2016 Annual Report

South Australian Cooper Basin Joint Venture Operations





1. Contents

1. Introducti	on5
2. Summary	Regulated Activities6
2.1. Seism	nic Activity
2.1.1.	Restoration7
2.1.2.	Significant Operations Proposed for 20177
2.1.3.	Environmental Monitoring7
2.2. Civil V	Vorks8
2.2.1.	Well Lease, Access Tracks, Borrow Pits, Campsite Construction and Restoration
2.2.2.	Major Road Construction8
2.2.3.	Water Extraction from Cooper Creek
2.3. Drilling	g and Well Operations8
2.3.1.	Drilling Operations
2.3.2.	Well Completion, Workover, Suspension and Abandonment9
2.3.3.	Well/Lease Abandonment9
2.3.4.	Producing Wells9
2.4. Produ	ction & Processing Facility Projects9
2.5. Pipeliı	ne Construction, Operation and Monitoring9
2.6. Licens	sed Pipelines
2.6.1.	Ballera to Moomba Pipeline (PL 5)10
2.6.2.	Stokes to Mettika Pipeline (PL 9)10
2.6.3.	Moon to Kerna Pipeline (PL 15)10
2.6.4.	Licenced Pipelines11
3. Compliand	ce Summary11
3.1. Regul	atory Non-Compliance
3.2. Comp	liance with Statement of Environmental Objectives11
3.3. SEO I	Review
3.4. Mana	gement System Audit11
4. Report and	d Data Submissions13
4.1. Repor	ting13
5. Incidents	

5.1. Serio	us Incidents	14
5.2. Repo	rtable Incidents	14
5.3. Sumn	nary of actions to prevent recurrence	16
6. Reasonab	ly Foreseeable Threats	17
6.1. Initiati	ves	17
6.2. Major	Hazard Facility	17
6.3. Risk /	Assessments	17
6.3.1.	Formal Safety Assessment (FSA) and BowTie Risk Assessment (FSA)	18
6.3.2.	Moomba Plant Emergency Response Plan (ERP)	18
6.3.3.	API Risk Based Inspection (RBI)	18
6.3.4.	Integrated Risk Register (IRR)	18
6.3.5.	Significant Hazard Risk Register (SHRR)	19
6.3.6.	Security	19
6.3.7.	Pipelines	19
7. Emergend	y Response	19
7.1. Emer	gency Response Capability	19
7.2. Emer	gency Response Procedures	19
7.3. Emer	gency Response Drills	20
7.3.1.	Overview of Significant Response Drills	20
7.3.2.	Emergency Response	23
8. Future Wo	ork Program	25
8.1. Regu	ated Activities	25
Production	n Facility Projects	25
8.2. Devel	opment Activities	25
8.2.1.	Drilling Activity	25
9. Productio	n Forecast	25
10. Statemer	nt of Actual and Proposed Expenditure 2016/2017	26
11. Glossary	of Terms	27
12. Appendi	ces	28
Appendix 1	Lease Scouting, Construction, Backfill and Restoration Activity	29
Appendix 2	- Petroleum Engineering	32
Appendix 4	- Flowlines Constructed	39

Appendix 5 – Pipeline Inspection, Testing and	. 40
Appendix 6 – Daily Drill, Production, Well Completion and Wire Line Log Submissions	. 42

Appendix 7 – Production & Processing Facility Projects 2016	45
Appendix 8 – Proposed Production & Processing Facility Projects 2017	46
Appendix 9 – Wells Drilled in 2016	47
Appendix 10 - Geophysical Operations SEO (2012): Review of 2016 Performance against Environmental Objectives	48
Appendix 11-Drilling and Well Operations SEO (2015) – Review of 2016 Performance Against Environmental Objectives	53
Appendix 12-Production and Processing Operations SEO	. 59

1. Introduction

This report covers the activities conducted in the South Australian section of the Cooper Basin (SACB) for the period 1 January 2016 to 31 December 2016 by Santos Ltd (Santos) as operator of the South Australian Cooper Basin Joint Venture (SACB JV).

The SACB JV consists of the following Joint Operating Agreements:

- South Australian Cooper Basin Unit Agreement; and
- Patchawarra East Joint Operating Agreement.

The report covers exploration, production and processing operations on the following permits:

- Petroleum Production Licences (PPL) associated with the SACB JV;
 - Pipeline Licence (PL) 5 (Ballera to Moomba);
 - PL 9 (Stokes to Mettika); and
 - PL 15 (Moon to Kerna).

This report also covers the following activities:

- emergency response exercises conducted during 2016; and
- the hydrocarbon liquids pumping station at the head of the Moomba to Port Bonython liquids pipeline.

While the systems and procedures mentioned in this report apply to the following, this report does not cover the following permits:

- PPL 206, PPL 208 and PPL 215, which are part of the Derrilyn Unit Joint Venture;
- PPLs 225, 226, 227 & 252, Petroleum Retention Licences (PRLs) 28-31 & 111-115 and AALs 187, 195 and 196, which are wholly owned by Santos;
- Petroleum Exploration Licence (PEL) 513, PRLs 111-115 and Associated Activities Licence (AAL) 207, which are part of the Drillsearch Joint Venture;
- PEL 570, which is part of the PEL 570 Joint Venture;
- PL 17 (the South Australian section of the Jackson to Moomba Oil Pipeline);
- PL 2 (the Moomba to Port Bonython liquids pipeline);
- PL 20 (the South Australian section of the Cook to Merrimelia Oil Pipeline); and
- any facilities not owned or operated by Santos.

An expenditure commitment is in place for PPLs 101 to 111 and 113 to 117. These permits make up the area known as the Nappamerrie Unitised Zone (NTUZ).

Work commitments for the NTUZ permits are summarised below.

The licensees shall expend on eligible activity on or in respect of the NTUZ permits:

- during that part of the term of the licence as elapses prior to 1 January, 2004 not less than an amount of fifty million dollars (\$50,000,000);
- during that part of the term of this licence from 1 January 2004 to 31 December 2013 not less than a further amount of fifty million dollars (\$50,000,000) provided that any expenditure on eligible activity in excess of the amount of fifty million dollars referred to in the preceding paragraph shall be carried over and credited against the expenditure of the further amount of fifty million dollars referred to in this paragraph; and
- during that part of the term of this licence from 1 January 2012 to 2 November 2018 not less than a
 further amount of one hundred and ninety million dollars (\$190,000,000) shall be spent on Eligible
 Activity provided that any expenditure on Eligible Activity from 1 January 2012 shall be credited against
 the expenditure referred to in the preceding paragraph and shall also be carried over and credited
 against the expenditure of the further amount of one hundred and ninety million dollars referred to in
 this paragraph.

Under the collective licence terms negotiated with respect to PPLs 101-111 and 113-117, Santos must provide an annual interim report on expenditure on Eligible Activity carried out under the licence

2. Summary Regulated Activities

During 2016, the following regulated activities (as defined in the Act) were conducted:

- exploration for and appraisal of petroleum;
- road, track, borrow pit and well lease construction;
- a seismic survey including seismic line construction;
- 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; and
- operation of licensed transmission pipeline

In particular, activity which occurred in 2016 includes:

- Snowball 3D Seismic Survey;
- 23 wells were drilled;
- 317 individual workover operations conducted, including 13 fracture stimulations.
 - o Workover activities included:
 - casing repair;
 - down-hole pump installation/repair;
 - well completion or re-completion;
 - integrity repairs;
 - water well conversion; and
 - perforation operations.
- 10 individual flowlines were constructed; and
- During 2016, there were:
 - 81.5 PJ's of Sales Gas produced ex Moomba
 - 12.9 PJ's of Ethane production (incl. Ethane injection Ethane Recirculation)
 - 175.7 kTonnes of LPG production
 - 1,454 kBBL of Condensate production
 - 3.7 MMBBLS (million barrels) of Crude Oil Production from STO JV's (incl. SA, SWQ, 3P & Unit Oil)

2.1. Seismic Activity

In 2016, the Snowball 3D Seismic Survey was recorded in PPL 12, 13, 23, 58, 92, 163, 228, 231 & AAL 233.

The survey also expended over the SA / Qld border into Queensland. The survey was recorded by Terrex Seismic.

Survey Name	Survey Type	Contractor	Recording Start Date	Recording End Date	Size
Snowball 3D	3D	Terrex Seismic	16/01/2016	11/08/2016	1678.336 Km ² Overall Survey

2.1.1. Restoration

Three graders were used during the recording of the Snowball 3D to flatten windrows behind the dozers preparing lines during the line preparation operations. No further restoration was deemed necessary.

2.1.2. Significant Operations Proposed for 2017

There are currently no plans for seismic acquisition in the South Australian Cooper Basin in 2017.

2.1.3. Environmental Monitoring

The following is a summary of:

- standards followed;
- environmental monitoring points set up; and
- environmental monitoring points revisited.

2.1.3.1 Standards

- SA Cooper Basin & Arid Regions, Statement of Environmental Objectives: Geophysical Operations July 2012
- 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.

2.1.3.2 Environmental Monitoring

Santos established multiple photo points (PPs) on the Snowball 3D survey to monitor rehabilitation. PP locations were located from the aerial map / programme overlay. The final location of each PP however, was determined by the Santos site representatives upon a ground inspection.

Photo Point & EMP reports have been submitted to DSD on 14/02/2017 & 13/12/2016 respectively.

2.1.3.3 Environmental Monitoring Point (EMP) Revisits

There were no revisits conducted of existing surveys in 2016.

