect the sensitivity of the area are placed on the activity.
			
			Borrow pit construction is minimised by reuse of any suitable existing borrow pit(s). Borrow pits are restored on an ongoing basis to ensure the most time efficient restoration.
			
			Four borrow pits were assessed against the GAS criteria in Table 6.1 of the SEO and were considered restored in 2013.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 2 cont: Minimise disturbance and avoid contamination to soil	Fuel and Chemical Storage, Handling and Transportation ▪ No spills/leaks outside of areas designed to contain them. ▪ Soils remediated to a level as determined by the SHI Decision Framework. ▪ Also refer to Objective 12. Oil/Condensate Spills (Pipeline/Road Transport) ▪ No spills/leaks outside of areas designed to contain them. ▪ Level of hydrocarbon continually decreasing for in situ remediation of spills. ▪ Soils remediated to a level as determined by the SHI Decision Framework. Produced Formation Water (PFW) • 0, +1 or +2 GAS criteria are attained for goals related to produced formation water impacts on soil. • PFW EMP developed and objectives achieved.	Fuel and Chemical Storage, Handling and Transportation ▪ All fuel, oil and chemicals are stored, handled and transported in accordance with appropriate standards and guidelines e.g. Australian Standard AS 1940, Australian Dangerous Goods (ADG) Code, EPA guidelines *080/07 Bunding and Spill Management*. ▪ Fuel and chemical storage, handling and transport procedures are reviewed and monitored in audit process. ▪ Records of spill events and corrective actions are maintained in accordance with company procedures. ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ Logged incidents are reviewed annually to determine areas that may require corrective action to reduce spill volumes in subsequent years (and drive continual improvement). ▪ Audit against EHSMS standards for underground storage tanks and bunds on a four yearly minimum frequency. Oil/Condensate Spills (Pipeline/Road Transport) ▪ Pipelines are compliant with AS2885 pipeline standards ▪ Pipeline Management System is reviewed annually. ▪ Pipelines are inspected and maintained in accordance with Pipeline Integrity Management System ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ Records of spill events and corrective actions are maintained in accordance with company procedures. Produced Formation Water (PFW) Develop (in consultation with PIRSA and the EPA) and implement Environmental Management Plan (EMP) following the PFW facility status review that has been conducted.	Spills that occurred outside areas designed to contain them are reported at quarterly meetings. Records of spills are maintained within Santos' Incident Management System, in accordance with the internal EHS management system. Spills are reported in accordance with legislative and company requirements. Incident report databases are reviewed to assess areas requiring improvement and to implement ongoing improvement. No new incidences of impact to groundwater identified in the reporting period. PFW management, current and future requirements continue to be assessed.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 2 cont: Minimise disturbance and avoid contamination to soil	Waste Disposal (domestic, sewage and sludges) ▪ All domestic wastes are disposed of in accordance with EPA licensing requirements. ▪ No evidence of rubbish or litter on ROW or at campsites / facilities. ▪ No spills or leaks from sludge treatment process and sludge pits. ▪ No increase in contamination at LTUs designated treatment area. Refer to assessment criteria for Objective 11.	Waste Disposal (domestic, sewage and sludges) ▪ Site activities to be audited against EPA licence for Waste Depot on a minimum two years schedule. ▪ EHS04 Waste Management is adhered to. ▪ Audit against EHS04 Waste Management – 4 yearly minimum. ▪ Covered bins are provided for the collection and storage of wastes. ▪ All loads of rubbish are covered during transport to the central waste facility. ▪ Disposal areas are not established in locations which pose an unacceptable hazard to stock or wildlife. ▪ Sewage treatment facilities to be operated in accordance with design criteria. Refer to Objective 11.	Domestic wastes are disposed of in accordance with EPA Licence Requirements. EPA conducted an audit of the Moomba Waste Management Facility in 2013. Waste bins and containers are covered during transport and in dedicated, fenced laydown yards at the major satellites. New landfill cell in operation and is operated as per EPA licence 2569. Landfill cells are located only at authorised facilities and are fenced to exclude stock and wildlife. There were no incidents at installed sewage disposal facilities.
Objective 3: Avoid the introduction or spread of pest plants and animals and implement control measures as necessary.	▪ No weeds or feral animals are introduced to, or spread in, operational areas as a consequence of activities. ▪ Weed management plans are implemented where priority weed species are identified.	▪ Where appropriate, weed and feral animal management strategy is in place (avoidance and control strategies). ▪ Vehicle and equipment wash downs to be initiated in accordance with the management strategy.	Weed and feral animal strategies are in place. There is no evidence of the introduction of feral animals. Buffel grass management steps have been implemented to control the spread of buffel grass within Santos' operational areas.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 4: Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	Construction Activities (e.g. pipelines and roads) ▪ 0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 1 and 2. ▪ Construction activities (e.g. access tracks or pipelines) are located and constructed to maintain pre-existing water flows (i.e. channel contours are maintained on floodplains and at creek crossings). ▪ No water (surface or groundwater) contamination as a result of construction activities. Produced Formation Water (PFW) ▪ Refer to assessment criteria for Objective 2. ▪ No unlicensed discharge of water to a creek, river or lake. PFW Waterflood ▪ No significant change in surface or groundwater contamination as a result of waterflood activities.	Construction Activities (e.g. pipelines and roads) • Constructed activities undertaken are designed and managed to avoid diversion of water flows. • Sensitive land systems (e.g. wetlands) avoided wherever possible. Where activities are undertaken in or near these areas, appropriate review, assessment and mitigation measures are in place to ensure that surface water flows are maintained and contamination of surface water and groundwater is avoided. Produced Formation Water (PFW) ▪ Refer to Objective 2. ▪ Water disposal ponds are located away from areas which are inundated during floods where possible (preferably above the 100-year flood level). ▪ Interceptor pits are not located in areas prone to inundation by flooding. PFW Waterflood ▪ Pumps and associated equipment installed within containment device with an adequately sized containment sump (e.g. at least $9m^3$). ▪ Refer to Objective 2.	Drainage channels and patterns are maintained or restored, so as to minimise impeding or changing natural drainage patterns associated with well leases, access tracks and roads and at creek crossings. Work programs are modified to avoid periods of flooding and other seasonal influences and variations. Assessment of PFW facilities against the GAS criteria in Table 6.2 of the SEO is conducted and improvement actions implemented as required. There was no report of produced formation water discharged to a creek, river or lake during the reporting period. There has been no identified change in surface or groundwater contamination, as a result waterflood activities, during the reporting period.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 4 cont Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	Fuel and Chemical Storage, Handling and Transportation ▪ Soils remediated to a level as determined by the SHI Decision Framework. Also refer to Objective 12. ▪ No water (surface or groundwater) contamination as a result of these activities. Cooper Creek Water Extraction No significant change in flow or contamination as a result of extraction activities.	Fuel and Chemical Storage, Handling and Transportation ▪ All fuel, oil and chemicals are stored, handled and transported in accordance with appropriate standards e.g. Australian Standard AS 1940, Australian Dangerous Goods (ADG) Code, EPA guideline *080/07 Bunding and Spill Management*. ▪ Fuel and chemical storage, handling and transport procedures are reviewed and monitored in an audit process. ▪ Records of spill events and corrective actions are maintained in accordance with company procedures. ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ Logged incidents are reviewed annually to determine areas that may require corrective action to reduce spill volumes in subsequent years (and drive continual improvement). ▪ Implementation of the SHI Decision Making Framework approved in January 2010. Cooper Creek Water Extraction Approval to conduct surfacewater extraction from Cooper Creek is subject to the following conditions: ▪ An approvals request for any proposed extraction is raised internally. This request will include estimated total volume required. ▪ The above request must demonstrate that PFW and Borewater of an acceptable quality cannot be sourced within an economically viable haulage distance (maximum 2 hour return journey). ▪ Any approved extraction occurs where water flow at Callamurra is >= 2.15m (>= 0.1m flow at Innamincka Causeway) and rising, and **never** at permanent water refuges (e.g Callamurra). Maps of approved surfacewater extraction points at Innamincka, Kudrieke and Mitchie Crossings are included in Appendix 2 of the EIR Addendum (Santos, 2010). ▪ Cumulative extraction volume to be capped at **15 ML** per year. ▪ Cumulative extraction volumes to be recorded in monitoring database and included in annual PIRSA reporting. ▪ Non-conformance with the above is a reportable incident - see Section 3 “Reporting” for incident definitions	Records of spills are maintained within Santos’ Incident Management System, in accordance with the internal EHS management system. Spills are reported in accordance with legislative and internal reporting requirements. Incident report databases are reviewed to assess areas requiring improvement and to implement ongoing improvement. Santos took no water from the Cooper Creek in South Australia under this allocation during the reporting period.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 4 cont	Waste Disposal (domestic, sewage and sludges) ▪ Refer to assessment criteria for Waste Disposal for Objective 2. ▪ Refer to assessment criteria for Objective 11. Oil/Condensate Spills (Pipeline/Road Transport) ▪ No spills/leaks outside of areas designed to contain them. ▪ Level of hydrocarbon continually decreasing for in situ remediation of spills. Soils remediated to a level as determined by the SHI Decision Framework.	Waste Disposal (domestic, sewage and sludges) ▪ Site activities to be audited against EPA licence for waste depot on a minimum of every two years. ▪ Audit against EHS04 Waste Management – 4 yearly minimum. ▪ Covered bins are provided for the collection and storage of wastes. ▪ All loads of rubbish are covered during transport to the central waste facility. ▪ Pits are not established in locations which pose an unacceptable hazard to stock or wildlife. ▪ Sewage treatment facilities to be operated in accordance with design criteria. Oil/Condensate Spills (Pipeline/Road Transport) ▪ Pipelines are compliant with AS2885 pipeline standards. ▪ Pipeline Management System is reviewed annually. ▪ Pipelines are inspected and maintained in accordance with Pipeline Integrity Management System. ▪ Spills or leaks are immediately reported and clean up actions initiated. ▪ Records of spill events and corrective actions are maintained in accordance with company procedures. ▪ Refer to Section 3 “Reporting” for clarification of incident reporting requirements Spill Response / Contingency Planning ▪ Results of emergency response procedures, carried out in accord with Regulation 31, show that the 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. ▪ Oil spill contingency plan (reviewed annually) is up to date with specific scenarios relating to spills to creeks and floodplain areas. ▪ Spill response equipment is audited annually. Annual spill response training exercise is undertaken.	Oil/condensate spills outside of areas designed to contain them are reported externally in accordance with the incident reporting requirements under the SEO. Emergency response procedures for spill response are in place and regularly tested. Emergency response plans are updated to reflect learnings from exercises and actual events.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 5: Avoid disturbance to sites of cultural and heritage significance.	▪ Proposed well sites and access tracks have been surveyed and any sites of Aboriginal and non-Aboriginal heritage identified. ▪ *Any identified cultural and heritage sites have been avoided.*	▪ Consultation with stakeholders (i.e. government agencies, landholders etc) in relation to the possible existence of heritage sites, as necessary. ▪ Heritage report forms completed for any sites or artefacts identified, and report forms forwarded to the Aboriginal Heritage Branch, Aboriginal Affairs and Reconciliation Division (AARD). ▪ Survey records are kept and are available for auditing. ▪ Areas requiring remediation which lie outside previously surveyed sites should be surveyed in accordance with company heritage clearance procedures. ▪ A procedure is in place for the appropriate response to any sites discovered during drilling activities. Note: 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.	Internal environmental standards indicate when there is a need for cultural heritage clearance and if required, cultural heritage approval is received prior to works commencing. Identified cultural heritage sites are avoided. Significant sites are fenced.
Objective 6: Minimise loss of aquifer pressure and avoid aquifer contamination.	▪ There is no uncontrolled flow to the surface (i.e. no free flowing bores). Produced Formation Water (PFW) Waterflood Injection Wells No significant change in water quality from the injection aquifer	▪ The volume/flow of water used by the Moomba Plant is continuously monitored to ensure appropriate management. ▪ Water usage is monitored, reviewed and management strategies implemented to minimise wastage. ▪ Review water licensing requirements and allocation plans. Produced Formation Water (PFW) Waterflood Injection Wells ▪ Aquifer water quality monitored where appropriate through testing carried out during Waterflood activities.	There were no well failures reported during 2013. Santos is in compliance with water licence requirements and allocation plans.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 7: Minimise disturbance to native vegetation and native fauna.	Construction Activities ▪ Any sites of rare, vulnerable and endangered flora and fauna have been identified, flagged and subsequently avoided. ▪ No removal of trees / vegetation of priority 1, 2 or 3 in Field Guide[1] in areas where removal could have been avoided. ▪ No removal of trees at campsites. ▪ No evidence of tree removal where trimming appropriate. ▪ The type and density of vegetation on the rehabilitated ROW is consistent with the surrounding landscape, but less mature. Note: assessment will take into account that regrowth is a time and rainfall dependent process. ▪ 0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 6.1 and 6.2.	Construction Activities ▪ Proposed construction areas have been assessed for rare, vulnerable and endangered flora and fauna species before the commencement of construction. ▪ Consider alternate routes during planning phase to minimise environmental impacts. ▪ Sensitive land systems (e.g. wetlands) avoided wherever possible. Where activities are undertaken in these areas (i.e. no practicable alternative), appropriate review, assessment and mitigation measures are in place. ▪ Assessment records are kept and are available for auditing. ▪ Optimised ROW widths are identified and implemented. ▪ Trees are trimmed rather than cleared where possible. ▪ Root stock is not removed beyond 3m of trenchline and ROW is either only lightly graded or not graded. Where vegetation is removed, it is respread over the full width of the ROW (excluding the access track).	Ecological assessments and site scoutings are undertaken to assess habitats for rare, vulnerable and endangered species prior to construction activities. Environmentally sensitive areas identified are avoided. Vegetation impacts are minimised during well lease access and construction by scouting surveys prior to the entry of construction machinery. Flowline construction procedures involve site scouting and ecological assessment. Wherever possible, significant vegetation is avoided by altering the proposed flowline route.