The breakdown of square kilometres in each Licence for CPSAN16 SNOWBALL 3D SEISMIC SURVEY was as follows:

LICENCE	RECORDED AREA (SQKM)
PPL 12	22.281
PPL 13	56.277
PPL 14	7.497
PPL 23	79.778
PPL 58	14.884
PPL 92	1.759
PPL 163	0.260
PPL 228	37.955
PPL 231	30.858
AAL 233	250.619
Total (SA portion of survey)	502.168

2.2. Civil Works

2.2.1. Well Lease, Access Tracks, Borrow Pits, Campsite Construction and Restoration

The drilling sites scouted, constructed, backfilled and restored during 2016 are listed in Appendix 1.

2.2.2. Major Road Construction

No major roads were constructed in 2016.

Maintenance of the State Roads within the Cooper Basin, including the Strzelecki Track (Santos names: Adelaide and Della Roads) and the Gidgealpa Access Road (Santos names: Tirrawarra and Merrimelia Access Roads), were handed over to the Department of Planning, Transport and Infrastructure (DPTI).

2.2.3. 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.

No water was extracted from the Cooper Creek during the 2016 reporting period.

2.3. Drilling and Well Operations

2.3.1. Drilling Operations

The drilling operations conducted by Santos are undertaken in accordance with the Statement of Environmental Objectives for Drilling, Completions 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 list of wells drilled by the SACB JV and Santos in 2016 is provided in Appendix 9.

2.3.2. Well Completion, Workover, Suspension and Abandonment

There were 318 individual workover operations conducted during 2016. This involved 13 Fracture Stimulation operations. Workover activities included pump repairs, well completion or re-completion, Integrity repairs, P&As and perforations. These activities are listed in **Appendix 2**.

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. There were no level 4 risk wells in 2016.

The number of substantial and moderate risk wells is as follows:

- No wells are currently rated as a Level 4 (High risk);
- 122 wells were rated as Level 3 (Substantial risk); and
- 1696 wells were rated as Level 1 or 2 (Low risk).

2.3.3. Well/Lease Abandonment

Sphalerite 1 was abandoned during 2016.

2.3.4. Producing Wells

At the end of this reporting period there were a total of 97 producing Oil Wells and 617 producing Gas, Santos operated wells.

2.4. Production & Processing Facility Projects

A number of plant facility maintenance projects were completed in 2016. A list of some of the major projects undertaken is provided in **Appendix 7**.

2.5. 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 2 weeks to 8 weeks as prescribed by Santos' Integrity Management Plan.

During 2016, pipelines and flowlines were constructed to connect new wells to the production system, as listed in **Appendix 4**. Various inspections, repairs and testing was undertaken on pipelines as listed in **Appendix 5**. A program covering in line inspection of key pipelines was also continued.

2.6. 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), *Petroleum and Geothermal Energy Regulations* (2013) and the relevant SEOs.

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:

2.6.1. Ballera to Moomba Pipeline (PL 5)

2.6.1.1 Internal Corrosion Mitigation

- Continuous inhibitor injection of 10 litres per day (IRN341A target rate, the injector system was monitored monthly);
- The pipeline was operationally pigged on 9 May 2016; and
- Pig Launcher treated with corrosion inhibitor on 19 February 2016.

2.6.1.2 External Corrosion Mitigation

- The operations of CP Units associated with the pipeline were checked bi-monthly; and
- A complete Cathodic Protection Test Post Potential survey was performed in June 2016 indicating full compliance with the AS 2832 'Off Potential' criteria.

2.6.1.3 Inspection

• The ROW patrol was performed June 2016. ROW observed to be in good condition.

2.6.2. Stokes to Mettika Pipeline (PL 9)

2.6.2.1 Internal Corrosion Mitigation

 Continuous inhibitor injection of 5 litres per day (IRN341A target rate, the injector system was monitored monthly).

2.6.2.2 External Corrosion Mitigation

- The operation of CP Units associated with the pipeline were checked bi-monthly; and
- A complete Cathodic Protection Test Post Potential survey was performed in April 2016 indicating full compliance with the AS 2832 'Off Potential' criteria.

2.6.2.3 Inspection

• The ROW patrol was performed in April 2016. ROW observed to be in good condition

2.6.3. Moon to Kerna Pipeline (PL 15)

2.6.3.1 Internal Corrosion Mitigation

 Continuous inhibitor injection of 2 litres per day (IRN341A target rate, the injector system was monitored monthly).

2.6.3.2 External Corrosion Mitigation

- The operation of CP Units associated with the pipeline were checked bi-monthly; and
- A complete Cathodic Protection Test Post Potential survey was performed in February 2016 indicating full compliance with the AS 2832 'Off Potential' criteria.

2.6.3.3 Inspection

The ROW patrol was performed in February 2016. ROW observed to be in good condition.

2.6.4. Licenced Pipelines

Product transported through licensed pipelines in 2016 was:

	Sales Gas	Ethane (PJ)	LPG (Kt)	Cond (MI)
Ballera to Moomba	27.36	3.51	46.70	58.91
Stokes to Mettika	0.98	0.20	2.80	2.98
Moon to Kerna	0.1443	0.0209	0.1481	0.0819

3. Compliance Summary

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

3.1. Regulatory Non-Compliance

There was one SEO non-compliance received from DSD during the reporting period.

3.2. Compliance with Statement of Environmental Objectives

In 2016 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 against Santos environmental hazard standards and procedures and the effectiveness of the standards in the field.

A review of performance against the environmental objectives outlined in the respective Statement of Environmental Objectives is provided in Appendices 10 through 12:

- Geophysical Operations (Appendix 10);
- Drilling and Well Operations (Appendix 11); and
- Production and Processing (Appendix 12).

There was one SEO non-compliance received from DSD during the reporting period. This non-compliance was due to a breach of the Production and Processing Operations SEO with regards to the Produced Formation Water Disposal at a number of PFW ponds. An action taken to rectify this non-compliance was the installation of emulsion breaker to minimise carryover of emulsified hydrocarbon. Santos is to provide DSD with an update in January and at the end of March 2017 in regards to performance of the emulsion breaker.

3.3. SEO Review

The scheduled 5 year review of both the Environmental Impact Report (EIR) and Statement of Environmental Objectives (SEO) for Production and Processing Operations (PPO) commenced in 2015. Submission of draft documents to DSD occurred on 30 October 2015. Public consultation, final submission to DSD and gazettal is expected to occur in 2017.

3.4. Management System Audit

The Environment, Health and Safety Management System (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.

Ongoing monitoring and review of the EHSMS continued throughout the organisation during 2016. By mid-2016, work had progressed in all areas, including review of three hazard standards. However, at that time the decision was made to create a consolidated Santos Management System (SMS) which will be made up of policies, standards and procedures that clarify minimum performance requirements across all company activities. The remainder of the year was focused on preparing to consolidate and simplify EHS requirements in readiness for inclusion in the SMS project framework. The EHSMS will be phased out gradually in 2017 as new standards and procedures are released. No new EHS standards or procedures have yet to be released.

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;
- During 2016, Asset Managers were responsible for ensuring EHS Self-Audits were conducted within their area of responsibility (on site). A risk-based approach was used to determine the required audits against EHS Management System and/or hazard standards. These audits are conducted in accordance with AS/NZS ISO 19011:2003; and
- 3. The internal Company-wide audit program continued during 2016 and a total of nine audits were completed across the company.

Audit findings were presented at the Environment, Health, Safety and Sustainability Committee of the Board Meetings. In 2016, Santos continued to report, investigate and record any High Potential Incidents (HiPos) that occurred within the company. A HiPo is defined as any incident or near miss that could have realistically resulted in one or more fatalities. 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.

4. Report and Data Submissions

4.1. Reporting The following reports were provided to DSD in 2016:

Description of Report/Data	Date Due	Date Submitted	Compliant / Non-Compliant
2015 Annual Report 2015 Annual Report Resubmission	15 April 2016 24 November 2016	15 April 2016 24 November 2016	Compliant in respect of timing
Quarterly Incident and Serious Incident Reporting	Refer to Section 5		

Reg #	Routine - Yes / No	Report Title	
33(2)e	Yes	Proved + Probable Reserves Data submitted for all SA permits on 28 April 2016 for YE15. Daily Drilling Reports (See Appendix 6)	
50	163		
39	Yes	Wireline Logs – Drilling (See Appendix 6)	
	Yes	Wireline Logs – completions (See Appendix 6)	
40	Yes	Well Completion Reports (See Appendix 6)	
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 (See Appendix 6)	

5. Incidents

5.1. Serious Incidents

During the reporting period there were no serious incidents reported to DSD in accordance with the Act, Regulations and relevant to the SEO.

5.2. Reportable Incidents

There were176 quarterly reportable incidents during the reporting period, compared to 188 in 2015. Of the 176 reportable incidents, 68 were reported from only a Process Safety perspective, the remaining incidents were reported due to environmental (or both environmental and process safety) reasons. Reportable incidents are reported to DSD in accordance with the Regulations and discussed at the quarterly performance meetings.

2016 Reportable incident reporting summary is tabled below.

Report	Due	Submitted	Compliant/Non-Compliant
Quarterly	Q1: 30 Apr 2016	Q1: 2 May 2016	Non-compliant in reference to
reportable	Q2: 31 JUI 2016	Q2: 29 JUI 2016	timing
Incidents	Q3: 31 Oct 2016	submitted 13 December 2016	
	Q4: 31 Jan 2017	Q4: 31 Jan 2017	

The table below provides a trend analysis of reportable incident issued to DSD.

The consequence of these incidents, according to the internal classification guide developed by Santos, was:

- Negligible 91% (compared to 86% in 2015);
- Minor 9% (compared to 14% in 2015); and
- Moderate 0% (no change from 2015).