[1] Field Guide refers to the *Field Guide to the Common Plants of the Cooper Basin – South Australia and Queensland* (Wiltshire and Schmidt 2003)

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 7 Cont	Borrow Pits ▪ 0, +1 or +2 GAS criteria for goals related to this objective, as listed in Appendix 1 are attained during site selection and construction. Fuel and Chemical Storage and Management ▪ Refer to assessment criteria for objectives 2 and 4. Waste Management ▪ Refer to assessment criteria for Objective 2, 4 and 11.	Borrow Pits ▪ 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). ▪ Sensitive land systems (e.g. wetlands) avoided wherever possible. Where activities are undertaken in these areas (i.e. no practicable alternative), appropriate review, assessment and mitigation measures are in place. ▪ Borrow pits are restored as soon as practicable after material extraction is complete to a standard consistent with the surrounding land use. ▪ Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders ▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body. Fuel and Chemical Storage and Management Refer to Objectives 2 & 4. Waste Management ▪ Covered bins are provided for the collection and storage of putrescible wastes. ▪ All loads of rubbish are covered during transport to the central waste facility. ▪ Pits are not established in locations which pose an unacceptable hazard to stock or wildlife. ▪ Sewage treatment facilities to be operated in accordance with design criteria. ▪ PFW pits are fenced as appropriate to minimise wildlife access.	Borrow pit site selection provides for the avoidance of vegetation impacts. Borrow pits are restored on an ongoing basis. Borrow pits are re-accessed in preference to new disturbance to minimise vegetation impacts and reduce ground disturbance footprint.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 7 Cont	Native Vegetation Act SEB ▪ Significant Environmental Benefit (SEB) for native vegetation clearance approved by PIRSA (where delegated authority applies) or Native Vegetation Council (NVC). ▪ Significant environmental benefit obligation is ultimately satisfied / implemented. Fauna Management ▪ Native fauna casualties associated with construction ▪ Activities restricted to as low as reasonably practical (ALARP).	Native Vegetation Act SEB ▪ Work (or payment to Native Vegetation Fund) undertaken to achieve an SEB for native vegetation clearance. ▪ SEB requirement either: - determined using the Guidelines (DWLBC 2005) or - negotiated with PIRSA or the Native Vegetation Council where SEB calculation differs from the standard methodology in the Guidelines. Fauna Management ▪ No domestic pets allowed at camps or worksites. ▪ Feeding of wildlife (e.g. dingoes) is not permitted. ▪ Where possible, provision of fauna exit ramps every 500m in open trenches, with other mechanisms for fauna exit (branches, mesh etc.) at more regular intervals in between. ▪ Inspection of trenches and removal of trapped fauna, where appropriate. ▪ Minimise length of time trench is open where practicable.	Santos' SEB contribution has been accepted for the 2013 reporting period. Internal environmental approvals provide conditions for the monitoring of open excavations for the presence of fauna. Some instances of native fauna casualties occurred during construction activities in 2013, despite the implementation of controls such as fauna egress ramps, inspections and limiting the time trenches were open. This outcome is considered as low as reasonably practical.

Environmental Objectives	Assessment Criteria	Guide to Objectives Achievement	Performance 2013 Report Period
Objective 8: Minimise air pollution and greenhouse gas emissions.	Gathering Systems/Satellite Facilities/Moomba Plant ▪ Compliance with EPA requirements.	Gathering Systems/Satellite Facilities/Moomba Plant ▪ Conduct production operations in accordance with appropriate industry accepted standards. ▪ Continually review and improve operations. ▪ Appropriate Emergency Response Procedures are in place in case of a gas leak.	Flares and emissions are conducted, monitored and/or reported in accordance with EPA requirements.
Objective 9: Maintain and enhance partnerships with the Cooper Basin community.	▪ No reasonable stakeholder complaints left unresolved.	▪ Relevant affected parties are notified and consulted on proposed activities. ▪ Forward development plans are presented to the local community. ▪ Local community projects and events are sponsored and supported where appropriate. ▪ Industry membership of appropriate regional land management committees and boards	Relevant parties are notified and consulted on proposed activities. There were no complaints, concerns or issues left unresolved. Local community events and activities are actively supported. Examples include the Cooper Cup, Innamincka races and access for the local community to Santos facilities. Membership and active participation is made to regional management committees and Boards.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
<u>Objective 10</u>: Avoid or minimise disturbance to stakeholders and/or associated infrastructure	▪ No reasonable stakeholder complaints left unresolved. <u>Cooper Creek Water Extraction</u> ▪ No impacts on local stakeholders from the extraction of water from the creek system. ▪ Refer to Objective 4.	▪ Induction for all employees and contractors covers pastoral, conservation, tourism, legislation and infrastructure issues. ▪ Relevant stakeholders are notified prior to survey and construction of well sites, camp sites and access tracks and undertaking of operations (pursuant to the Regulations). Borrow pits left open (unrestored) if requested by stakeholder and upon receipt of letter of transfer of responsibility to stakeholder. ▪ Gates or cattle grids are installed to a standard, consistent with pastoral infrastructure instead of fences where crossings are required for access. ▪ All gates left in the condition in which they were found (i.e. open/closed). ▪ Fences repaired to 'as before' standard following pipeline construction. ▪ Potential sources of contamination (e.g. formation water ponds) are fenced as appropriate to prevent stock access. ▪ Written evidence that stakeholder is satisfied with water disposal arrangements. ▪ System is in place for logging stakeholder complaints to ensure that issues are addressed as appropriate. ▪ Requirements of the Cattle Care and Organic Beef accreditation programs are complied with. ▪ In recognised conservation reserves (i.e. Innamincka Regional Reserve) excavations are left in a state as agreed <u>Cooper Creek Water Extraction</u> Refer to Objective 4.	Santos employees and contractors understand the importance of developing and maintaining good relationships with landholders. Relevant stakeholders are notified of and consulted about projects, and are provided with information and maps, where a Notice of Entry is required. No Borrow pits were formally transferred to landholders. Grids, fences, gates installed are to a standard acceptable to the landholder. All gates are left "as found". Production facility fencing continues to be installed and repaired as required. Landholder complaints and requests are logged to ensure closeout. There were no complaints lodged in the reporting period. Cattle management systems (cattle care) are recognised and complied with.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 11: Optimise (in order of most to least preferable) waste avoidance, reduction, reuse, recycling, treatment and disposal	▪ Domestic wastes are disposed of in accordance with EPA licensing requirements. ▪ Wastewater (sewage and grey water) disposed of in accordance with the *Public and Environmental Health (Waste Control) Regulations 1995* or to the Department of Health's satisfaction. ▪ No spills or leaks from sludge treatment process and sludge pits. ▪ No increase in contamination at LTUs designated treatment area	▪ Chemicals and oil are 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. ▪ Waste streams are segregated on site to maximise opportunities for waste recovery, reuse and recycling. ▪ Evidence/records are maintained showing that recyclable material has been returned to Moomba Waste Management Depot. ▪ Production of waste is minimised by specifying reusable, biodegradable or recyclable materials in procurement, where practical. ▪ Waste audit conducted at 5 year minimum interval. ▪ Waste water (sewage) disposal is where possible in accordance with the *Public and Environmental Health (Waste Control) Regulations 1995* (which require that the waste water disposal system must either comply with the *Standard for the Construction, Installation and Operation of Septic Tank Systems in SA* or be operated to the satisfaction of the Department of Health) and the *Environment Protection (Water Quality) Policy 2003*. ▪ Evidence/records maintained to show that appropriately designed sewage facilities have been constructed.	Chemicals, cement & inhibitors are purchased in bulk containers and stored appropriately. Waste material is disposed of at EPA Approved facilities.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 12: Remediate and rehabilitate operational areas to agreed standards.	Contaminated Site Remediation ▪ Contaminated sites are remediated to a level as determined by the approved SHI Decision Framework. Construction Site and Access Track Restoration ▪ Refer to assessment criteria for Objectives 2, 4, 7 and 11. ▪ 0, +1 or +2 GAS criteria are attained for 'minimise the visual impact' and 'revegetation of indigenous species' as listed in Appendix 4. Borrow Pit Restoration ▪ The attainment of 0, +1 or +2 GAS criteria as in Appendix 1. Production Facility Abandonment ▪ Surface structures are removed and the ground surface re-contoured to approximate pre-existing contours unless alternative agreement is reached with the regulator and stakeholders. ▪ 0, +1 or +2 GAS criteria are attained for 'minimise the visual impact' and 'revegetation of indigenous species' as listed in Appendix 4, unless alternative agreement is reached with the regulator and stakeholders. ▪ Refer to criteria for contaminated site remediation under this objective (above). ▪ Refer to the assessment criteria for Objective 11.	▪ Rehabilitation/abandonment plans for regulated activities will be developed in consultation with relevant stakeholders. Construction Site and Access Track Restoration Compacted soil areas have been ripped (except on gibber and tablelands) and soil profile and contours are reinstated following completion of operations. Production Facility Abandonment The following steps will typically be undertaken unless otherwise agreed with the regulator and stakeholders: ▪ hydrocarbon and contaminants will be reduced to an acceptable level in buried structures (e.g. pipelines, tanks, pits) as determined by the approved SHI Decision Framework. ▪ hazardous materials will be stabilised or removed including ground decontamination. ▪ hazardous material dumps will be clearly marked and a monitoring plan developed and implemented. ▪ surface structures will be removed and re-used / recycled where appropriate ▪ waste will be removed and recycled where appropriate (refer to Objective 11). ▪ foundations will be levelled and covered (the standard to which they will be restored will be defined as a result of stakeholder consultations). ▪ disturbed areas will be re-contoured to approximate pre-existing contours, natural drainage restored and compaction relieved (e.g. by scarification or ripping where appropriate) to promote rainwater infiltration and enhance seed capture and germination. ▪ contour banks and energy dissipating structures will be constructed where necessary to protect disturbed areas from erosion prior to stabilisation	No sites assessed as requiring remediation in 2013. Access tracks are restored in accordance with restoration guidelines. No production facilities were abandoned during the reporting period.

Environmental Objectives	Assessment Criteria	Guide to How Objectives Can Be Achieved	Performance 2013 Report Period
Objective 12 Cont:	Pipeline Abandonment Attainment of the following (unless otherwise agreed with stakeholders and approved by the regulatory authority): ▪ No evidence of waste, redundant equipment / infrastructure or signs and markers on abandoned pipelines. ▪ Refer to criteria for contaminated site remediation under this objective (above). ▪ Refer to the assessment criteria for Objective 11.	Pipeline Abandonment The following steps will typically be undertaken unless otherwise agreed with the regulator and stakeholders: ▪ all aboveground pipes and supports will be assessed for the condition of the pipe for either salvage or for dismantling and re-use. ▪ all underground pipe work will be cut-off (at a minimum depth of 750mm below the natural surface or at pipeline depth, removed and blinded below the surface. ▪ all aboveground signs and markers will be removed. ▪ all pipeline protection systems will be removed to allow the pipeline to degrade in-situ. ▪ monitoring and auditing of abandoned pipelines will be undertaken. ▪ all pipelines which are partially or wholly left in-situ will be accurately mapped and recorded. Records will be prepared and submitted to the appropriate authority.	The following flowlines and trunklines were abandoned, or had abandonment and rehabilitation works commence, during the reporting period: • Mudlalee #4 flowline • Farina #1 flowline • Moomba #12 flowline • Tantanna to Gidgealpa trunkline Flowlines/trunklines were abandoned and rehabilitated in accordance with AS 2885 and their respective Abandonment and Rehabilitation Plans.
Objective 13: Minimise as far as reasonably practicable interruptions to natural gas supply.	▪ No interruptions to natural gas supply that cause significant social disruption.	▪ Adequate contingencies are in place which seek to address a prudent level of security of supply in the case of short and unforseen interruption events (e.g. adequate gas storage). ▪ Pipelines are designed, operated and maintained in accordance with AS 2885. ▪ Plant and equipment are designed, operated and maintained in accordance with appropriate industry accepted standards. ▪ Emergency Response Plan (ERP) and associated procedures are in place and exercised. ▪ Results and recommendations of plant and facility hazard reviews, including the five (5) yearly Fitness for Purpose assessment, are appropriately addressed. ▪ Significant operations-specific hazards and risks are summarised in the Significant Hazard Risk Register (SHRR).	There were no gas supply reduction events from the Moomba Plant during 2013.

14 REPORTS ISSUED DURING THE 2013 LICENCE YEAR

The following reports were generated for Santos purposes or forwarded to DMITRE or others in 2013:

- Sustainability Report 2013
- Significant Environmental Benefits Summary July 2012 to June 2013
- Santos pipeline fracture control compliance
- Bushfire Preparedness Report.

15. STATEMENT OF ACTUAL AND PROPOSED EXPENDITURE 2013/2014

Confidential

16. GLOSSARY OF TERMS

AEGR	Asset Engineering Governance Review
AAL	Associated Activity Licence
AIMS	Asset Integrity Management System
ALARP	As Low As Reasonably Practicable
APPEA	Australian Petroleum Production and Exploration Association
BBLS	Barrels
CP	Cathodic Protection
DA	Direct Assessment
DCVG	Direct Current Voltage Gradient
DISCEX	Discussion Exercise
DPCU	Dew Point Control Unit
DFW	Department for Water (previously DWLBC)
DMITRE	Department for Manufacturing, Innovation, Trade, Resources and Energy (previously PIRSA)
EALT	Eastern Australia Leadership Team
EHS	Environment, Health and Safety
EHSMS	Environment, Health and Safety Management System
EIR	Environmental Impact report
EIS	Environmental Impact statement
EPA	Environment Protection Authority
EPIRB	Emergency Position Indicating Radio Beacon
EOC	Emergency Operations Centre
EMP	Environmental Monitoring Point
ERF	Environmental Report Forms
ERP	Emergency Response Plan
ESP	Electric Submersible Pump
EUE	External Upset Tubing Connection
FAIR	Fixed Asset Integrity Review
FSA	Formal Safety Assessment
GAS	Goal Attainment Scaling
GLNG	Gladstone Liquefied Natural Gas
GRE	Glass Reinforced Epoxy
HAZOP	Hazard and Operability
ILI	In-Line Inspection
IMP	Integrity Management Plan
KPI	Key Performance Indicator
Kbbls	Kilo barrels (1,000 barrels)
Kt	Kilo tonne (1,000 tonnes)
LRP	Liquids Recovery Plant
LTU	Land Treatment Unit
MHF	Major Hazard Facility
MIC	Microbiological Induced Corrosion
MOC	Management of Change
mL	mega litre (1,000,000 litres)
mm	BBLS Million barrels
OPREX	Operational Exercise
PAMS	Pipeline Asset Management System
PEL	Petroleum Exploration License
PHS	Phase Separated Hydrocarbon
PJ	Peta-joule (a unit of heat)
PL	Pipeline Licence
PFW	Produced Formation Water
PCP	Progressive Cavity Pump
PPL	Petroleum Production License
PPE	Personal Protective Equipment
PSM	Process Safety Management
RFDS	Royal Flying Doctor Service
ROW	Right of Way (for pipelines)
SACB	South Australian Cooper Basin
SACBJV	South Australian Cooper Basin Joint Venture
SEO	Statement of Environmental Objectives
SHRR	Significant Hazard Risk Register
SHI	Soil Health Index
SIMP	Santos Incident Management Plan
SOP	Standard Operating Procedure
SWSA	Safe Work SA
TEWT	Tactical Exercise without Troops
VSP	Vertical Seismic Profile
WOPRA	Whole of Plant Risk Assessment

17. APPENDICES

Appendix 1 DMITRE Meetings – 2013

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

These meetings included the following:

Quarterly Santos / DMITRE Performance Meeting

4th Quarter, 2012	-	8 February 2013
1st Quarter, 2013	-	10 May 2013
2nd Quarter, 2013	-	9 August 2013
3rd Quarter, 2013	-	15 November 2013

2013 Development Plan & Operational Review - October 2013

Appendix 2 Environmental Incidents Summary - 2013

Total Incidents	63	
	% Total incidents	**Comments**
Location		
Plant	5	
Field: Satellite	29	
Field: Wells	32	
Field: Pipelines	24	
Field: Other	8	
Spills		
Crude Oil	37	
Condensate	3	
Produced Formation Water	30	
Chemical	14	
Lube Oil	3	
Hydraulic Oil	5	
Diesel	6	
Grey Water / Sewage	2	
Spill Volume (Total uncontained volume)		
>100 m^3	3	
20 – 99 m^3	3	
5 – 19 m^3	8	
1 – 4 m^3	6	
500 – 999 Litres	3	
100 – 499 Litres	22	
50 – 99 Litres	6	
10 – 49 Litres	24	
5 – 9 Litres	3	
<5 Litres	14	

REPORTABLE to DMITRE 2013 – Includes NOTIFIABLE WORK RELATED INJURY OR DANGEROUS OCCURRENCE

Total Incidents 35	% of Total Incidents	Comments
Report Type		
Injury	-	
Dangerous Occurrence	-	
Reportable to DMITRE	100	
Location		
Plant	-	
Field	-	
-Satellite/Facility	17.6	
-Wells	3	
-Pipelines	79.4	
-Other	-	
Camp	-	
Root Cause – DMITRE		
Design	-	
Monitoring & Maintenance	100	
Work Practices	-	
Communication	-	
Supervision	-	
Risk Management	-	
Induction/Training	-	
Other	-	

Appendix 3 Emergency Drills - 2013

Date	Drill Type	Description of Scenarios	Objective Outcomes:	Observations, Learnings and Actions
28/12/2013	**EOC DISCEX**	**Alternate EOC Exercise – Cold Box incident** This exercise will be a Training Exercise without Troops (TEWT), designed to practice established emergency response procedures and individuals skills in relation to relocation of the Emergency Management Team (EMT) from the primary Emergency Operations Centre (EOC) to the designated Alternate EOC as required by *EHSMS 13 EMERGENCY PREPAREDNESS*. **Scenario:** A report of a fire in Area 65/75 Cold Box A has been received by the Moomba Communications Operator. The Moomba Plant Evacuation has been (notionally) instigated. The appropriate emergency response notifications are to be carried out by Moomba Comm's as per the relevant procedures. Once the EMT have established operations in the primary EOC the E/S1 will give the instruction that due to a forecast wind change the EMT are to relocate to the Alternate EOC (vehicles are safe to be used for this relocation). The evacuation sirens will not be sounded and no persons will be expected to muster at the designated muster points.	**Objective Outcomes:** • To practise and assess the effectiveness of relocating to the Alternate EOC (as per the Cooper Basin Emergency Response Procedure). • To facilitate the relocation and subsequent re-activation of emergency communications and journey management systems. • To practise and assess the ability of all EMT members to relocate to the alternate EOC in a timely and effective manner.	**Observations:** • Number of vehicles available to relocate staff and equipment was not a problem. • Access to the Comm's Workshop is restricted to master key access only. • The building requires the use of the generator to be started due to the power shortage. • The DIM contact number was not available at the Alternate EOC. • Continuous communication was happening between FCP to EOC and M/P's to EOC. A broadcast was announced from the EOC to M/P's "That the EOC is moving to the Alternate EOC". Comms were unable to have journey management online due to technical problems. The Work Instructions on how to log into the general system was not correct. • The Alternate EOC was set up in a timely matter. Each person knew of their roles and responsibilities. • Training Room M/P has obstacles in the way. It was queried whether there was a requirement for Production to attend the EOC. **Learnings:** • The journey management system does not like to be rebooted. • The Romtec is unable to be monitored from the Alternate EOC. • The communications between the EOC to & from the camp M/P were not clear and sometimes unreadable. • All communications should be transmitted through dedicated phones & base radios and not through personal hand held radios. **Actions:** • Place the DIM contact number in the Alternate EOC. • Update the Work Instructions on how to get the Comm's system on line (Refer ERP49). • Create a template that the Comm's Officer can use, in the event of the manual system being used to track vehicle movements in the field. • Investigate if the Romtec can be logged in remotely from the

				Alternate EOC. • Upper management to elevate the topic around the lack of support in implementing a new journey management system. • Include in the ERP a reminder that "All communications should be transmitted through dedicated phones & base radios and not through personal hand held radios". • Investigate if there is a need for a Production Team leader to attend the EOC.
30/06/2013	**OPREX**	**Limestone creek – Medical** This exercise will be an operational exercise (OPREX), designed to practice established emergency response procedures and individual skills in relation to a response to a medical emergency in the Limestone Creek production satellite as required by EHSMS 13 EMERGENCY PREPAREDNESS. **Scenario:** The Area operator will be told that his work colleague is experiencing tightness in the chest, he has shallow breathing and requires First Aid and monitoring until RFDS arrive on site. After being cared for by his work colleague, he falls unconscious and stops breathing.	**Objective Outcomes:** • To practice and assess the appropriate notifications and information transfer from the Limestone Creek site back to the Moomba Communications Centre in the event of such an emergency taking place. • Provide a skills maintenance opportunity for Production Department personnel in First Aid treatment of the patient prior to RFDS arriving on site. • Skills maintenance on the use of onsite Defibrillator.	**Observations:** • Once the operator was briefed on the scenario, he immediately dialled 222 to raise the alarm on what the situation was occurring, some coaching was needed to identify what information was needed to be passed onto the Moomba Comms operator. The Comms operator also asked several important questions to prompt more information about the patient. It was also identified that 2 landing zones for the helicopter have been allocated for Limestone Creek, so the operators had discussed between which one would be more suitable for the helicopter to land at, and this information was then passed onto Moomba Comms. It was decided the Heli zone at the satellite would be most appropriate for this incident. • Once the production operator had made the call to Comms in regards to the patients symptoms, the occupational first aider returned to the camp to retrieve the Defibrillator to be on standby, he also brought back the Oxygen resuscitation kit. Whilst the production operator was on the phone to the RFDS, the nurse indicated what equipment was on hand, they replied with Defib and oxygen kit, she asked them to place the oxygen on the patient. • Neither person in the room had any training with this equipment, and were unable to put the equipment to use. • Although no training pads could be obtained to use the Defib in a training scenario, the operators seemed confident in applying CPR. They were also tested on where to place the Defib pads on the patient and this was done correctly. **Learnings:** • The Limestone operators were on the belief that calling 222 went directly to the RFDS, this is not the case as all 222 calls go directly to the Moomba Communications.

				• The equipment was laid out and was explained on how to use the various pieces of equipment, Training needs to be completed if this type of equipment is to be kept on site, and regular inspections and familiarisation on cylinder(O2) and equipment needs to be carried out. • There is no disposable razor and medical shears kept in the Defib case. **Actions:** • Team Leader OIL to organise Oxygen Resuscitation Therapy training for Limestone Creek Satellite and any other Satellites which have Oxy kits. • Team Leader OIL to organise the purchase of disposable razor and medical shears for the defibrillator at Limestone Creek and any other site under his control which carries Defibs and do not have these items in. • Obtain Updated "Basic Life Support Flow Chart" to replace out of date poster which is located inside the First Aid room – requires to read DRSABC.
31/08/2013	**OPREX**	**Tirrawarra – Search & Rescue** This exercise will be an Operational Exercise (OPREX), designed to practice established emergency response procedures and individuals skills in relation to Communications, Search & Rescue Procedures, Vehicle accident management and casualty management as required by *EHSMS 13 EMERGENCY PREPAREDNESS.* **Scenario:** At 09:00 hours Saturday Moomba Comms are contacted via radio by an operator working in the Tirrawarra field, reporting an accident involving a Santos vehicle with casualties. Search and rescue procedures are activated by Moomba Communications from the information provided by the caller. The Caller will provide GPS coordinates of the accident location.	**Objective Outcomes:** • Assess onsite staffs ability to manage an Emergency Situation. • Provide a training opportunity for the OFA on site. • To assess the effectiveness of raising the alarm through to Moomba Comms. • Assess staff's ability to safely render assistance during a vehicle accident. • Provide an opportunity for Heli-West to practice Search and Rescue procedures.	**Observations:** • Responding personnel followed correct response procedures and provided good clear information and directions to Moomba Communications. Attending responders showed good casualty management and scene preservation. Stabilisation of the casualty was priority and managed well until the RFDS arrived. • Onsite OFA's did an outstanding job with providing first aid treatment. Established early on the patient had severe neck pain and a neck collar was placed on the casualty straight away. Great team work by all OFA's. Continuous communication with the patient was carried out. The extrication of the casualty was perfect and minimal movement to the spine was achieved. • Raising the alarm through Channel 9 was excellent. Great information relied to Moomba Comms. • Original GPS co-ordinates were incorrect and put the helicopter 2km out. However with communication to the responders on the ground and correct procedures the pilot was able to locate the accident scene. **Learnings:** • Ensure the OFA performs a handover with the incoming RFDS. To ensure all information is captured. • Was suggested to place 1m length ribbons on ground to act