Reportable Environmental Incidents Summary

	2014 (%)	2015 (%)	2016 (%)
Location			
Plant	6	11	2
Field: Satellite	24	42	39
Field: Wells	28	25	33
Field: Pipelines	9	15	8
Field: Other	33	7	18
Spills: Contaminant Type			
Crude Oil	15	21	27
Condensate	7	6	10
Produced Formation Water	27	38	31
Chemical	11	7	3
Lube Oil	5	7	10
Hydraulic Oil	5	2	1
Diesel	4	4	5
Grey Water / Sewage	22	8	3
Other	4	7	12
Spills: Total uncontained volume			
>100 m ³	2	0	1
20 – 99 m ³	3	5	2
5 – 19 m ³	2	5	4
1 – 4 m ³	9	10	8
500 – 999 Litres	4	9	5
100 – 499 Litres	18	29	21
50 – 99 Litres	10	4	7
10 – 49 Litres	25	20	29
5 – 9 Litres	10	0	3
<5 Litres	10	13	16
Not specified	13	5	5

Total Environmental	2014	2015	2016
Incidents* (reported to DSD)	192	188	108

* In January 2014, the Serious and Reportable incidents reporting requirements were updated by DSD and updated within the SEO. These new reporting definitions introduced several new requirements, including the need to report any non-compliance with the SEO in the quarterly compliance. The scope of reporting expanded to include incidents relating to risk to the public and third parties, cultural heritage site avoidance and attainment of 0, +1 and +2 scores against GAS criteria. As such, the number of quarterly reportable incidents increased due to the increase in scope of what was required to be reported.

5.3. Summary of actions to prevent recurrence

A range of corrective actions, from investigations, have been implemented, including:

- Continuing the emphasis on recording of all environmental hazards, near misses and incidents within Santos' internal incident management system to enable meaningful corrective actions to be raised, and for trends to be analysed;
- EHS bulletins and knowledge sharing at meetings with all areas of the business, from Area operators in the field through to senior management;
- Further raise awareness during toolbox talks (Santos and contractor personnel), EHS Communications meetings and general interactions on site;
- Focus on pipeline and plant integrity, which involved:
 - Ongoing designing of pipelines in accordance with AS 2885 and relevant engineering standards. Operation and maintenance of pipelines was managed by the Santos Pipeline Asset Management System which sets standards for integrity management and design life review to ensure EHS risks are as low as reasonably practicable;
 - Continual development, implementation and measurement of Integrity Management Plans (IMPs) for pipelines in the Santos-operated network. IMPs indicate the activities and frequencies of inspections required to manage integrity of each asset, based on estimated risk analysis; and
 - Prioritisation of flowlines and/or production infrastructure for maintenance, replacement or abandonment based on risk.

6. Reasonably Foreseeable Threats

6.1. Initiatives

Reasonably foreseeable threats (those that reasonably present, or may present, a hazard to facilities or activities) continued to be reviewed and reduced, due to a number of activities.

These activities included:

- Close liaison continues with third parties exploring and producing in the Cooper Basin to manage the risk of third party impact on pipelines;
- 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;
- The Moomba Plant achieved its Major Hazard Facility (MHF) licence by SafeWork SA; and
- The Integrated Risk Register (IRR) was implemented so that the risk associated with Significant Hazards is managed within a centralised system. Bowties contained within the Moomba Safety Case are operationalise through monitoring on reporting on effective of controls/barriers utilising the Integrated Risk Register as a tool.

6.2. Major Hazard Facility

In 2012, the Moomba Plant was designated a Major Hazard Facility (MHF). In July 2016 the plant was awarded a 5 year licence without conditions, following the successful completion of an audit conducted by SafeWork SA.

The Safety Case provides assurance that the Moomba Gas Plant has the processes, equipment and personnel to operate safely and meet all statutory requirements. It demonstrates how the plant is managed to ensure that the risks of operating a Major Hazard Facility are reduced so far as is reasonably practicable. Opportunities identified through the Safety Case development have been and are being incorporated into business processes and documents.

The Safety Case includes the following components:

- Facility Description;
- Safety Management System Summary;
- Safety Assessment What the potential major incidents, risks and controls are; and
- Emergency Response Action to be taken in the event of a major incident.

Offsite risks to nearby facilities (for example contractor yards) that could be impacted by a potential major incident are also examined in the Safety Case.

6.3. Risk Assessments

During 2016, Santos undertook a number of risk assessments. 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 accordance with EHSMS09 – Managing EHE Risks.

6.3.1. Formal Safety Assessment (FSA) and BowTie Risk Assessment (FSA)

The Formal Safety Assessment (FSA) was undertaken in 2014-2015 for the Moomba Gas Plant. It has been undertaken using bowtie analysis to identify, in a structured manner, the threats that may lead to losses of containment of Schedule 15 materials and the controls in place or required to prevent a loss of containment or mitigate the effects. Participation in the Safety Assessment workshops included representation from process safety, process & maintenance team, and process & discipline engineering, the process was supported by initial hazard identification and consequence analysis, and subsequent qualitative risk assessment base on the Santos risk matrix. In addition the safety assessment drew on knowledge from prior safety assessment, including the Formal Safety Assessment completed in 2010 and the Whole of Plant Risk Assessment (WOPRA) undertaken 2002-2003.

The safety assessment process is ongoing, with formal reviews to be undertaken at least 5-yearly, and will continue throughout the Operations phase of the facility.

During 2016, the bowtie analyses were finalised, incorporated into the Safety Case and submitted to SafeWork SA.

6.3.2. Moomba Plant Emergency Response Plan (ERP)

The Moomba Plant Emergency Response Plan was developed in 2015 and identifies the specific emergency response requirements for major incidents ("an incident that results from an uncontrolled event involving, or potentially involving, Schedule 15 chemicals which exposes a person to a serious risk to health or safety"). The Emergency Response Plan acts as a guide to the on-site response to major incidents by:

- Describing general incident responses;
- Identifying site-specific equipment required for emergency response;
- Describing scenario based response procedures;
- Identifying key resource contact details; and
- Identifying the areas in the Moomba Plant with Schedule 15 inventories.

6.3.3. API Risk Based Inspection (RBI)

The API Risk Based Inspection (RBI) program implementation has progressed throughout 2016 to become operationalised. The focus during 2016 has been on:

- Ensuring the feedback from inspections has been incorporated into future inspection intervals;
- Developing new Integrity Management Plans (IMPs) to support the RBI decision outcomes and Inspection Strategy development for all fixed equipment assets;

Developing Integrity Operating Windows (IOWs); and Implementing RBI piping inspection programs to better understand piping integrity and mitigate risk associated with the degradation of process piping.

6.3.4. Integrated Risk Register (IRR)

In 2015, Santos developed and commenced implementation of an Integrated Risk Management capability that combined a number of disparate processes and tools to improve visibility and management of the following:

- Transient Risks (departures from expected operating states) including bridges, operating deviations, and maintenance deferrals;
- Risk Assessment associated with Significant Hazards including Bowtie Risk Assessment and EHSMS09 Risk Assessment (Activity based risks are managed through Health and Safety Hazard Standards);
- Threat management.

The new tool - the integrated risk register - enhances Santos' ability to make informed risk management decisions and improves focus and governance of critical controls.

6.3.5. Significant Hazard Risk Register (SHRR)

Santos is in the process of migrating its data to the Integrated Risk Register. The Moomba Significant Hazard Risk Register is managed through the Integrated Risk Register.

Risk data which has yet to be migrated from the superceded Significant Hazard Risk Register relates to the management of EHS risk and is utilised to:

- Manage significant EHS risks, key controls and associated resource prioritisation;
- Assist with the development of site/function EHS inspection, monitoring and audit programs; and
- Assist with the development of annual EHS Improvement Plans.

6.3.6. Security

The Cooper Basin Security Plan describes a range of measures to manage and minimise risks arising from security threats to Moomba Gas Plant including drills and exercises, procedures and employment of security officers. The Security Plan is aligned with the National Security Framework.

6.3.7. 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 mitigant 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.

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); and
- Mitigation (5 measures), Inspection (7 measures).

A number of risk assessments were undertaken on key pipelines, listed in **Appendix 5**, as required under the Pipeline Management System.

7. Emergency Response

7.1. Emergency Response Capability

Santos has maintained a dedicated emergency response crew at Moomba during 2016 consisting of fully trained Emergency Officers and medical response personnel together with a large inventory of emergency response equipment, material and vehicles. All Emergency Officers and members of the emergency response team are trained in line with the Santos Competency Based Training programme to effectively fulfil their roles and responsibilities.

7.2. Emergency Response Procedures

The Moomba Gas Plant Emergency Response Plan (MGPERP) is a subset of the Cooper Basin Operations Emergency Response Plan (CBOERP). The CBOERP covers all Santos operations in the Cooper Basin and covers communication, escalation, procedure for initiating and implementing Emergency Response, Roles and Responsibilities, testing and training requirements for emergency response. The purpose of the MGPERP is to identify the specific emergency response requirements for major incidents in the MGP including Moomba North Compressor Facility and also consist of Contingency Pre Plans which are also used to scope Emergency Exercise scenarios for the MGP. The ERP's have been developed aligning to the AIIMS principles (Australasian Inter Service Incident Management System). Key to effective control utilising AIIMS principles is the implementation of an appropriate management structure which enables delegation and an orderly approach to the allocation of tasks. This management structure is flexible and can be scaled up or down to suit the type, size, location and complexity of the Emergency.

The detailed scenario-based emergency response procedures have been developed and implemented under the Santos Crisis Management Plan and Incident Management Plan to guide personnel in emergency incident response.