		All Santos Emergency response procedures are to follow.		as wind indicators for the helicopter. Also a good idea to walk the heli-pad to ensure the ground is even and stable for the chopper to land.
17/11/2013	**OPREX**	**Merrimelia Oil – Fire with Injury** This exercise will be an Operational Exercise (OPREX), designed to practice established emergency response procedures and individuals skills in relation to Emergency response, Raising the alarm, First aid and casualty management and casualty retrieval as required by EHSMS 13 EMERGENCY PREPAREDNESS. **Scenario:** At 09:00 hours on Sunday 17th November, a production worker from Merri. Oil is doing routine inspections of the oil storage tanks at Merri Oil Satellite. Whilst opening the hatch on the roof of number 2. Tank the worker is consumed by fire after the vapours flashed from an unknown ignition source. The fire went out as the operator managed to close the hatch but the operator sustained burns to his face, neck and chest. The operator has staggered down to the first level of the stairs and has passed out on the first small platform. It is unsure whether the worker fell or is in shock.	**Objective Outcomes:** • Assess onsite staffs ability to manage an Emergency Situation. • Provide a training opportunity for the OFA on site. • To assess the effectiveness of raising the alarm through to Moomba Comms. • Assess staff's ability to safely render assistance, stabilise and apply basic first aid during an accident. • Assess staffs ability to retrieve a casualty from heights during an emergency.	**Observations:** • Responding personnel followed correct response procedures. A safety first approach was taken at all times upon investigating the emergency and provided good clear information and directions to Moomba Communications. Attending responders also showed good safety behaviours. Chris Gordon gained valuable experience as a loan worker on a work site of how to respond to an incident if one should occur. • The use of improvisation when erecting shade for the casualty was good. • Onsite OFA's did an outstanding job with providing first aid treatment. Established a good handover with the operator on site. A neck collar was placed on the casualty early as a precaution and was good to see basic protection protocols adhered to. Great team work by all OFA's. Continuous communication with the patient was carried out. The extrication of the casualty was planned well and minimal movement to the spine was achieved. Treatment of the burns was high priority and treated accordingly. • Raising the alarm through 222 was achieved well. Good information relayed to Moomba Comms. when prompted. • Initial first aid was applied well with personnel safety in mind. Handover to the on-coming OFA was good and continued treatment of the casualty was performed well until handover to the arriving RFDS Nurse. • Good use of the spine board and great team work was demonstrated within the limited space provided. All movements were executed well with good instruction and leadership shown. **Learnings:** • Communication is always going to be difficult when the accident site is some distance from the phone or radio. Use radio to communicate whilst staying with the casualty as help will be some time away and the condition of the casualty will suffer quickly if not managed. • Ensure all equipment is brought out to the accident site in case is needed for incident. Eg, basket stretcher from Tirrawarra would have made retrieving the casualty a little easier and eliminated the need to strap the patient in. Ensure the OFA performs a handover with the incoming RFDS. To

				ensure all information is captured. • Ensure as much information is relayed to Comms. as possible. • Use of basket stretcher could have provide and easier option if available. **Action:** • Source or purchase suitable shade protection for use in such events.
07/11/2013	**OPREX**	**MOOMBA FC 47/60/70 CAMP (After Hours)** This exercise was held at 19:30Hrs to capture a full camp including the new 60/70 camp and the evacuation of recreational areas including the wet mess. Approx. 900 personnel (almost full camp). This event will be an operational exercise (OPREX), designed to practice established camp emergency evacuation drill procedures and functional management roles in the FC 47/60/70 camp as required by EHSMS 13 Emergency Preparedness. **Scenario:** The Spotless Staff will be required to activate the Evacuation alarms as per the procedure. They will also be required to door knock all vans as per the procedure to ensure evacuation has been completed.	**Objective Outcomes:** • Assess the effectiveness of evacuation procedures for the FC 47/60/70 camp. • Practice and assess the operation of the Muster point at the FC 47/60/70 camp. • Practice and assess procedures for activation of the multiple manual siren activation points. • Practice and assess procedures for clearance of the FC47/60/70 accommodation vans within acceptable time frames (40 minutes).	**Observations:** • Camp personnel attended the MP in a safe manner. Some camp personnel refused to Muster. Some Departments Supervisors were unsure of their responsibilities during a Camp Muster. • Spotless Muster Point Controller (MPC) was clearly visible & identifiable. The MPC knew her role & responsibility. Majority of site personnel once at the Muster Point did not leave until told to. Majority of site personnel gathered appropriately in their groups or departments. MPC nominated a staff member to frequently relay voice messages to all personnel. Multiple swipe points were working effectively. All camp sirens activated. Allowing the camp sirens to be activated for a max of 15mins worked successfully. • MPC was unable to liaise with the EOC via the Camps Muster Point intercom. The newly installed swipe points failed to work after approx. 10 mins. Majority of personnel at the MP were unable to hear any messages relayed through the loud hailer. There was not enough lighting around the area that the MPC was working in. The FC 70 camp siren stopped working. • All camp sirens activated. Allowing the camp sirens to be activated for a max of 15mins worked successfully. • MPC in a timely manner had Spotless staff checking rooms. If the power failed at some point (night time) would Spotless have enough torches. **Action:** • Add in the Procedure that an All Clear Siren is activated. • Install a large sign with basic steps that must be undertaken by all personnel when they arrive at the Muster Point. • Determine if there is a need to purchase more Hi-Vis vests and creating new position titles. • Repair the Camps Muster Point intercom. • Repair the swipe card readers, and investigate why they stopped working.

				• Look into a hard wired PA system with multiple speakers and a microphone. Voice over ride, continuously relaying a message on what to do while at the Muster Point. • Repair the FC 70 camp siren. • Purchase more UHF radios to assist in better communications. • Identify if Spotless require the purchase of more torches.
13/10/2013	**DISCEX**	**Central Fields - Production** This exercise will be a DISCEX, designed to practice established emergency response procedures and individual skills in Safely Rendering Assistance at Vehicle Accidents. **Scenario:** Participants will meet and view the Safely Rendering Assistance at Vehicle Accidents power point before opening discussions.	**Objective Outcomes:** • To discuss and review initial emergency response arrangements in the event a vehicle accident has been discovered. • To discuss and review the appropriate notifications and information transfer to Moomba Communications • To discuss and review the appropriate response, in the event of such an emergency taking place. • To discuss and review the effectiveness & skill levels and available resources to safely render assistance at vehicle accidents.	**Observations:** • Much discussion was focussed on vehicle safety and scene preservation. There were also discussions around the correct things to do such as vehicle isolations, responder's safety, vehicle positioning as well as road safety, patient management and prioritising injuries. • Radio communication skills were discussed and the protocols for keeping the airways open in the event of an emergency. The group also discussed radio terms and appropriate language to use when communicating to Moomba Comms. and the chopper pilot. **Learnings:** • Important facts regarding unemployed air bags was understood. Note taking and scene preservation was also highlighted. • Terms like "no duff" " check, check, check" and "priority message" are all good ways to clear the radio traffic when sending priority messages. Avoid using names over unsecured airways. • Most learning's were gained from watching the Safely Rendering Assistance at Vehicle Accidents power point presentation providing valuable knowledge to operators unfamiliar with the role they can perform if the situation occurs.
28/09/2013	**OPREX**	**Moomba Major Exercise** The 2013 Major plant exercise for the Moomba plant will be an operational exercise (OPREX) designed to analyse	**Objective Outcomes:** • To validate the effectiveness of the current Moomba Emergency Plan, Emergency	**Observations:** • Position knowledge – EOC team members used and referenced the positional role descriptions in the Moomba Emergency Response Plan (ERP) regularly.

		the effectiveness of established emergency response procedures, strategic decisions made by the Emergency Response Team within the EOC and tactics employed by the combatants at the location of the emergency. Under review will also be the effectiveness of evacuation procedures for a major hazardous facility. **Scenario:** Two maintenance contractors arrive at Gate 10 and prepare to swipe in entry to the Plant. They observe a white cloud, approximately the size of a vehicle, emanating from the pipework at the base of the Nitrogen storage vessels and a Process Operator lying motionless on the roadway to the North of the Nitrogen storage area. One maintenance contractor raises the alarm and the second contractor goes to render assistance to the collapsed Process Operator. Whilst raising the alarm, the first maintenance contractor observes the other contractor collapse to the ground near the Process Operator. Both the Process Operator and the maintenance contractor are lying motionless and their gas detectors are in alarm. Both casualties will be simulated with training manikins to mitigate any casualty handling issues and will be found to be deceased.	Response Procedures and the Moomba Plant Contingency Pre-Plan. • Measure the effectiveness of call, receive and dispatch procedures and relevant notifications. • Measure the effectiveness of first response capabilities and training. • To employ HAZMAT and rescue tactics to provide continuous improvement opportunities for Emergency Services Officers and Process Personnel. • Provide the opportunity to practise casualty assessment, treatment and transportation. • To present the Moomba Emergency Response Team with a scenario that will require the implementation of the Moomba Emergency Plan, strategic management and support of the emergency. • Manage any environmental concerns from the emergency. • Identify any weakness in the plans, procedures and training so actions can be assigned to rectify any potential issues.	• Regular SITREPS were provided by the Incident Controllers • The use of positional prompt cards at each work station in the EOC aided in the completion of the roles. • The Process Departments Emergency Response procedures worked well, operators manned the plant gates in a timely manner and were able to guide personnel evacuating, and restrict access to unauthorised personnel. • Advanced Fire Fighting and First Aid trained personnel were quickly identified at muster points and transported to the Forward Command Post (FCP) in a timely manner. • The muster points were manned quickly and control was taken and personnel organised as per procedures and the ERP. • The timely notification of the Duty Incident Manager (DIM). An initial SITREP of the incident occurrence was provided, and information that concerned casualties/deceased persons was delayed until all information had been gathered to provide the DIM with an accurate report. • The Plant Unit Controller notified Moomba Communications Centre with the correct information, who in turn initiated the pager message as per the Moomba Emergency Response Procedures. • The plant siren was sounded quickly upon the receipt of the incident notification by the Unit Controller. • The majority of the EOC personnel responded to the EOC upon hearing the plant siren. • The area operator raised the alarm and did not put themselves into a position of danger and maintained situational awareness. • Emergency Services were operating with a reduced amount of personnel due to the NO DUFF incident and required additional Advanced Fire Trained personnel, which were gained via the muster points. • The flexibility and multiple access points to the plant area. The initial call was made to enter the plant via Gate 10, however based on information from the area operator at the scene, this was subsequently changed to enter via gate 8 B prior to the arrival of Emergency Services • The consideration given to where the “gas cloud” was moving and the set-up of exclusion zones based on the use of portable gas detection units and testing/monitoring methods. • The consideration given to what type of gas detection units required due to the gas release being an inert gas e.g. Infra Red units (Drager XAM-5600) vs Catalytic Units (Drager XAM-2000)

				• Additional first aid personnel being raised from the muster points to assist and take over casualty treatment from Emergency Services Officers • The EOC skills were tested and all members were challenged by the complexity of what seemed like a simple emergency initially. **Learnings:** • A Logistics Support person is allocated by the Operations Support Team Leader, and is a critical aid to the Logistics Officer. • Physical and human resources are limited for any emergency type within the Cooper Basin, particularly more so with a rationalisation of field based personnel. • The ACE Building was locked, which restricted access to the personnel mustered at this location to the toilets and other amenities including drinking water. • Use of Tabbards made the identification of key position holders effective for all personnel. • When an EOC position holder has to leave the EOC, they should inform all team members of their departure, intended location and expected time of return. • The use of the Special Events radios for communications between EOC personnel. • Engineering maps were pinned to the walls making access to Event Historian tools e.g. whiteboards difficult • The methodologies surrounding Incident Management such as Management by Objectives and the use of incident management tools such as SITREPS and SMEACS to set objectives. • There is a delay in the time it takes from when the Communications Centre operator initiates the pager message to when it is physically received. Hence why many EOC personnel did not receive the page until they were physically in the EOC. • Additional physical resources were required from the Emergency Services building logistics personnel did not know where equipment is stored which increased the time required to source and dispatch the equipment to the forward command post. • The lock on the Gate 8 was not immediately operable (suspect filled with dust/dirt). If required in an emergency, Emergency Services personnel would physically remove the lock with hand tools. • The backup Moomba Ambulance was not onsite (currently on

				loan to Mereenie). Alternate arrangements would have to be made to transport casualties to the Moomba Health Centre in an actual event. **Action:** • Replace the missing hard copy of the Moomba Plant Contingency Pre Plan in the EOC. • Moomba Plant Contingency Pre Plan to be updated to include the Nitrogen Storage Facilities. • Consider relocating the special events radio's to a more prominent location in the EOC. • Send copies of SITREPS and SMEACS posters and prompt sheets to Moomba for placement in the EOC. • Spotless Security to ensure that the ACE Building is opened daily. • Assign a key for the Training Rooms and ACE building is assigned to the Training Room Muster Point Controllers pager.
26/10/2013	**DISCEX**	**Moomba Aerodrome Exercise** This exercise is a discussion exercise designed to extract high levels of knowledge from more experienced personnel and enlighten new personnel of company policies in the event of emergencies, equipment locations, roles and responsibilities, first aid and emergency control. This exercise is a requirement of EHSMS 13 EMERGENCY PREPARDNESS. **Scenario:** Flight NC11 has landed in Moomba and taxied onto the apron and parked with its nose pointing to the East. Ground staff are in the process of placing the stairs into position and the luggage trolleys have been brought alongside in preparation for unloading baggage. The refueller truck has stopped in position to add fuel to the starboard wing tank. The portable scaffold has been positioned and the pressure	**Objective Outcomes:** • To evaluate the situation at hand and promptly notify the correct personnel. • Ensure correct on site personnel are informed and responded as required. • Ensure all relevant. communications are made to Santos management and Government agencies. • Develop an incident action plan and plan for business continuity. • Manage medical requirements and evacuation plans. • Consider all other flow on effects from the immediate emergency.	**Observations:** • The Cooper Basin Airport Manager would assume initial control of the emergency and direct the following actions – • Call 222 to advise Moomba Comms & request an emergency response from RFDS, E/S & Santos Management. • Direct ground crew members to provide immediate first aid to casualty. • Advise pilot of situation & initiate safe disembarkation of PAX and crew. • Moomba Comms would send page notifying Emergency Services, RFDS and on-call EOC personnel of aerodrome emergency. • Once the EOC is established, the ERC would obtain as much information on current situation as possible in order to make the required notifications. Initial notifications would be made to Santos Duty Incident Manager (DIM), CASA/ATSB, SAPol, Toll Energy and EHS & Compliance. Initial notifications would be followed up with detailed information when it became available. Further notifications would be made to Santos HR management advising them that Contractor company HR departments would need to be notified as casualty details became available. Moomba Camp Manager would also be advised pending requests for water, transport, or provision of bedding etc. • Airport Manager would advise Cobham ATO-OPS and

		connector has been attached to the underside of the wing. The earth strap is connected to the aircraft and the supply hose from the truck is then connected to the portable scaffold. The refueller commences to pump fuel into the aircraft and notices what appears to be fuel leaking from the connection into the portable scaffold. He moves forward to investigate and as he does so, an o-ring fails, spraying jet-A1 onto the refueller and towards the rear of the hot outboard turbine. A flash fire occurs, engulfing the refueller and the failed connector. The refueller is able to ESD the refuelling operation and the fire is quickly extinguished by ground staff using DCP extinguishers. The refueller suffers second degree burns to hands, forearms and chest, with first degree burns to face and suspected injury to respiratory organs. Damaged is sustained to the refuelling connections and there are visible scorch marks on the nacelle. Dry Chemical powder is visible on the nacelle and compressor blades. None of the 72 persons on board have disembarked the aircraft but many have observed what has just occurred. The temperature at the Moomba Aerodrome is 38 degrees with a South East wind 10 km/h gusting to 20 km/h.		advised that any Media enquiries were to be directed to Ball Public Relations. The Airport Manager would also liaise with Air Services Australia regarding issuance of Notams. • EOC would provide ongoing SITREPS to the Duty Incident Manager, information provided by the Airfield Reporting Officer would be advised to CASA. • Emergency Services and RFDS would deploy and while enroute would seek additional information regarding the position and condition of the aircraft, fuel tanker, passenger evacuation status and any injured persons. Upon arrival establish a forward control point in a position of safety approx. 100m from the aircraft. Crew would be deployed to make area safe and when safe, assist with passenger evacuation and medical support to any injured persons. Evacuating PAX would be marshalled away from area to a place of safety – terminal building or helicopter hangar. Assistance from first aid trained persons would be sought from outgoing PAX; remaining PAX would be directed back to camp and kept informed of alternate travel arrangements when they became available. • Airport Manager would liaise with Pilot and Airfield Reporting Officer about aircraft serviceability and any actions required to repair/replace aircraft. Airport Manager advised that refuelling could be undertaken using fixed hose spool until refuelling truck was repaired. Contracts Coordinator – Aviation to liaise with Airport Manager/Cobham ATO-OPS to make arrangements for repairs, as necessary, to aircraft; or alternative aircraft to transport outgoing PAX. • EOC would request Camp Manager for bus to shuttle persons back to camp, water to area where PAX were being marshalled and any persons trained in first aid to assist where required. • RFDS personnel dispatched by Moomba Comms would travel to airport and while enroute establish the current location of the casualty. On arrival at the airport, report to the Forward Control Point and await instructions to proceed from Emergency Services. After clearance, proceed to casualty and render medical care. Transport casualty to medical centre and organise aeromedical evacuation as per procedure. **Learnings:** • The ground crew personnel are provided by Contractors. Due to shift arrangements and rotation of personnel, the existence or currency of first aid or basic firefighting skills could not be determined.

				• There was discussion about the level of detail that would likely to be provided in the initial page. All responses to this emergency would be reactive; therefore significant further information would be required whilst personnel and equipment were on route to the aerodrome. This information would likely be sought from the Airport Manager, who may be involved in initial actions and not contactable. Field Services would be requested to provide a suitable person to perform the role of Airfield Reporting Officer. • While notification of the Santos HR Department would include discussion on accessing EAP to provide counselling services to persons seeking assistance, there had previously been a Peer Support network available within the Cooper Basin. Discussion identified that this network had not been maintained and that contact lists for support trained personnel were out of date & the provision of Peer support had been predominately superseded by the Adelaide based HR Department. Whilst counselling services would be flown up from Adelaide, there was no on-site service immediately available to trauma affected persons. • The Moomba Aerodrome Emergency Plan (MAEP) makes reference to marshalling people to designated areas in a place of safety, given the changes to airport infrastructure; the nominated designated places may need revision. There was also discussion as to who would be responsible for control and direction of evacuating and outgoing PAX. It was identified that there would be minimal Security personnel in attendance at the airport and that additional Security personnel would have to come from rostered night shift personnel, creating HSW issues for subsequent shifts. It was identified that outgoing PAX would need to be delegated this function until suitable persons could be deployed by the EOC. There are currently no procedures in place for marshalling people, Incident debriefing or managing welfare for large groups of affected persons. • Assistance to RFDS with loading/driving ambulance and on-scene casualty management is usually provided by Emergency Services personnel, with an emergency of this nature, assistance would be sought from first aid trained outgoing PAX. **Action:** • Determine levels of fire and first aid training held by Contractors as these persons are likely to undertake initial actions prior to the arrival of Emergency Services and RFDS responders. Where gaps in skills are identified, facilitate skills

				sessions to ensure persons can safely undertake basic actions. • Review Moomba Aerodrome Emergency Plan to update designated areas for mustering people in the event of an aircraft emergency. • Develop a procedure for the control and marshalling of persons evacuated from an aircraft away to a designated place of safety. Identify responsibility for implementing procedure at an aircraft emergency. Identify responsibility in MAEP as a Security role. • Develop procedure for debriefing and managing welfare where persons have been evacuated from an aircraft and mustered. This procedure could similarly be utilised at any emergency where multiple casualties have been incurred or persons potentially affected by psychological trauma. • Update contact list and develop procedure for implementing Peer Support at emergencies within the Cooper Basin.
Multiple (Process)	**Moomba Process Department Scenarios included:** • Dara drain valve leak 15/02/2013 • Reinjection - Withdrawal Line Rupture 24/03/13 • Tk 3000 Roof Top Fire 05/04/2013 • SWQ Inlet Pipe blind failure 06/05/2013 • Moomba Plant Electrical fire #9 Instrument Air Compressor 19/05/2013	**Process DISCEX Example** **SWQ Inlet Pipe blind failure 06/05/2013** This exercise will be a Desktop exercise discussion, designed to practice established emergency response procedures and individual skills in relation to a response to a emergency in the Cooper Basin Environ *EHSMS 13 EMERGENCY PREPAREDNESS.* **Scenario:** Two process workers are working on the SWQ inlet pipe when a blinding has failed and is releasing a gas cloud to atmosphere. The two operators immediately evacuate the area and raise the alarm. The wind is pushing the gas cloud towards the Emergency Services building (easterly direction). The building is evacuated and the	**Objective Outcomes:** • To evaluate the situation at hand and promptly notify the correct personnel. • Perform any isolations if safe and possible to do so. • Roles and responsibilities of process operators. • Consider alternate fire fighting abilities since no fire appliances are available.	**Observations:** • The group discussed that the situation on hand was a high risk event, and no personnel would stay in the immediate area until the appropriate fire fighting equipment was deployed and the UC were informed, the UC would be informed via radio call with information containing the following information: • What had happened, what's happening, who's affected, who's involved, all operators had a sound knowledge and agreed on the process of how to raise the alarm. • The only isolation that can be made on the SWQ pipeline is from the Unit Controller and this is done via remote closing of a single valve located at Innamincka which is Approx. 100km from the Moomba Plant. • Each Process Operator were very knowledgeable and confident in what roles they would take on in such an event, contacting the Unit Controller was the first priority to evacuate the plant etc, set up fire fighting equipment, clearing the area of non essential personnel and checking all areas for anyone that may have not evacuated the area as instructed by sounded the evacuation sirens. They also discussed the importance of getting all traffic diverted away from the immediate area as well. • All the groups that participated in the exercise had the same idea, that fire monitors and hoses would be deployed ASAP, even in the event that the Emergency Services appliance

		emergency services are unable to respond with their appliances.		could not be utilised, Fog/power cones would be used to disperse the gas cloud from the nearest hydrants and monitors, ground monitors could also be collected from the Emergency Services building when safe to do so. With the location of the incident it was discussed that no appliance would be able to access the area anyway. **Learnings:** • Once the valve is closed in at Innamincka Approx. 24 hrs of gas is still in the pipeline, consideration of number of personnel to combat this event would need to be considered so rotation of process and Emergency Services personnel would need to be carried out due to fatigue related issues. Also fire fighting water supply would also need to be monitored throughout the operation. • The gas that is left in the Moomba Plant side would go straight to flare. • Regular training and exercises like the desk top scenario help keep skills and knowledge to a good standard. • Fire fighting training for process operators is conducted on a 3 yearly basis on the Advance Fire fighting course which is instructed by Emergency Services, training in the use of SCBA, branches, hoses, monitors and extinguishers are all covered in a 3 day training. Process operators have access to fire fighting protective clothing in the main control room for a more advance level of protection. • Fire monitors in the Moomba environs are designed for attack purposes and do not rely on a fire appliance to operate, the fire mains system is boosted by diesel fire pumps which can maintain a good working pressure of Approx. 1000kpa. There are 3 fire pumps that can be utilised in this type of event.
Multiple	**Camp Evacuation OPREX**	**Camp evacuation** Camp evacuation exercises were carried out on all shifts at Moomba Dullingari and Tirrawarra throughout the year. (Moomba Operations Camp FC47 As detailed above)	These operational exercises also included practical components to provide an opportunity for occupational first aiders and Advanced Firefighters to practice their skills and use of associated equipment.	Review, update of evacuation procedures and updated Muster Point Controller equipment Eg. • Extra radios purchased for camps. • More powerful Loud Halers • Evac Siren upgrades
Multiple	**Other**	Muster Point Controller Training. The muster point training delivered on area of responsibility i.e. Airport, Training Room, Operations Camp or Main Gate Muster Points.	Muster Point Controller Training is delivered on a regular basis to capture new employees and new position holders with Muster Point Controller responsibilities. In	A copy of training records kept in the Moomba EOC Muster Point Controller training record folder.

			addition Muster point controllers are now included in exercises to enable practise of their roles.	
Multiple	**Other**	Individual EOC Roles and Responsibilities Training.	An extensive training campaign was undertaken during 2013 to deliver individual EOC training targeting newly appointed personnel with EOC position responsibilities. Also covered off number of EOC exercises 2013	A list of EOC position holders is kept in the EOC A copy of training records kept in the Moomba EOC and recorded on AIMS.
Multiple (weekly)	**Drill**	Emergency Services skills maintenance drills.	Moomba ESO's conducted weekly skills maintenance drills including, but not limited to, the following disciplines - Rope Rescue ,Confined Space Rescue, Road Crash Rescue, CABA search and rescue, Live Oil & Gas Fire Fighting, HAZMAT Response, etc.	Develop 2013 schedule for weekly ESO skills maintenance training sessions.