Extensive induction training for all personnel with CBOERP and associated EOC emergency response responsibilities continued during 2016 reflecting extensive organisational restructuring, emergency response scenarios are regularly rehearsed 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 de-brief of all relevant parties is conducted in order to ensure learning's are incorporated into the plans.

7.3. Emergency Response Drills

A listing of drills held during 2016 is contained in Appendix 2.

Emergency Services conducted a number of Drills, Exercises and Desktop Exercises in 2016 including Evacuation Drills, Muster Point Training, Operational Exercises, EOC Training and exercises, Search and Rescue exercises, Heights and Confined Space Entry rescue training including Rescue Rehearsals etc.

An agreement with DSD provides for a summary within this report with regard to the requirements of Regulation 31 (5) of the Petroleum and Geothermal Energy Regulations 2000, the preparation and submission of a report after a drill.

The drills held during 2016 have met the requirements of Reg 31-(6). They have demonstrated the adequacy of the emergency response procedures and the competency of personnel to execute the procedures. A number of emergency response exercises were conducted during 2016 to test the adequacy of the emergency response procedures and the competency of personnel to execute the procedures, local exercises were also conducted throughout 2016 on drilling rigs. These exercises involved medics and actual rescue scenarios.

The following provides some additional detail on the more significant response drill Santos conducted, or participated in, during 2016.

7.3.1. Overview of Significant Response Drills

7.3.1.1 Moomba Plant Major Exercise (OPREX)

This exercise was scheduled as part of the EHSMS.13 Emergency Preparedness 2016 Santos Cooper Basin Emergency Exercise requirements in conjunction with the requirement for internal site emergency response exercises for designated Major Hazard Facilities, specifically - the Plant wide verification of the ERP responding to scenarios identified in the Moomba Gas Plant ERP and associated Contingency Pre Plans. 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.

The 2016 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 personnel are working on the Seperator in the Moomba North Compressor Facility, this has resulted in a gas leak and fire. Two persons are injured, require rescue and medical assistance. The aim of this operational exercise was to validate current emergency plans and procedures, to test current resources available on site to respond to an emergency of this nature and provide a skills maintenance

opportunity for all involved:

- To validate the effectiveness of the current Moomba Emergency Plan, Emergency Response Procedures and the Moomba Plant Contingency Pre-Plans..
- Test the new (CRD) call, receive and dispatch procedures and relevant notifications.
- Measure the effectiveness of response initial actions by Process and Production Operators. The strategy developed and the tactics undertaken by Emergency Services with a focus on fire supression and casualty rescue. Measure the effectiveness of sourcing Advanced Fire trained personnel to assist in suppression efforts.
- Measure the effectiveness of medical response and the ability to source current firt-aiders from Muster-points.
- Ensure full evacuation of Moomba Plant & surrounding environs, (including Contractor compounds if required by the On Scene Commander), is done in a timely manner & muster points are reviewed for suitability to ensure they are outside the primary impact zone
- Development of a plan for what actions would need be taken to maintain and or recover operations and steps taken to prevent any knock on effects

7.3.1.2 Emergency Operations Centre Exercises (TEWTS & OPREX)

A number of EOC exercises were conducted throughout 2016. These exercises were designed to practice established emergency response procedures and individual roles and responsibilities within the Emergency Operations Centre during the time of an incident. The alternate EOC was also relocated to the old Airport Terminal during 2016 and was also the subject of exercises to ensure functionality.

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 several major exercises held within the Cooper Basin Operations including South West Queensland. Exercises included Moomba Plant, Moomba Aerodrome (DISCEX), Search and Rescue (SAR) and Satellite Exercises

7.3.1.3 Tirrawarra – Gas Leak- Unit 8 (OPREX)

This exercise was an Operational Exercise (OPREX) designed to evaluate established emergency response procedures, Moomba Communications Emergency Response Procedures for Call, Receipt and Dispatch in the event of incidents, equipment locations, roles and responsibilities, first aid and emergency control. **Scenario**

During normal operations at the Tirrawarra satellite there is an uncontrolled gas leak. **Objectives**

- Assess onsite staff and work party their understanding, roles and responsibilities and their ability to manage an Emergency Situation and provide a training opportunity for the first responding person on site.
- Test the current CRD Procedures.
- On site Emergency Control
- First aid and equipment/resources on site location

7.3.1.4Moomba South Central Satellite - Loss of containment (LOC) Gas (OPREX)

This exercise was an operational exercise (OPREX), designed to practice established emergency response procedures and individual skills in relation to a response to a loss of containment (Gas leak) at the Moomba South Satellite.

The aim of this exercise was to practice and refine emergency management arrangements in the event of an emergency occurring at the Moomba South Satellite affecting surrounding fields to provide a skills maintenance training opportunity for Production Department personnel.

Scenario

Operators arrive at the satellite first thing in the morning to hear a very loud hissing noise coming from the eastern side of the satellite. Upon closer inspection you determine that large amounts of gas is escaping from a fatigued fitting in the bypass line on the reinjection side of the MOD Change Skid.

Objectives

- To practise and assess initial emergency response arrangements for the area operator and Moomba South satellite site
- To validate the Cooper Basin ERP for a "Pipeline Integrity Compromised" situation
- To practice and assess the appropriate notifications and information transfer from the forward command site back to the Moomba Communications Centre and implementation of the CRD (Call Receipt & Despatch)

7.3.1.5 Moomba Environs – Bomb Threat (OPREX)

This exercise was an operational exercise (OPREX), designed to practice established emergency response procedures and individual skills in relation to a response resulting from a potential Bomb Threat situation.

The aim of this exercise was to practice and refine emergency management arrangements in the event of a Bomb Threat emergency occurring

Scenario

At approximately 0800 hrs a call will be made to Moomba Comms of a Bomb threat. (Telstra Communications Tower)

Objectives

- To validate the Moomba CRD procedures for this type of incident To validate the Cooper Basin ERP for this type of incident Demonstrate Rig Emergency Response Procedures
- To test the response capabilities of the Moomba Emergency teams.

7.3.1.6 Moomba Aerodrome Emergency Exercise (TEWT)

- CASA regulations require a full scale Aerodrome Emergency Exercise at intervals not exceeding 24 months. The last exercise was conducted 2015 so every other year a DISCEX is held.
- The 2016 Aerodrome Exercise for Moomba was TEWT style exercise, designed to practice established Emergency Response Procedures and Emergency Personnel as required by:
- Civil Aviation Safety Authority (CASA) regulation 139.215
- EHSMS 13 EMERGENCY PREPAREDNESS.
- The aim of this exercise was to test, validate and review the soundness of the Moomba Aerodrome Emergency Response Plan and supporting response services capability.

Scenario

- At approximately 1245hrs an inbound charter flight to Moomba called the Moomba Aerodrome for possible assistance needed (PAN) due to a oil low warning on the starboard side engine. The flight was a Sharp Airlines Fairchild Metroliner (*Fairchild SA227-DC Metro 23*). Crew comprised of a Captain and Co-Pilot with 16 passengers on board.
- At approximately 1300hrs another call came from the aircraft that this fault has resulted in an engine fire on the Starboard side engine, fire supression systems have been activated but a fire was still active in the nacelle due to visible flames and smoke. The aircraft was on final approach to 'Runway 12' Moomba Aerodrome. Temperature at the Aerodrome was 30 degrees with a Southerly wind direction of 25km/h gusting to 35 km/h.

Objectives

- Moomba EOC Emergency Response Team (ERT)
 - ERT structure is to be practiced in accordance with the Moomba Aerodrome Emergency Plan.
 - ERT follows the Moomba Aerodrome Emergency Plan

Development of a strategy by the On Scene Commander

- Aviation Rescue & Firefighting (ARFF) response to a fixed wing aircraft incident.
- Liaise with RFDS Nurse #1 to set up a triage area and provide primary care to any casualties

All roles within the Moomba EOC and those at the FCP to understand the function of their role and practice the responsibilities required.

- a) Consult the Moomba Aerodrome Emergency Plan.
- b) Seek required guidance from the Emergency Response Co-ordinator and On Scene Commander were applicable.

Moomba EOC (ERT) and Responders that would be at the Aerodrome (FRT) to walk through the time line of the incident response.

- a) FRT to develop strategies and tactics.
- b) ERT to develop plan to assist operations

7.3.2. Emergency Response

In addition to planned drills, the Moomba emergency response resources were activated on a number of occasions in 2016. 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:

- Minor Gas Leak LRP B Cold Box Gland Packer
 January 1st 2016
- Minor Gas leak at the LRP-B Expander Compressor UV Outlet June 6th 2016
- Sharp Airline (Conquest) Possible landing gear problem May 23rd 2016
- RFDS Aircraft Crash Land, Moomba Aerodrome December 13th 2016

24 Moomba environs and field incidents (including non-Santos related) included medical assists, vehicle accidents, Hazmat / Oil Spill and third party search and rescue. There were also a small number of incidents in South West Queensland requiring partial implementation of the Santos ERP including the Moomba key EOC personnel. In all cases, the response systems operated effectively.

Santos Emergency Response personnel 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.

7.3.2.1 Emergency Response Equipment

In response to the recommendations of a 2013 review of well site control emergency equipment involving representation from "CUDD Well Control" there has been an increase of standby equipment held in the Cooper Basin and is stored in Moomba.

A full cache of Well Control emergency equipment centralised in Moomba consisting of two containers and two Rapid Response boxes of specific type emergency equipment for quick deployment including a stand alone skid mounted high volume fire water pump with diesel engine driver and skid mounted heat shielded monitors.