Appendix 4 Well Drilling Lease Scout, Construct, Backfill and Restoration Activity – 2013

#	Well Name	Well No.	Scout Date	Wellsite Construct Commence	Well Status After drilling	Borrow Pits	No B/Pits Restored	Lease Restored	Photos Taken	Road Km Built	Road KM Restored	Lease Backfilled Y/N
1	Charo	6	28/05/2009	6/07/2009	Oil	1	0	No	Yes	0.5	0	Yes
2	Charo	11,12,13	19/11/2011	18/01/2012	Oil	0	0	No	Yes	0.46	0	Yes
3	Charo	10	17/12/2011	13/01/2012	Oil	1	0	No	Yes	0.75	0	Yes
4	Charo	9	17/11/2011	28/12/2011	Oil	0	0	No	Yes	1.3	0	Yes
5	Charo	15	6/12/2011	5/02/2012	Oil	1	0	No	Yes	0.28	0	Yes
6	Coonatie	18	18/09/2009	11/01/2010	Gas	2	0	No	Yes	1.7	0.5	Yes
7	Coonatie	19	18/09/2009	2/01/2010	Gas	1	0	No	Yes	0.4	0	Yes
8	Coonatie	17	18/09/2009	9/12/2009	Gas	1	0	No	Yes	0.5	0	Yes
9	Coonatie	15	18/09/2009	27/01/2010	Gas	1	0	No	Yes	0.3	0	Yes
10	Coonatie	14	18/09/2009	31/01/2010	Gas	1	0	No	Yes	0.4	0.2	Yes
11	Coonatie	20	18/09/2009	16/01/2010	Gas	1	0	No	Yes	1.2	0.5	Yes
12	Coonatie	16	18/09/2009	19/12/2009	Gas	2	0	No	Yes	1	0.5	Yes
13	Moomba	190	25/03/2011	23/08/2011	Gas	1	0	No	Yes	0.7	0.7	Yes
14	Moomba	184	31/08/2009	16/12/2010	Gas	1	0	No	Yes	1	0	Yes
15	Moomba	185	31/08/2009	28/02/2011	Gas	1	0	No	Yes	0.6	0	Yes
16	Moomba	186	31/08/2009	16/03/2011	Gas	1	0	No	Yes	0.5	0	Yes
17	Moomba	189	17/01/2011	12/08/2011	Gas	2	0	No	Yes	0.7	0	Yes
18	Moomba	182	22/06/2007	10/09/2007	Oil	1	1	No	Yes	0.2	0	Yes
19	Moomba	187	31/08/2009	16/12/2010	Oil	1	0	No	Yes	0.4	0.4	Yes
20	Moomba	188	25/03/2011	3/08/2011	Gas	4	0	No	Yes	0.7	0.2	Yes
21	Mudera	12	19/07/2008	12/01/2008	Gas	1	0	No	Yes	0.9	0	Yes
22	Mudera	13	19/07/2007	4/01/2008	Gas	1	0	No	Yes	1.4	0	Yes
23	Mudera	14	19/07/2007	20/01/2008	Gas	1	0	No	Yes	1.2	0	Yes
24	Mudera	9	21/12/2005	14/03/2006	Gas	4	2	No	Yes	0.6	0	Yes
25	Mudera	15	19/07/2007	23/01/2008	Gas	1	0	No	Yes	0.5	0	Yes
26	Mudrangie South	1	16/12/2008	20/01/2009	Gas	1	0	No	Yes	1.2	1.2	Yes
27	Ragno	1	19/10/2006	3/07/2007	Oil	1	0	No	Yes	2.3	0	Yes

28	Seccante	1	19/10/2006	21/06/2007	Oil	3	0	No	Yes	1.1	0	Yes
29	Shazlick	1	30/01/2007	28/02/2007	Oil	5	0	No	Yes	0.3	0.3	Yes
30	Squalo	1	14/11/2007	28/01/2008	Oil	1	0	No	Yes	0.8	0	Yes
31	Tindilpie	13,14 15,16,17,18	10/11/2011	13/12/2011	Gas	1	0	No	Yes	1.2	0	Yes

PEL 114 - Nil

PPL 225

31	Stimpee	3	22/06/2007	28/06/2007	Oil	1	0	No	Yes	0.05	0	Yes

PPL 226 - Nil

Appendix 5 Well Workover Summary

#	WELL	START DATE	END DATE	WORKOVER ACTIVITY	FRACTURE STIMULATION
1	Kanowana 9	18/12/2012	1/01/2013	Gas Completion	N
2	Big Lake 94	25/12/2012	3/01/2013	Gas Completion	N
3	Tindilpie 17	26/12/2012	1/01/2013	Gas Completion	N
4	Andree 4	2/01/2013	6/01/2013	Gas Completion	N
5	Kanowana 8	2/01/2013	18/01/2013	Gas Completion	N
6	Big Lake 41	4/01/2013	17/01/2013	Integrity	N
7	Big Lake 4	7/01/2013	13/01/2013	Gas Workover	N
8	Waukatanna 4	7/01/2013	2/02/2013	Gas Completion	Y
9	Dilchee 2	14/01/2013	20/01/2013	Gas Workover	N
10	Woolkina 2	18/01/2013	28/01/2013	Gas Workover	N
11	Fortanna 1	19/01/2013	8/02/2013	Gas Workover	Y
12	Lake Macmillan 1	28/01/2013	13/02/2013	Gas Workover	Y
13	Waukatanna 5	8/02/2013	10/02/2013	Gas Completion	Y
14	Bobs Well 3	10/02/2013	13/02/2013	Gas Completion	Y
15	Kudrieke 2	14/02/2013	26/02/2013	Gas Workover	Y
16	Nephrite South 6	24/02/2013	2/03/2013	Gas Completion	Y
17	Tallerangie 1	27/02/2013	12/03/2013	Gas Workover	Y
18	Gidgealpa 60	3/03/2013	12/03/2013	ESP Repair	N
19	Tindilpie 16	13/03/2013	18/03/2013	Gas Completion	N
20	Big Lake 41	13/03/2013	4/04/2013	Integrity	N
21	Merrimelia 24	19/03/2013	7/04/2013	Oil Workover	N
22	Alwyn 5	25/03/2013	31/03/2013	BP Repair	N
23	Ragno 1	30/03/2013	3/04/2013	PCP Repair	N
24	Ulandi 1	31/03/2013	3/04/2013	BP Repair	N
25	Bugito 1	3/04/2013	7/04/2013	PCP to LRP Conversion	N
26	Biala 2	4/04/2013	7/04/2013	BP Repair	N
27	Pirraminta 1	5/04/2013	11/04/2013	P&A	N
28	McKinlay 9	7/04/2013	9/04/2013	PCP Repair	N
29	Cooba 4	7/04/2013	13/04/2013	Gas Completion	Y
30	Biala 2	12/04/2013	14/04/2013	BP Repair	N
31	Merrimelia 45	12/04/2013	24/04/2013	Gas Workover	N
32	Tallerangie 1	13/04/2013	17/04/2013	Gas Workover	N
33	Jena 1	14/04/2013	19/04/2013	Oil Workover	N
34	Moolion 6	18/04/2013	20/04/2013	Gas Completion	Y
35	Jena 9	19/04/2013	20/04/2013	BP Repair	N
36	Toolachee 5	19/04/2013	28/04/2013	Gas Completion	Y
37	Moolion 5	20/04/2013	23/04/2013	Gas Completion	Y
38	Narcoonowie 7	21/04/2013	25/04/2013	BP Repair	N
39	Burke 6	24/04/2013	28/04/2013	BP Repair	N
40	Tirrawarra 74	24/04/2013	28/04/2013	Gas Completion	Y
41	Moomba 72	24/04/2013	16/05/2013	Pre Frac Workover	N
42	Munkarie 10	26/04/2013	28/04/2013	Gas Completion	N
43	Toolachee 30	28/04/2013	2/05/2013	Gas Completion	Y
44	Burke 9	28/04/2013	4/05/2013	BP Repair	N
45	Tirrawarra 75	29/04/2013	4/05/2013	Gas Completion	Y
46	Goyder 6	29/04/2013	5/05/2013	Gas Completion	N
47	Brumby 13	3/05/2013	6/05/2013	Gas Completion	Y
48	Narcoonowie 10	4/05/2013	7/05/2013	Surface Repair	N
49	Dullingari 61	6/05/2013	10/05/2013	Gas Completion	Y
50	Dullingari North 20	13/05/2013	17/05/2013	Gas Completion	Y
51	Affogato 1	17/05/2013	23/05/2013	Oil Completion	N
52	Moomba 57	17/05/2013	5/06/2013	Pre Frac Workover	N
53	Woolkina 2	20/05/2013	24/05/2013	Gas Workover	Y
54	Narcoonowie 4	24/05/2013	26/05/2013	BP Repair	N
55	Rissikia 1	26/05/2013	28/05/2013	PCP Repair	N

56	Ulandi 13	28/05/2013	30/05/2013	BP Repair	N
57	Moomba 136	28/05/2013	31/05/2013	ESP Repair	N
58	Merrimelia 59	29/05/2013	10/06/2013	Oil Workover	N
59	Pitchery 3	30/05/2013	2/06/2013	BP Repair	N
60	Ulandi 9	31/05/2013	2/06/2013	BP Repair	N
61	Moomba 178	1/06/2013	9/06/2013	Gas Workover	N
62	Jena 25	2/06/2013	4/06/2013	PCP Repair	N
63	Strzelecki 27	4/06/2013	5/06/2013	Surface Repair	N
64	Kurunda 2	6/06/2013	18/06/2013	Gas Workover	N
65	Moomba 180	9/06/2013	22/06/2013	Gas Workover	N
66	Moomba 94	22/06/2013	27/06/2013	ESP Repair	N
67	Meranji 17	27/06/2013	1/07/2013	Pre Frac Workover	Y
68	Charo 10	2/07/2013	5/07/2013	BP Repair	N
69	Charo 7	5/07/2013	5/07/2013	Surface Repair	N
70	Charo 3	6/07/2013	16/07/2013	Injector Conversion	N
71	Charo 11	16/07/2013	17/07/2013	Surface Repair	N
72	Charo 15	17/07/2013	17/07/2013	Ratigan Repair	N
73	Granchio 1	17/07/2013	23/07/2013	Oil Workover	N
74	Roswell 1	20/07/2013	28/07/2013	Gas Completion	Y
75	Jena 18	23/07/2013	27/07/2013	BP Repair	N
76	Gidgealpa 51	23/07/2013	28/07/2013	Gas Completion	Y
77	Chorizo 1	27/07/2013	5/08/2013	Oil Completion	N
78	Moomba 72	28/07/2013	21/08/2013	Pre Frac Workover	Y
79	Farina 1	29/07/2013	12/08/2013	Gas Workover	Y
80	Bookabourdie 2	12/08/2013	27/08/2013	Pre Frac Workover	Y
81	Ulandi 6	13/08/2013	14/08/2013	BP Repair	N
82	Moomba 57	15/08/2013	22/08/2013	Gas Completion	Y
83	Moomba 122	22/08/2013	24/08/2013	Siphon String Pull	N
84	Moomba 141	25/08/2013	26/08/2013	Siphon String Pull	N
85	Juno 6	26/08/2013	30/08/2013	Gas Completion	Y
86	Charo 19	27/08/2013	2/09/2013	Oil Completion	N
87	Charo 18	2/09/2013	7/09/2013	Oil Completion	N
88	Charo 19	7/09/2013	11/09/2013	Oil Completion	N
89	Jena 11	11/09/2013	17/09/2013	BP Repair	N
90	Moomba 83	16/09/2013	19/09/2013	Gas Workover	N
91	Allunga 1	20/09/2013	31/10/2013	Gas Workover	Y
92	Big Lake 3	21/09/2013	18/10/2013	Pre Frac Workover	Y
93	Kudrieke 2	23/09/2013	28/09/2013	Gas Workover	N
94	Big Lake 54	18/10/2013	16/11/2013	Pre Frac Workover	Y
95	Charo 7	22/10/2013	30/10/2013	Oil Workover	N
96	Charo 18	30/10/2013	5/11/2013	Oil Completion	N
97	Gidgealpa 26	30/10/2013	15/11/2013	BP Repair	N
98	Pelican 2	1/11/2013	20/11/2013	Gas Workover	N
99	Granchio 1	5/11/2013	13/11/2013	Oil Workover	N
100	Cowralli 22	14/11/2013	17/11/2013	Gas Completion	Y
101	Ulandi 7	16/11/2013	20/11/2013	BP Repair	N
102	Cowralli 23	17/11/2013	19/11/2013	Gas Completion	Y
103	Cowralli 27	19/11/2013	22/11/2013	Gas Completion	N
104	Toparoa 1	20/11/2013	25/11/2013	ESP Repair	N
105	Pelican 1	20/11/2013	11/12/2013	Pre Frac Workover	Y
106	Cowralli 24	23/11/2013	24/11/2013	Gas Completion	Y
107	Cowralli 26	24/11/2013	25/11/2013	Gas Completion	Y
108	Cowralli 17	25/11/2013	28/11/2013	Gas Completion	Y
109	Cowralli 15	28/11/2013	1/12/2013	Gas Completion	Y
110	Big Lake 79ST1	30/11/2013	12/12/2013	Pre Frac Workover	Y
111	Cowralli 18	1/12/2013	4/12/2013	Gas Completion	Y
112	Cowralli 21	4/12/2013	6/12/2013	Gas Completion	Y
113	Cowralli 14	7/12/2013	9/12/2013	Gas Completion	Y
114	Cowralli 19	9/12/2013	11/12/2013	Gas Completion	Y
115	Merrimelia 24	10/12/2013	20/12/2013	Oil Workover	N

116	Cowralli 20	11/12/2013	13/12/2013	Gas Completion	Y
117	Cowralli 16	13/12/2013	15/12/2013	Gas Completion	Y
118	Pelican 13	13/12/2013	19/12/2013	Gas Completion	Y
119	Cadenza 1	18/12/2013	27/12/2013	Gas Workover	N
120	Waukatanna 3	20/12/2013	29/12/2013	Gas Completion	Y
121	Kurunda 6	20/12/2013	26/12/2013	Gas Completion	N
122	Dorodillo 2	27/12/2013	3/01/2014	Gas Workover	N

Well Workover Summary – DERRILYN UNIT

#	WELL	START DATE	END DATE	WORKOVER ACTIVITY	FRACTURE STIMULATION
1	Derrilyn 1	23/03/2013	29/03/2013	ESP Repair	N
2	Derrilyn 3	26/11/2013	30/11/2013	PCP Repair	N
3	Chimmichurri 1	27/12/2013	1/01/2014	Oil Workover	N

Well Workover Summary – PPL 225, 226 & 227

#	WELL	START DATE	END DATE	WORKOVER ACTIVITY	FRACTURE STIMULATION
2	Stimpee 4	9/04/2013	12/04/2013	Tubing Pump Conversion	N
3	Stimpee 4	24/05/2013	26/05/2013	BP Repair	N

Fracture Stimulation Summary

#	WELL	FRAC DATE	WORKOVER ACTIVITY
1	Waukatanna 3	01-Jan-13	Y
2	Waukatanna 4	06-Jan-13	Y
3	Waukatanna 5	09-Jan-13	Y
4	Bobs Well 3	16-Jan-13	Y
5	Tallerangie 1	22-Jan-13	Y
6	Nephrite South 6	25-Jan-13	Y
7	Cooba 4	01-Feb-13	Y
8	Moolion 6	05-Feb-13	Y
9	Moolion 5	09-Feb-13	Y
10	Tirrawarra 75	09-Feb-13	Y
11	Tirrawarra 74	23-Feb-13	Y
12	Fortanna 1	25-Feb-13	Y
13	Lake MacMillan 1	16-Mar-13	Y
14	Woolkina 2	22-Mar-13	Y
15	Moomba 120DW	01-Apr-13	N
16	Dullingari 16	07-Apr-13	N
17	Burke 12	09-Apr-13	N
18	Brumby 13	14-Apr-13	Y
19	Dullingari 61	18-Apr-13	Y
20	Dullingari North 20	26-Apr-13	Y
21	Dullingari 49	01-May-13	N
22	Dullingari North 17	04-May-13	N
23	Beckler 5	10-May-13	N
24	Toolachee West 1	16-May-13	N
25	Toolachee 5	28-May-13	Y
26	Toolachee 30	02-Jun-13	Y
27	Roswell 1	06-Jun-13	Y
28	Moomba 72	13-Jun-13	Y
29	Big Lake 30	22-Jun-13	N

30	Moomba 57	25-Jun-13	Y
31	Gaschnitz 1	01-Jul-13	Y
32	Juno 6	18-Jul-13	Y
33	Kudrieke 2	20-Aug-13	Y
34	Meranji 17	25-Aug-13	Y
35	Gidgealpa 51	28-Aug-13	Y
36	Farina 1	02-Sep-13	Y
37	Fly Lake 17	05-Sep-13	N
38	Moorari 11	09-Sep-13	N
39	Bookabourdie 2	15-Sep-13	Y
40	Tirrawarra South 1	05-Oct-13	N
41	Moomba 192	09-Oct-13	Y
42	Cowralli 22	13-Oct-13	Y
43	Cowralli 23	13-Oct-13	Y
44	Cowralli 24	13-Oct-13	Y
45	Cowralli 25	13-Oct-13	Y
46	Cowralli 27	23-Oct-13	Y
47	Cowralli 29	23-Oct-13	Y
48	Cowralli 28	23-Oct-13	Y
49	Cowralli 26	23-Oct-13	Y
50	Cowralli 17	28-Oct-13	Y
51	Cowralli 14	28-Oct-13	Y
52	Cowralli 16	28-Oct-13	Y
53	Cowralli 15	05-Nov-13	Y
54	Cowralli 18	05-Nov-13	Y
55	Cowralli 21	05-Nov-13	Y
56	Cowralli 20	05-Nov-13	Y
57	Cowralli 19	05-Nov-13	Y
58	Van der Waals 1	02-Nov-13	Y
59	Moomba Fortuna 1 Vt 194	16-Nov-13	Y
60	Pelican 13	16-Nov-13	Y
61	Allunga 1	24-Nov-13	Y
62	Langmuir 1	03-Dec-13	Y
63	Big Lake 54	07-Dec-13	Y
64	Big Lake 3	11-Dec-13	Y

Appendix 6 Well Summary – Producing and Suspended Wells

	As at 31/12/2013	Gas or Gas/Oil	Oil
1	Number of Wells in Production (Operating)	544	228
2	Number of Wells Suspended (Suspension plug run or In-active >1yr)	580	306
3	Number of Wells Completed/Not on line	1	1
4	Number of Wells - Cased & Suspended	41	5
5	Number of Wells - Casing Annuli Tested	711	242
6	Current EHS Risk Analysis		
	- Level 4 (High Risk)	0	1
	- Level 3 (Substantial Risk)	63	21
	- Level 2 (Moderate Risk)	310	149
	- Level 1 (Low Risk)	642	68
7	Number of Wells – Integrity Repairs Undertaken	2	0
8	Number of Wells - Plugged & Abandoned (post Completion and/or Production)	1	0
9	Number of Wells - Plugged & Abandoned (Post Drilling)	0	3
10	Number of Wells - Plugged and Suspended (post Drilling)	0	0
11	Planned 2014 - Plug & Abandonment's (post Completion and/or Production)	2	0
Note:	1) Gas/Oil wells are those that have perforations planned or completed in separate oil and gas bearing reservoirs e.g. Tirrawarra, Moorari or Fly Lake fields		

Appendix 7 Flowlines Constructed – 2013

Pipeline	Diam. (mm)	Pipeline Material	Const. Finish	Length (m)	Total (m)
BIG LAKE 93 GAS FLOWLINE	100	Steel	1-Jan-13	750	750
BIG LAKE 92 GAS FLOWLINE	100	Steel	1-Jan-13	1100	1100
BIG LAKE 94 GAS FLOWLINE	100	Steel	1-Jan-13	1200	1200
CARMINA 2 OIL SPINELINE	150	Steel	10-Jan-13	10581	10581
COWRALLI PAD 1 TO LAYDOWN AREA GAS FLOWLINE	150	Steel	29-Jan-13	346	346
COWRALLI PAD 2 TO LAYDOWN AREA GAS FLOWLINE	150	Steel	29-Jan-13	607	607
COWRALLI PADS TO COWRALLI-MERANJI GAS GATHERING LINE	150	Steel	29-Jan-13	574	574
COWRALLI TO GIDGEALPA GAS GATHERING LINE	150	Steel	29-Jan-13	8020	8020
TINDILPIE 12 GAS FLOWLINE	100	Steel	31-Jan-13	291	291
NEPHRITE TO GIDGEALPA BYPASS	200	Steel	31-Jan-13	21800	21800
MUNKARIE 10 GAS FLOWLINE	150	Steel	31-Jan-13	2432	2432
ANDREE 4 GAS FLOWLINE	100	Steel	1-Feb-13	252	252
KANOWANA 9 GAS FLOWLINE	100	Steel	1-Feb-13	330	330
KANOWANA 8 GAS FLOWLINE	100	Steel	1-Feb-13	365	365
GOYDER 6 GAS FLOWLINE	100	Steel	5-Feb-13	842	842
WAUKATANNA 4 GAS FLOWLINE	100	Steel	1-Mar-13	760	760
WAUKATANNA 5 GAS FLOWLINE	100	Steel	1-Mar-13	1070	1070
BURKE 12 GAS FLOWLINE	100	Steel	5-Mar-13	922	922
NEPHRITE SOUTH 3 REDIRECTION GAS FLOWLINE	100	Steel	26-Mar-13	736	736
COOK TO MERRIMELIA OIL PIPELINE	130	HDPE	31-Mar-13	170000	170000
MERRIMELIA 45 GAS FLOWLINE	150	Steel	30-Apr-13	556	556
MOOLION 5 & 6 GAS FLOWLINE	150	Steel	1-May-13	3217	3217
FLY LAKE 9 UNIT OIL FLOWLINE REPLACEMENT	100	Steel	8-May-13	587	587
CHARO 19 OIL FLOWLINE	73	EUE	17-May-13	622	622
CHARO 18 (DEV) OIL FLOWLINE	73	EUE	17-May-13	622	622
TIRRAWARRA 74 GAS FLOWLINE	150	Steel	20-May-13	3300	3300
TIRRAWARRA 75 GAS FLOWLINE	100	Steel	20-May-13	1720	1720
FROSTILLICUS 1 REPLACEMENT OIL FLOWLINE	69	GRE	24-May-13	926	926
TERINGIE 1 REPLACEMENT OIL FLOWLINE	69	GRE	24-May-13	544	544
PELICAN 13 GAS FLOWLINE	100	Steel	10-Jul-13	459	459
TOOLACHEE 30 GAS FLOWLINE	100	Steel	10-Jul-13	2655	2655
CHORIZO 1 OIL FLOWLINE	69	GRE	6-Aug-13	2371	2371
TOOLACHEE 5 GAS FLOWLINE	100	Steel	1-Sep-13	919	919
FARINA 1 REPLACEMENT GAS FLOWLINE	100	Steel	4-Oct-13	1839	1839
GIDGEALPA 51 GAS FLOWLINE	100	Steel	1-Nov-13	1220	1220
Total Km					244535
Total Steel Line					69450
Total HDPE					170000
Total GRE					3841
Total EUE					1244

Appendix 8 Pipeline Inspection, Testing and Repair – 2013

Integrity Testing

High Velocity Wellhead Spooling / Swing Wells - Ultrasonic Inspection & Radiography of the Choke Welds (73 in Total):

Coonatie 06	Tirrawarra 49	Moomba 014	Moomba 72
Coonatie 08ST1	Tirrawarra 56	Moomba 019	Big Lake 30
Coonatie 16	Tirrawarra 58	Moomba 024	Barina 1
Coonatie 20	Arrakis North 01	Moomba 027	Farina 1
Kanowana 02	Big Lake 01	Moomba 032	Della 25
Kanowana 03	Big Lake 05	Moomba 037	Kerna 06
Leleptian 04	Big Lake 12	Moomba 042	Kidman North 04
Merrimelia 17	Big Lake 35	Moomba 048	Strzelecki 25
Tirrawarra 02 L	Big Lake 45	Moomba 049	Toolachee 01
Tirrawarra 08 U	Big Lake 47	Moomba 059	Toolachee 18
Tirrawarra 09 U	Big Lake 66	Moomba 075	Toolachee 36
Tirrawarra 18	Big Lake 68	Moomba 091	Dullingari 16
Tirrawarra 25	Big Lake 71ST2	Moomba 158	Dullingari North 3
Tirrawarra 28	Big Lake 72	Moomba 191	
Tirrawarra 32	Big Lake 83	Nephrite South 07	
Tirrawarra 34	Big Lake 85	Nephrite South 08	
Tirrawarra 39	Big Lake 90	Raven(Sa) 04	
Tirrawarra 40 U	Cowralli 06	Moomba 120DW	
Tirrawarra 43 U	Kurunda 04 U	Moomba 180 R	
Tirrawarra 47	Moomba 002	Moomba 178 R	