In addition OSCAR "Oil Spill Containment and Recovery" equipment was maintained with equipment including curtain and absorbent Booms, pneumatic driven skimmer and associated deployment equipment.

Key personnel received associated OSCAR training during 2016 with additional training scheduled in 2017.

The Fire Training Ground provides the ability to train and maintain skills in an extensive range of key required competencies and qualifications Eg. Confined Space, Working at Heights, Tower Rescue, Live Fire (Oil and Gas) Heavy Rescue (Road Crash Rescue), SCBA, and CUDD equipment Etc. all of which assist both Emergency Service Officers to maintain their skills with respect to emergency response and also enables the work force in general to receive appropriate training and ability to rehearse rescue plans in a controlled environment.

8. Future Work Program

8.1. Regulated Activities

During 2017 the following regulated activities (as defined in the Act) may be conducted:

- exploration for and appraisal of petroleum;
- road, track, borrow pit and well lease construction;
- 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; and
- operation of licensed transmission pipelines.

Production Facility Projects

Production facility projects proposed to be completed in 2017 are provided in Appendix 8.

8.2. Development Activities

8.2.1. Drilling Activity

Drilling activity planned for 2017 (numbers indicated are approximate) includes the following:

- 26 wells to be drilled, plus 1 deepening well;
- No downhole abandonments are scheduled for 2017;
- 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; and
- Fracture stimulations.

9. Production Forecast

The estimated gas and liquids production and export volumes from the Moomba Plant for 2017 are as listed below:

Sales Gas (PJ) - export	76.9
Ethane (PJ) (Qenos Demand)	11.7
LPG (Kt) – production and 3 rd party	152.8
Condensate (Kbbls) – production and 3 rd party	1222.6
Crude Oil (Block and Unit) (mm bbls) – production and 3rd party	8.7
Crude Oil (Block and Unit) – SACB JV production only (mm bbls gross)	1.5

2017 Gas Storage Estimates (Moomba):

Opening Storage (PJ) Sales Gas + ethane	43.2
Net Storage Injection / (Withdrawal) (PJ)	(11.3)
Total Closing Sales Gas and Ethane Storage (PJ)	31.9

10. Statement of Actual and Proposed Expenditure 2016/2017

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11. Glossary of Terms

AAL	Associated Activity Licence
AIMS	Asset Integrity Management System
ALARP	As Low As Reasonably Practicable
BBLS	Barrels
CP	Cathodic Protection
DISCER	Discussion Exercise
DPCU	Dew Point Control Unit
DEVV	Department for Water (previously DWLBC)
DSD	Department of State Development (previously DMITRE)
EHS	Environment, Health and Safety
EHSMS	Environment, Health and Safety Management System
EIR	Environmental Impact report
EPA	Environment Protection Authority
EOC	Emergency Operations Centre
EMP	Environmental Monitoring Point
ERF	Environmental Report Forms
FRP	Emergency Response Plan
ESD	Electric Submersible Pump
	External Upset Tubing Connection
EUE	Cool Attainment Secling
HAZOP	
	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
MHF	Major Hazard Facility
MIC	Microbiological Induced Corrosion
mL	mega litre (1.000.000 litres)
mm	BBLS Million barrels
OPREX	Operational Exercise
PEI	Petroleum Exploration License
	Produced Formation Water
	Produced Formation Water
PPL	Petroleum Production License
RFDS	Royal Flying Doctor Service
ROW	Right of Way (for pipelines)
SACB	South Australian Cooper Basin
SACB JV	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

12. Appendices

Appendix 1	Lease Scouting, Construction, Backfill and Restoration Activity
Appendix 2	Petroleum Engineering
Appendix 3	Well Summary: Producing and Suspended Wells
Appendix 4	Flowlines Constructed
Appendix 5	Pipeline Inspection, Testing and Repair
Appendix 6	Daily Drilling, Production, Well Completion and Wire Line Log Report Submissions
Appendix 7	Production Facility Projects
Appendix 8	Proposed Production Facility Projects 2016
Appendix 9	Wells Drilled
Appendix 10	Environmental Objectives and Performance – Geophysical Operations SEO
Appendix 11	Environmental Objectives and Performance – Drilling and Well Operations SEO
Appendix 12	Environmental Objectives and Performance – Production and Processing SEO
Appendix 13	Emergency Drills

Appendix 1 - Lease Scouting, Construction, Backfill and **Restoration Activity**

Construction

Well Name	Well No.	New Well Scout Date	Construction Commenced	Well Status	New Borrow Pits Constructed for Well & Access	Road Length Km constructed for new lease build
Allunga Dev A/B	2,3	23/05/2016	6/10/2016	Gas	1	1.6
Berylium	1	8/01/2016	5/02/2016	Gas	5	5.9
Big Lake	134	14/04/2016	6/06/2016	Gas	2	2.4
Big Lake Pad East	135-138	15/04/2016	15/06/2016	Gas	0	0.6
Lyra	1	13/01/2016	12/02/2016	Gas	6	1.8
Namur	4	9/08/2016	14/10/2016	Gas	2	3.7
Sphalerite	1	9/01/2016	19/02/2016	P&A	4	2.8
Tirrawarra	90	1/03/2016	28/04/2016	Gas	0	0.4
Tirrawarra	91,92	26/02/2016	30/04/2016	Gas	1	-
Tirrawarra	93	27/02/2016	6/04/2016	Gas	2	1.6
Varanus Sth	2	2/12/2015	8/01/2016	Gas	1	2.0
Kanowana Pad	12-14	8/11/2016	20/12/2016	Gas	1	0.5

Backfill

Well Name	Well No.	Construction Commenced	Well Status	Restoration Activity	Number of Borrow Pits Restored	Road Length km Restored	Restoration Sign off Date
Balcaminga	2	29/07/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Big Lake	92	16/05/2012	Gas	Drill Sump and Pit Rehabilitation	-	-	5/12/2016
Big Lake	106,107,108,109	18/12/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	25/12/2016
Big Lake	115 - 119	14/03/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	2/12/2016
Big Lake	124 - 127	29/04/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	5/12/2016
Big Lake	132	24/08/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	29/11/2016
Big Lake	133	18/08/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	21/11/2016
Big Lake	100	2/10/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Big Lake	102,103,104,105	20/11/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Big Lake	89 -90 -91	4/07/2008	Gas	Drill Sump and Pit Rehabilitation	-	-	2/12/2016
Big Lake	131	12/08/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	5/12/2016
Gooranie	7	25/06/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	208	18/09/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	191	8/11/2011	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	210	15/08/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	202	16/10/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	211	26/09/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	203-205	21/07/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba	212	21/10/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba Aurora 2	193	29/07/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba Fortuna 1	1	22/06/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Moomba Fortuna 2	2	29/07/2013	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016

Moomba Nth Pad B	206-207	13/07/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Swan Lake	11	6/06/2014	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Swan Lake	13-16	12/02/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Swan Lake	12	10/02/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tallerangie	2	6/07/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tirrawarra	84	2/05/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tirrawarra	85	2/06/2105	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tirrawarra	86	25/07/2015	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tirrawarra	87	10/06/2105	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Tirrawarra	88	12/06/2105	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016
Van der Waals	1	1/11/2012	Gas	Drill Sump and Pit Rehabilitation	-	-	23/12/2016

Appendix 2 – Petroleum Engineering

Well Name		Start Date	Finish date
TIRRAWARRA 87	COMPLETION	29-Dec-15	04-Jan-16
MOOMBA 211	COMPLETION	30-Dec-15	02-Jan-16
GOORANIE 7	PULL PLUG	30-Dec-15	09-Jan-16
DELLA 24DW1	RUN PLUG	04-Jan-16	04-Jan-16
MERRIMELIA 64	FRACTURE STIMULATION	08-Jan-16	09-Mar-16
MOOMBA 211	WORKOVER RIG ACTIVITY	09-Jan-16	09-Jan-16
ULANDI 14	WORKOVER	11-Jan-16	13-Jan-16
MOOMBA 68	WORKOVER RIG ACTIVITY	12-Jan-16	12-Jan-16
MOOMBA 209	WORKOVER RIG ACTIVITY	12-Jan-16	16-Jan-16
ULANDI 9	WORKOVER	13-Jan-16	15-Jan-16
TIRRAWARRA 31	PERFORATION	14-Jan-16	16-Jan-16
KIDMAN NORTH 4	PERFORATION	15-Jan-16	15-Jan-16
JENA 20	WORKOVER	15-Jan-16	17-Jan-16
MOOMBA 68	SWABBING	17-Jan-16	21-Jan-16
MUDERA 7	WORKOVER RIG ACTIVITY	18-Jan-16	18-Jan-16
TIRRAWARRA 31	WORKOVER RIG ACTIVITY	18-Jan-16	18-Jan-16
MOOMBA 205	RUN PLUG	18-Jan-16	19-Jan-16
TINDILPIE 15	PERFORATION	18-Jan-16	20-Jan-16
MOOMBA 204	WORKOVER RIG ACTIVITY	19-Jan-16	19-Jan-16
MOOMBA 203	RUN PLUG	19-Jan-16	22-Jan-16
MOOMBA 205	COMPLETION	19-Jan-16	24-Jan-16
MOOMBA 12	WORKOVER RIG ACTIVITY	20-Jan-16	22-Jan-16
MOOMBA 205	WORKOVER RIG ACTIVITY	21-Jan-16	21-Jan-16
MOOMBA 68	WORKOVER RIG ACTIVITY	21-Jan-16	21-Jan-16
PELICAN 10	PERFORATION	21-Jan-16	23-Jan-16
GRANCHIO 2	WORKOVER	21-Jan-16	24-Jan-16
MOOMBA 12	RUN PLUG	21-Jan-16	25-Jan-16
TIRRAWARRA 75	PERFORATION	23-Jan-16	23-Jan-16
MOOMBA 116	PERFORATION	24-Jan-16	25-Jan-16
MOOMBA 192	RUN PLUG	24-Jan-16	25-Jan-16
JENA 25	WORKOVER	24-Jan-16	27-Jan-16
MOOMBA 204	COMPLETION	24-Jan-16	31-Jan-16
MOOMBA 192	WORKOVER RIG ACTIVITY	25-Jan-16	28-Jan-16
BUNGEE 2	PERFORATION	26-Jan-16	27-Jan-16
MOOMBA 203	COMPLETION	26-Jan-16	28-Jan-16
MOOMBA 210	WORKOVER RIG ACTIVITY	26-Jan-16	30-Jan-16
BIG LAKE 67	PERFORATION	27-Jan-16	29-Jan-16
JENA 19	WORKOVER	27-Jan-16	29-Jan-16
MOOMBA 211	PERFORATION	27-Jan-16	29-Jan-16
DELLA 24	WORKOVER RIG ACTIVITY	27-Jan-16	31-Jan-16
DELLA 24	SWABBING	28-Jan-16	29-Jan-16
MOOMBA 12	PERFORATION	28-Jan-16	31-Jan-16
GOORANIE 4	PERFORATION	29-Jan-16	01-Feb-16
MOOMBA 206	FRACTURE STIMULATION	29-Jan-16	08-Apr-16
THURAKINNA 1	PERFORATION	30-Jan-16	31-Jan-16
MOOMBA 211	WORKOVER RIG ACTIVITY	30-Jan-16	02-Feb-16
MOOMBA 12	RECOMPLETION	30-Jan-16	15-Feb-16
MOOMBA 205	PULL PLUG	01-Feb-16	01-Feb-16

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THURAKINNA 3	PERFORATION	01-Feb-16	02-Feb-16
WOOLKINA 2	PERFORATION	01-Feb-16	04-Feb-16
MOOMBA 204	PULL PLUG	02-Feb-16	02-Feb-16
TOOLACHEE 14	WORKOVER RIG ACTIVITY	02-Feb-16	02-Feb-16
MOOMBA 203	PULL PLUG	03-Feb-16	03-Feb-16
MOOMBA 83	WORKOVER RIG ACTIVITY	03-Feb-16	03-Feb-16
MOOMBA 207	RUN PLUG	03-Feb-16	05-Feb-16
MOOMBA 203	WORKOVER RIG ACTIVITY	04-Feb-16	04-Feb-16
MOOMBA 12	RUN PLUG	07-Feb-16	07-Feb-16
BIG LAKE 93	PERFORATION	07-Feb-16	08-Feb-16
MOOLION 5	PERFORATION	09-Feb-16	11-Feb-16
MOOMBA 192	WORKOVER RIG ACTIVITY	09-Feb-16	11-Feb-16
MOOMBA 141	PERFORATION	10-Feb-16	12-Feb-16
MOOLION 5	PERFORATION	12-Feb-16	12-Feb-16
COONATIE 14	PERFORATION	12-Feb-16	13-Feb-16
COONATIE 17	PERFORATION	14-Feb-16	15-Feb-16
TIRRAWARRA 75	PERFORATION	15-Feb-16	18-Feb-16
CORREA 3	WORKOVER	16-Feb-16	21-Feb-16
COONATIE 22	WORKOVER RIG ACTIVITY	18-Feb-16	18-Feb-16
MOOMBA 210	WORKOVER RIG ACTIVITY	18-Feb-16	18-Feb-16
LAKE MACMILLAN 3	PERFORATION	18-Feb-16	19-Feb-16
BIG LAKE 110	WORKOVER RIG ACTIVITY	19-Feb-16	19-Feb-16
BEANBUSH 2	PERFORATION	19-Feb-16	22-Feb-16
BIG LAKE 76	PERFORATION	21-Feb-16	21-Feb-16
TARWONGA 4	WORKOVER RIG ACTIVITY	21-Feb-16	21-Feb-16
TOOLACHEE 3	WORKOVER RIG ACTIVITY	21-Feb-16	21-Feb-16
COONATIE 21	WORKOVER RIG ACTIVITY	22-Feb-16	22-Feb-16
MOOMBA 12	WORKOVER RIG ACTIVITY	23-Feb-16	23-Feb-16
COONATIE 7	PERFORATION	23-Feb-16	26-Feb-16
MERRIMELIA 26	PERFORATION	24-Feb-16	25-Feb-16
BEANBUSH 2	WORKOVER RIG ACTIVITY	25-Feb-16	25-Feb-16
MOOMBA 187	WORKOVER RIG ACTIVITY	25-Feb-16	25-Feb-16
BULYEROO 1	WORKOVER RIG ACTIVITY	26-Feb-16	26-Feb-16
PONDRINIE 5	PERFORATION	26-Feb-16	27-Feb-16
MCKINLAY 11	COMPLETION	26-Feb-16	14-Mar-16
BIG LAKE 111	PERFORATION	01-Mar-16	03-Mar-16
MOORARI 3	WORKOVER RIG ACTIVITY	02-Mar-16	02-Mar-16
BIG LAKE 110	WORKOVER RIG ACTIVITY	04-Mar-16	04-Mar-16
NEPHRITE 2	WORKOVER RIG ACTIVITY	06-Mar-16	09-Mar-16
TINDILPIE 13	WORKOVER RIG ACTIVITY	07-Mar-16	07-Mar-16
WAUKATANNA 3	PERFORATION	07-Mar-16	08-Mar-16
DULLINGARI NORTH 11	WORKOVER RIG ACTIVITY	08-Mar-16	08-Mar-16
CORREA 3	FRACTURE STIMULATION	08-Mar-16	14-Mar-16
MCKINLAY 11	WORKOVER RIG ACTIVITY	09-Mar-16	09-Mar-16
CORREA 3	PERFORATION	09-Mar-16	13-Mar-16
BIG LAKE 110	PERFORATION	09-Mar-16	17-Mar-16
MCKINLAY 10	COMPLETION	15-Mar-16	28-Mar-16
BIG LAKE 110	PERFORATION	17-Mar-16	17-Mar-16
NEPHRITE SOUTH 10	WORKOVER RIG ACTIVITY	17-Mar-16	17-Mar-16
BIG LAKE 83	PERFORATION	17-Mar-16	20-Mar-16
МООМВА 207	FRACTURE STIMULATION	17-Mar-16	08-Apr-16
BIG LAKE 83	PERFORATION	19-Mar-16	20-Mar-16

		20 Mar 16	20 Mar 16
		20-Mar-16	20-Mar-16
		21-Mar-16	22-Mar-16
		23-Mar-16	23-Mar-16
MOOMBA 206		24-Mar-16	24-Mar-16
		24-Iviai-10	24-Iviai-10
		24-Iviai-10	24-Ivial-10
		24-Iviai-10	24-1vial-10
		24-IVId1-10	26 Mar 16
		25-Iviai-10	20-101a1-10
		25-Mar 16	26 Mar 16
		20-Mar-16	20-1viai-10
		20-Mar-16	02-Apr-16
		20-War 16	20 Mar 16
		20 Mar 16	01 Apr 16
		21 Mar 16	21 Mar 16
		21 Mar 16	01 Apr 16
		01 Apr 16	01-Apr-10
		01-Apt-16	01-Apr-16
		02-Apr-10	03-Apr-10
		03-Apr-16	04-Apt-16
		05-Apr-16	04-Apt-16
		05-Apr-16	03-Apr-16
		05-Apr-16	07-Apr-16
		06-Apr-16	07-Apr-16
		00-Apr-16	09-Apr-16
		09-Apr-16	09-Apr-16
		09-Apr-16	09-Apr-16
		09-Apr-16	10-Apr-16
JENA 19		09-Apr-16	13-Apr-16
		10-Apr-16	10-Apr-16
		10-Apr-16	11-Apr-16
		11-Apr-16	12-Apr-16
		12-Apr-16	12-Apr-16
		12-Apr-16	13-Apr-16
		13-Apr-16	14-Apr-16
		13-Apr-16	10-Apr-16
		14-Apr-16	14-Apr-16
BIG LAKE 43		14-Apr-16	15-Apr-16
		15-Apr-16	15-Apr-16
		10-Apr-10	10-Apr-10
		17-Apr-16	17-Apt-16
		18-Apr-16	27-Apr-16
		19-Apr-16	19-Apr-16
		19-Apr-16	21-Apr-16
		19-Apr-16	21-Apr-10
		21-Apr-16	21-Apr-16
		25-API-10	25-API-10
		20-Apr-10	20-API-10
		20-Apr-10	04 - 101 dy - 10
		20-Apr-10	09-IVIdy-10
		20-API-10	09-1VIdy-10
FLÍ LAKE Z/	PERFURATION	27-Abi-10	20-Abi-10