Pig Barrel Inspections – 2013

UT and Visual inspection of 32 barrels completed

Brolga Spineline Receiver	Tindilpie Gas Trunkline Receiver	Della To Moomba Gas Trunkline Launcher
Coonatie to Bookabourdie Gas Launcher	Tirrawarra to Merrimelia Oil Trunkline Receiver	Dilchee to Dullingari Gas Trunkline Receiver
Coonatie to Bookabourdie Gas Receiver	Big Lake To Moomba Gas Trunkline (14") Pig Launcher	Dullingari to Della Gas Trunkline Receiver
Cuttapirie to Moorari Gathering line Launcher	Cabernet Gas Spineline Receiver	Marabooka 2 Gas Flowline Launcher
Kurunda Nodal to Gidgealpa Gas Trunkline Launcher	Daralingie To Moomba Gas Trunkline Launcher	Mudlalee to Strzelecki Trunkline Launcher
Kurunda Nodal to Gidgealpa Gas Trunkline Receiver	Daralingie To Moomba Gas Trunkline Receiver	Ballera to Moomba Transmission Line Launcher
Merrimelia to Moomba Oil Trunkline Launcher	Gidgealpa To Moomba Gas Trunkline Receiver	Ballera to Moomba Transmission Line Receiver
Merrimelia to Moomba Oil Trunkline Receiver	Jack Lake to Gidgealpa Gas Flowline Receiver	Goyder to Big Lake Gas Spineline Launcher
Nulla Gathering Flowline Receiver	Raven Gas Bypass Launcher	Mettika to Toolachee Gas Spineline Launcher
Tantanna To Gidgealpa Oil Trunkline Launcher	Raven Gas Bypass Receiver	
Tantanna To Gidgealpa Oil Trunkline Receiver	Brumby/Munkarie To Toolachee Gas Trunkline Receiver	
Tindilpie Gas Trunkline Launcher		

Mothballed Pipelines - 2013

Fly Lake 11 Gas Flowline

Final Abandonment - 2013
Tantanna to Gidgealpa Oil Trunkline

Pipeline Risk Assessments

Field-wide Pipeline Integrity Reviews (PIRs) of:
High level Oil Pipeline Integrity Field Reviews completed for: Northern Fields, Central Fields and Eastern Fields
Infrastructure Gas Pipelines in Northern Fields reviewed

Pipeline Integrity / Risk Workshops – 2013

Northern Fields
Moolion to Moorari Gathering Line (part of Cuttapirrie to Moorari Gathering Line)

Eastern Fields
Strzelecki Junction to Moomba Oil Trunkline
Epsilon to Moomba Oil Trunkline

Pipeline ILI (Inline Inspection) Surveys – 2013

- Fly Lake EOR Pipeline
- Jack Lake Gathering Flowline
- Moonanga 01 Gas Flowline
- Dilchee to Dullingari Gas Trunkline
- Toolachee 44 Gas Flowline
- Toolachee 10 Gas Flowline
- Raven 04 Replacement Gas Flowline
- Bookabourdie 01 Gas Flowline
- Bookabourdie 02 Gas Flowline
- Bookabourdie 09 Gas Flowline
- Woolkina 02 Gas Flowline
- Moomba 46 Gas Flowline (Reinjection)
- Moomba 45 Gas Flowline
- Moomba 19 Gas Flowline
- Moomba 30 Gas Flowline (Reinjection)
- Moomba 83 Gas Flowline
- Moomba 12 Gas Flowline (Reinjection)
- Moomba 84 Gas Flowline
- Moomba 12 Gas Flowline (reinjection)
- Moomba 84 Gas Flowline
- Moomba 18 Gas Flowline
- LDB Ethane X-Over Flowline – Moomba West
- Moomba 48 Gas Flowline

Appendix 9 Details of Seismic Activity

The breakdown of square kilometres in each Licence for **CPSAN13B GASCHNITZ 3D SEISMIC SURVEY** was as follows:

LICENCE	AREA RECORDED - SQ KM
PPL 17	**113.222**
PPL 80	3.378
PPL 101	6.280
TOTAL	**122.88**

The breakdown of linear kilometres in each Licence for **CPSAN13C COWRALLI MICRO SEISMIC SURVEY** was as follows:

LICENCE	LENGTH RECORDED - KM
PPL 6	**4.086**
PPL 91	9.498
PPL 140	25.951
PEL513	2.735
TOTAL	**42.24**

Appendix 10a 2013 Production Facility Projects

#	Project	Project Description	Location
1	Planned shutdowns	LRP A Major Area 75, Area 70 & Area 65, Major, CO2 Train 5 Major K60C Compressor Overhaul Boiler 9	Moomba Plant
2	DPCU 7 Sieve replacement	DPCU 7 Sieve replacement & inspection	Moomba Plant
3	Moomba Sludge Treatment Plant	Construction & commissioning of new facilities completed	Moomba Plant
4	Re-life Salt Bath Heater 1 and DPCU	Unit commissioned an back on line	Moomba Plant
5	Interceptor Pond Upgrade Northern & Southern	Northern pond completed, Southern pond to be completed 1Q 2014	Moomba Plant
6	LP Flare Tip replacement	Re-life of LP Flare	Moomba Plant
7	Big Lake Flare	Upgrade to Big Lake Flare system	Big Lake
8	SA Gas Relifing	Replace tape wrap pipelines and explore opportunity to improve tie ins	Big Lake
9	Gidgealpa Gas Interceptor Pond Upgrade	Interceptor Pond Upgrade	Gidgealpa
10	Tirrawarra Evaporation pond	Upgrade	Tirrawarra
11	Gas Jack Wellhead Compression Phase V	Installation of Gas Wellhead compression units at various locations in the Cooper Basin (SA)	Various SA Field locations

Appendix 10b 2014 Production Facility Projects – Proposed

#	Project	Project Description	Location	Finish
1	Planned shutdowns	LRP B Major, CO2 Train 6 Major CO2 Train 3 Major Boiler 5 Major Waste Heat Boiler B Major	Moomba Plant	2014
2	Northern Evaporation Pond liner	Northern Evaporation Pond liner installation	Moomba Plant	1H 2014
3	DPCU 8 & 9 Sieve replacement & inspection	DPCU 8 & 9 Sieve replacement & inspection	Moomba Plant	1H 2014
4	Moomba GTA # 1 Turbine Major O/haul	Moomba GTA # 1 Turbine Major O/haul	Moomba Plant	2014
5	Interceptor Pond Upgrade Northern & Southern	Southern pond to be completed 1Q 2014	Moomba Plant	1Q 2014
6	Moomba-Southern Third Party Gas Treatment (3PGST Ph.2)	Upgrade of LRP to treat third party gas	Moomba Plant	2015
7	CIEP - Expansion of Moomba Gas Processing Facility	Civil and earth works for preparation for the installation of CO2 Train #8, Gas Turbine Alternator and a heat recovery steam generator (forecast installation 2015)	Moomba Plant	2016
8	MSC, Big Lake Turbine Air Coolers and Filtration	Installation of self-cleaning filters at Moomba South Central and Big Lake	Central Fields	Ongoing/2014
9	CIEP - Gas Facility expansion of Big Lake Gas Satellite	Installation of 2 compressors and 2 inlet seperators	Central Fields	2014
10	Tirrawarra Ruston H.P. Compressors #1 and #2 Control System Upgrade	Control System Upgrade	Northern Fields	Ongoing/2014
11	Strzelecki Tanks 1220A&B Statutory Internal Inspections & Overhaul	Statutory Internal Inspection & Overhaul	Cross Border	Ongoing/2014
12	Wellhead Compression Phase Vl	Installation of Gas Wellhead compression units at various locations in the Cooper Basin (SA)	Various SA Field locations	2014

Appendix 11 Wells Drilled – 2013

	Well Name	Well Type	Well Location	Spud Date	Rig Release Date	TD	Status
1	**Munkarie 10**	Gas Dev	PPL23	19/01/2013	30/01/2013	2386	C&S gas well
2	**Dullingari 61**	Gas Dev	PPL12	27/01/2013	10/02/2013	2748	C&S gas well
3	**Dullingari North 20**	Gas Dev	PPL12	14/02/2013	3/03/2013	2707	C&S gas well
4	**Burke 12**	Gas Dev	PPL12	21/02/2013	7/03/2013	2650	C&S gas well
5	**Goyder 6**	Gas Dev	PPL135	17/03/2013	28/03/2013	2121	C&S gas well
6	**Cowralli 22**	Gas Dev	PPL91	21/03/2013	10/04/2013	3278	C&S gas well
7	**Van Der Waals 1**	Gas App	PPL113	7/04/2013	5/07/2013	3727	C&S gas well
8	**Moomba 192**	Gas Exp-App	PPL7	8/04/2013	1/05/2013	2980	C&S gas well
9	**Cowralli 23**	Gas Dev	PPL91	12/04/2013	28/04/2013	3347	C&S gas well
10	**Cowralli 24**	Gas Dev	PPL91	29/04/2013	18/05/2013	3269	C&S gas well
11	**Cowralli 14**	Gas Dev	PPL91	8/05/2013	22/05/2013	3323	C&S gas well
12	**Cowralli 25**	Gas Dev	PPL91	19/05/2013	5/06/2013	3452	C&S gas well
13	**Cowralli 15**	Gas Dev	PPL91	23/05/2013	8/06/2013	3300	C&S gas well
14	**Hoff 1**	Oil NFE	PRL 28	28/05/2013	8/06/2013	1640	P&A
15	**Cowralli 26**	Gas Dev	PPL91	6/06/2013	21/06/2013	3324	C&S gas well
16	**Cowralli 16**	Gas Dev	PPL91	9/06/2013	23/06/2013	3269	C&S gas well
17	**Charo 19**	Oil App	PPL177	14/06/2013	25/06/2013	1878	C&S oil well
18	**Cowralli 27**	Gas Dev	PPL91/PPL140	22/06/2013	10/08/2013	3421	C&S gas well
19	**Langmuir 1**	Gas App	PPL102	22/07/2013	29/09/2013	3815	C&S gas well
20	**Cowralli 17**	Gas Dev	PPL91	29/07/2013	17/08/2013	3362	C&S gas well
21	**Charo 18**	Oil Dev	PPL177	30/07/2013	15/08/2013	2112	C&S oil well
22	**Cowralli 28**	Gas Dev	PPL91/PPL140	10/08/2013	26/08/2013	3329	C&S gas well
23	**Cowralli 18**	Gas Dev	PPL 91	18/08/2013	1/09/2013	3255	C&S gas well
24	**Moomba 194**	Gas NFE	PPL113	25/08/2013	7/10/2013	3368	C&S gas well
25	**Cowralli 29**	Gas Dev	PPL91/PPL140	27/08/2013	11/09/2013	3364	C&S gas well
26	**Cowralli 19**	Gas Dev	PPL91/PPL140	1/09/2013	16/09/2013	3447	C&S gas well
27	**Cowralli 20**	Gas Dev	PPL91/PPL140	17/09/2013	2/10/2013	3492	C&S gas well
28	**Pelican 13**	Gas Dev	PPL17	17/09/2013	28/09/2013	2708	C&S gas well
29	**Cowralli 21**	Gas Dev	PPL91/PPL140	4/10/2013	20/10/2013	3352	C&S gas well
30	**Moomba 198**	Gas Dev	PPL7	9/10/2013	27/10/2013	3354	C&S gas well
31	**Roswell 2**	Gas Exp	PPL9	12/10/2013	6/12/2013	3481	C&S gas well
32	**Moomba 196**	Gas Dev	PPL7	16/10/2013	22/11/2013	3130	C&S gas well
33	**Moomba 199**	Gas Dev	PPL7	28/10/2013	16/11/2013	3278	C&S gas well
34	**Kurunda 6**	Gas Dev	PPL6	28/10/2013	13/11/2013	2523	C&S gas well
35	**Moomba 200**	Gas Dev	PPL 7	17/11/2013	9/12/2013	3185	C&S gas well
36	**Big Lake 95**	Gas Dev	PPL11	18/11/2013	5/12/2013	3126	C&S gas well
37	**Moomba 197**	Gas Dev	PPL7	30/11/2013	27/12/2013	3157	C&S gas well
38	**Big Lake 96**	Gas Dev	PPL11	7/12/2013	28/12/2013	2997	C&S gas well
39	**Moomba 201**	Gas Dev	PPL7	11/12/2013	31/12/2013	3370	C&S gas well
40	**Moomba 193ST1**	Gas Exp	PPL7	17/12/2013			Drilling
41	**Big Lake 97**	Gas Dev	PPL11	31/12/2013	14/01/2014	3054	C&S gas well

Wells Drilled 2013 – Not SACBJV projects
PEL 114

Well Name	Well Type	Well Location	Spud Date	Rig Release Date	TD	Status
Moe 1	Oil NFE	PEL114	22/03/2013	1/04/2013	1647	P&A
Affogato 1	Oil NFE	PEL114	5/04/2013	18/04/2013	1610	C&S oil well
Chorizo 1	Oil NFE	PEL114	22/04/2013	9/05/2013	1593	C&S oil well
Chivito 1	Oil NFE	PEL114	13/05/2013	23/05/2013	1660	P&A

Appendix 12 2013 Reports, including Geological and Reserves Reports

Reg #	Routine Yes / No	Report Title	Comment
33	Yes	Annual Report – 2012	
33 (2) e	Yes	Proved + Probable Reserves Data, YE 2012.	
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	

2013 Reports In Accordance With Reg 33 (2) (e)

Reg #	Routine Yes / No	Report Title	Comment
33 (2) e	Yes	Proved + Probable Reserves Data, YE 2012.	