MOOMBA 206	COMPLETION	27-Apr-16	30-Apr-16
BULYEROO 1	PULL PLUG	27-Apr-16	01-May-16
MOOMBA 139	WORKOVER RIG ACTIVITY	28-Apr-16	28-Apr-16
JACK LAKE 4	PERFORATION	28-Apr-16	29-Apr-16
JACK LAKE 5	PERFORATION	29-Apr-16	29-Apr-16
MOOMBA 210	PERFORATION	29-Apr-16	29-Apr-16
MOOMBA 207	COMPLETION	30-Apr-16	02-May-16
MOOMBA 212	WORKOVER RIG ACTIVITY	01-May-16	01-May-16
MOOMBA 47	PULL PLUG	01-May-16	01-May-16
TIRRAWARRA 86	PERFORATION	01-May-16	02-May-16
TIRRAWARRA 74	PERFORATION	01-May-16	04-May-16
MOOMBA 47	RUN PLUG	02-May-16	02-May-16
MOOMBA 208	COMPLETION	02-May-16	04-May-16
JACK LAKE 4	PERFORATION	04-May-16	04-May-16
JACK LAKE 5	PERFORATION	04-May-16	04-May-16
MOOMBA 55	PERFORATION	04-May-16	04-May-16
CORREA 3	COMPLETION	04-May-16	06-May-16
MOOMBA 206	WORKOVER RIG ACTIVITY	05-May-16	05-May-16
MOOMBA 207	WORKOVER RIG ACTIVITY	05-May-16	05-May-16
BIG LAKE 85	PERFORATION	05-May-16	06-May-16
MOOMBA 208	WORKOVER RIG ACTIVITY	05-May-16	06-May-16
JACK LAKE 4	PERFORATION	09-May-16	09-May-16
JACK LAKE 5	FRACTURE STIMULATION	09-May-16	09-May-16
JACK LAKE 5	PERFORATION	10-May-16	10-May-16
TOOLACHEE NORTH 1	WORKOVER RIG ACTIVITY	13-May-16	13-May-16
DELLA 24	WORKOVER RIG ACTIVITY	16-May-16	16-May-16
BIG LAKE 114	WORKOVER RIG ACTIVITY	18-May-16	18-May-16
TARWONGA 5	SWABBING	18-May-16	23-May-16
BIG LAKE 114	PERFORATION	19-May-16	25-May-16
MCKINLAY 10	WORKOVER RIG ACTIVITY	23-May-16	23-May-16
DELLA 24	WORKOVER RIG ACTIVITY	24-May-16	24-May-16
TOOLACHEE NORTH 1	WORKOVER RIG ACTIVITY	26-May-16	26-May-16
MOOMBA 47	SWABBING	26-May-16	27-May-16
BIG LAKE 114	WORKOVER RIG ACTIVITY	28-May-16	28-May-16
MOOMBA 47	RUN PLUG	28-May-16	28-May-16
MOOMBA 47	PULL PLUG	28-May-16	28-May-16
MOOMBA 184	WORKOVER RIG ACTIVITY	28-May-16	30-May-16
MOOMBA 47	PERFORATION	29-May-16	30-May-16
BURKE 4	PERFORATION	31-May-16	31-May-16
MCKINLAY 10	WORKOVER RIG ACTIVITY	31-May-16	31-May-16
PELICAN 10	WORKOVER RIG ACTIVITY	02-Jun-16	02-Jun-16
PELICAN 3	PERFORATION	02-Jun-16	02-Jun-16
MOOMBA 59	WORKOVER RIG ACTIVITY	04-Jun-16	04-Jun-16
DULLINGARI NORTH 17	PERFORATION	05-Jun-16	07-Jun-16
BIG LAKE 111	WORKOVER RIG ACTIVITY	07-Jun-16	10-Jun-16
BIG LAKE 111	PERFORATION	07-Jun-16	10-Jun-16
TIRRAWARRA 91	FRACTURE STIMULATION	02-Jul-16	02-Jul-16
BIALA 7	WORKOVER	02-Jul-16	07-Jul-16
TIRRAWARRA 92	FRACTURE STIMULATION	02-Jul-16	23-Jul-16
TIRRAWARRA 93	FRACTURE STIMULATION	02-Jul-16	09-Aug-16
BRUMBY 12	WORKOVER RIG ACTIVITY	03-Jul-16	03-Jul-16
JACK LAKE 4	WORKOVER RIG ACTIVITY	05-Jul-16	06-Jul-16

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ALWYN 6	WORKOVER	07-Jul-16	10-Jul-16
TOOLACHEE 30	WORKOVER RIG ACTIVITY	09-Jul-16	09-Jul-16
BIG LAKE 131	PERFORATION	16-Jul-16	17-Jul-16
MOOMBA 212	WORKOVER RIG ACTIVITY	18-Jul-16	18-Jul-16
TIRRAWARRA 86	WORKOVER RIG ACTIVITY	18-Jul-16	18-Jul-16
TOOLACHEE 3	WORKOVER RIG ACTIVITY	18-Jul-16	18-Jul-16
TIRRAWARRA 93	PERFORATION	21-Jul-16	22-Jul-16
CORREA 3	WORKOVER RIG ACTIVITY	21-Jul-16	24-Jul-16
TIRRAWARRA 91	PERFORATION	23-Jul-16	23-Jul-16
TIRRAWARRA 92	PERFORATION	23-Jul-16	23-Jul-16
TIRRAWARRA 90	FRACTURE STIMULATION	24-Jul-16	20-Aug-16
PONDRINIE 11	SWABBING	25-Jul-16	02-Aug-16
BIG LAKE 102	WORKOVER RIG ACTIVITY	27-Jul-16	27-Jul-16
TIRRAWARRA 90	PERFORATION	27-Jul-16	27-Jul-16
BIG LAKE 34	WORKOVER	28-Jul-16	15-Aug-16
MOOMBA 212	PERFORATION	29-Jul-16	29-Jul-16
MUNKARIE 8	WORKOVER RIG ACTIVITY	29-Jul-16	29-Jul-16
TOOLACHEE 30	WORKOVER RIG ACTIVITY	29-Jul-16	29-Jul-16
PELICAN 1	WORKOVER RIG ACTIVITY	30-Jul-16	31-Jul-16
MOOMBA 47	WORKOVER RIG ACTIVITY	01-Aug-16	01-Aug-16
JACK LAKE 5	PERFORATION	03-Aug-16	03-Aug-16
TIRRAWARRA 90	FRACTURE STIMULATION	03-Aug-16	05-Aug-16
BULYEROO 1	PULL PLUG	04-Aug-16	05-Aug-16
MOOMBA 209	WORKOVER RIG ACTIVITY	06-Aug-16	06-Aug-16
TIRRAWARRA 93	PERFORATION	06-Aug-16	08-Aug-16
BIG LAKE 34	WORKOVER RIG ACTIVITY	06-Aug-16	09-Aug-16
PELICAN 1	PERFORATION	07-Aug-16	09-Aug-16
BULYEROO 1	WORKOVER RIG ACTIVITY	08-Aug-16	08-Aug-16
BIG LAKE 34	PERFORATION	10-Aug-16	11-Aug-16
TIRRAWARRA 90	PERFORATION	10-Aug-16	11-Aug-16
MOOMBA 203	WORKOVER RIG ACTIVITY	11-Aug-16	11-Aug-16
TIRRAWARRA 91	WORKOVER RIG ACTIVITY	12-Aug-16	12-Aug-16
TIRRAWARRA 92	WORKOVER RIG ACTIVITY	12-Aug-16	12-Aug-16
BIG LAKE 34	RUN PLUG	13-Aug-16	14-Aug-16
TIRRAWARRA 91	PERFORATION	13-Aug-16	15-Aug-16
TIRRAWARRA 91	FRACTURE STIMULATION	13-Aug-16	16-Aug-16
TIRRAWARRA 92	FRACTURE STIMULATION	13-Aug-16	16-Aug-16
TIRRAWARRA 92	PERFORATION	14-Aug-16	15-Aug-16
MCKINLAY 11	WORKOVER	16-Aug-16	22-Aug-16
MCKINLAY 11	PERFORATION	18-Aug-16	18-Aug-16
TIRRAWARRA 93	PERFORATION	19-Aug-16	21-Aug-16
PELICAN 1	WORKOVER RIG ACTIVITY	20-Aug-16	20-Aug-16
BIG LAKE 111	WORKOVER RIG ACTIVITY	21-Aug-16	21-Aug-16
BIG LAKE 34	PULL PLUG	22-Aug-16	23-Aug-16
MCKINLAY 10	WORKOVER	23-Aug-16	28-Aug-16
TIRRAWARRA 90	WORKOVER RIG ACTIVITY	25-Aug-16	26-Aug-16
VARANUS 1	WORKOVER RIG ACTIVITY	01-Sep-16	01-Sep-16
PASTICCIO 1	WORKOVER	27-Sep-16	15-Oct-16
BIG LAKE 68	PERFORATION	05-Oct-16	06-Oct-16
MOOMBA 199	WORKOVER RIG ACTIVITY	05-Oct-16	09-Oct-16
MOOMBA 199	PERFORATION	06-Oct-16	08-Oct-16
JENA 18	WORKOVER	07-Oct-16	10-Oct-16
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2016 Annual Report - South Australian Cooper Basin Joint Venture Operations

MUDERA 7	WORKOVER RIG ACTIVITY	08-Oct-16	08-0ct-16
MOOMBA 208		09-Oct-16	09-Oct-16
MOOMBA 208	PERFORATION	09-Oct-16	11-Oct-16
		12-Oct-16	12-Oct-16
		12 Oct 10	12 Oct 10
GAMBERO 1	WORKOVER	15-0ct-16	13-0ct-16
SECCANTE 1		13-0ct-16	18-0ct-16
		10 Oct 16	18-0ct-10
		19-0ct-10	19-0ct-10
		19-001-10	19-0ct-10
		21-001-16	22-001-16
		21-001-16	25-001-16
		22-001-16	23-0ct-16
		22-0ct-16	23-0ct-16
		22-0ct-16	26-0ct-16
		23-Oct-16	23-0ct-16
		24-Oct-16	25-0ct-16
JACK LAKE 4	COMPLETION	26-Oct-16	29-Oct-16
BECKLER 2	WORKOVER	26-Oct-16	30-Oct-16
JACK LAKE 4	WORKOVER RIG ACTIVITY	27-Oct-16	27-Oct-16
STRZELECKI NORTHEAST 1	WORKOVER RIG ACTIVITY	29-Oct-16	29-Oct-16
JACK LAKE 5	COMPLETION	29-Oct-16	01-Nov-16
MOOMBA 212	PERFORATION	30-Oct-16	30-Oct-16
JACK LAKE 5	PULL PLUG	02-Nov-16	05-Nov-16
TIRRAWARRA 92	PERFORATION	03-Nov-16	04-Nov-16
MOOMBA 212	COMPLETION	04-Nov-16	09-Nov-16
MOOMBA 203	WORKOVER RIG ACTIVITY	05-Nov-16	05-Nov-16
MOOMBA 208	WORKOVER RIG ACTIVITY	05-Nov-16	05-Nov-16
TIRRAWARRA 91	WORKOVER RIG ACTIVITY	06-Nov-16	06-Nov-16
TIRRAWARRA 92	WORKOVER RIG ACTIVITY	06-Nov-16	06-Nov-16
JACK LAKE 5	WORKOVER RIG ACTIVITY	07-Nov-16	07-Nov-16
MOOMBA 212	SLEEVE SHIFT	07-Nov-16	08-Nov-16
BIG LAKE 92	WORKOVER RIG ACTIVITY	08-Nov-16	08-Nov-16
TIRRAWARRA 92	COMPLETION	09-Nov-16	12-Nov-16
MOOMBA 212	PULL PLUG	10-Nov-16	15-Nov-16
VARANUS 1	SWABBING	10-Nov-16	19-Nov-16
TIRRAWARRA 91	COMPLETION	12-Nov-16	14-Nov-16
CHARO 7	RECOMPLETION	14-Nov-16	19-Nov-16
CHARO 7	RUN PLUG	16-Nov-16	16-Nov-16
THURAKINNA 4	COMPLETION	19-Nov-16	24-Nov-16
NARIE 5	ZONE CHANGE	20-Nov-16	21-Nov-16
THURAKINNA 4	WORKOVER RIG ACTIVITY	21-Nov-16	22-Nov-16
VARANUS 1	WORKOVER RIG ACTIVITY	23-Nov-16	23-Nov-16
VARANUS 1	WORKOVER RIG ACTIVITY	23-Nov-16	23-Nov-16
TIRRAWARRA 91	WORKOVER RIG ACTIVITY	26-Nov-16	29-Nov-16
TIRRAWARRA 92		26-Nov-16	29-Nov-16
		27-Nov-16	27-Nov-16
ΜΟΟΜΒΔ 203		29-Nov-16	09-Dec-16
		20-Nov-16	30-Nov-16
		02-Doc-16	$06_{Dec} 16$
		05-Dec-16	11-Dec-16
		00-Dec-10	10-Dec 16
		10-Dec-16	10-Dec-16
INICOINIDA 100		10-060-10	T0-D6C-T0

2016 Annual Report - South Australian Cooper Basin Joint Venture Operations

BIG LAKE 138	WORKOVER RIG ACTIVITY	10-Dec-16	12-Dec-16
MOOMBA 40	WORKOVER RIG ACTIVITY	11-Dec-16	11-Dec-16
NARIE 5	ZONE CHANGE	14-Dec-16	17-Dec-16
BIG LAKE 136	FRACTURE STIMULATION	18-Dec-16	18-Dec-16
MOOMBA NORTH 1	WORKOVER RIG ACTIVITY	18-Dec-16	18-Dec-16
MOORARI 3	WORKOVER RIG ACTIVITY	20-Dec-16	20-Dec-16
MOOMBA 207	WORKOVER RIG ACTIVITY	21-Dec-16	21-Dec-16
MOOMBA 149	PERFORATION	25-Dec-16	26-Dec-16
FLY LAKE 5	PERFORATION	31-Dec-16	31-Dec-16

2016 Fracture Stimulation Summary

Well Name	Start Date	Finish date
MERRIMELIA 64	8/01/2016	9/03/16
MOOMBA 206	29/01/2016	8/04/16
	8/02/2016	14/02/16
	6/03/2010	14/03/10
MOOMBA 207	17/03/2016	8/04/16
MOOMBA 208	24/03/2016	4/04/16
MOOMBA 212	25/03/2016	2/04/16
JACK LAKE 4	26/04/2016	9/05/16
JACK LAKE 5	9/05/2016	9/05/16
TIRRAWARRA 91	2/07/2016	2/07/16
TIRRAWARRA 92	2/07/2016	23/07/16
TIRRAWARRA 93	2/07/2016	9/08/16
TIRRAWARRA 90	24/07/2016	20/08/16
BIG LAKE 136	18/12/2016	18/12/16

Appendix 4 – Flowlines Constructed

Flowline Name	Diameter	Material	Length (m)	Date Completed
Calamia East 1	2-7/8"	Screwed EUE	2,330	Jan-16
Moomba to Gidgealpa Fuel Gas Line	DN200	Welded Steel	27,350	Jan-16
MK to Gidge Oil	DN100	Welded Steel	2,735	Jan-16
Jack Lake 4 & 5	DN100	Welded Steel	840	Apr-16
Moomba 19 (Replacement)	DN150	Welded Steel	2,200	Apr-16
Moomba South App C	DN100	Welded Steel	1,560	Apr-16
McKinlay 10	2-7/8"	Screwed EUE	1,330	Apr-16
McKinlay 11	2-7/8"	Screwed EUE	1,760	Apr-16
Moomba SE Gathering Line (Replacement)	DN150	Welded Steel	1,380	Nov-16
Big Lake Dev A, B, C & H	DN150	Welded Steel	620	Nov-16
TOTAL			42,105	

Appendix 5 – Pipeline Inspection, Testing and Repair

Lease Spool Testing

High Velocity Wellhead Spooling / Swing Wells - Ultrasonic Inspection & Radiography of the Choke Welds (16 in Total):

Balcaminga 01 Gas Flowline	Moomba North 02 Gas Flowline
Brolga 03 Gas Flowline	Moorari 08 Unit Oil Flowline
Hackett 01 Gas Flowline	Pelican 02 Gas Flowline
Jack Lake 04 Gas Flowline	Pondrinie 04 Gas Flowline
Kanowana 03 Gas Flowline	Pondrinie 09 Gas Flowline
Kanowana 04 Gas Flowline	Tirrawarra 13 Unit Oil Flowline
LDB Crossover for Ethane Trunkline	Tirrawarra 53 Unit Oil Flowline
Merupa 02 Gas Flowline	Waukatanna 01 Gas Flowline

Pig Barrel Inspections

UT and Visual inspection of 18 barrels completed

Gidgealpa to Moomba Gas Trunkline Receiver	Raven 04 Gas Flowline Launcher
Big Lake to Moomba Gas Trunkline Launcher	Raven 04 Gas Flowline Receiver
Big Lake to Moomba Gas Trunkline Receiver	Tirrawarra TIG 8" Gas Gathering Line Receiver
Limestone Creek to Strzelecki Receiver	Moorari to Tirrawarra Oil Trunkline Launcher
Della to Moomba Gas Trunkline Launcher	Moorari to Tirrawarra Gas Trunkline Receiver
Dullingari to Della Gas Trunkline Launcher	Pelican to Merrimelia Gas Trunkline Receiver
Epsilon to Burke Gas Trunkline Launcher	Merrimelia Gas Spineline Receiver
Epsilon to Burke Gas Trunkline Receiver	Cowralli to Gidgealpa Gathering Line Launcher
Cowralli to Gidgealpa Gathering Line Receiver	Pondrinie to Bookabourdie Gas Trunkline Launcher

Mothballed Pipelines

19 flowlines were de-oiled and flushed in readiness for final abandonment

Bugito 01 Oil Flowline	Jena 10 Oil Flowline
Carmina 01 Oil Flowline	Jena 12 Oil Flowline
Carmina 02 GRE Oil Flowline	Jena 17 Oil GRE Flowline
Carmina 02 Oil Flowline	Limestone Creek 01 Oil Flowline
Biala 04 Oil Flowline	Limestone Creek 02 Oil Flowline
Biala 06 Oil Flowline	Limestone Creek 03 Oil Flowline
Biala 08 Oil Flowline	Limestone Creek 09 Oil Flowline
Biala Spineline - parallel line	Limestone Creek Field Gathering Flowline
Frostillicus 01 Oil Flowline	Teringie 01 Oil Flowline
Hoek 02 Oil Flowline	

21 flowlines have been mothballed

Moolion 01 Gas Flowline	Meranji East 01 Gas flowline
Moolion 03 Gas Flowline	Meranji 20 Gas flowline
Moolion 04 Gas Flowline	Meranji North 02 Gas flowline
Moolion 05 & 06 Gas Flowline	Meranji 23 Gas Flowline
Moolion 07 Gas Flowline	Coonatie 17 Gas Flowline (lease spool only)
Moolion North 01 Gas Flowline	Raven 1 Gas Flowline
Moolion North 02 Gas Flowline	Raven 2 Gas Flowline
Kudrieke 02 Gas Flowline	Raven 4 Gas Flowline
Mitchie 01 Gas Flowline	Moonanga 1 Gas Flowline
Mitchie 02 Unit Oil Flowline	Raven Twin Line
Meranji South 01 Gas flowline	

Final Abandonment

Tirrawarra to Merrimelia Oil Trunkline has been abandoned

Pipeline Integrity / Risk Workshops

Northern Fields

• Nil

Eastern Fields

• Nil

Central Fields

• Ethane Storage Trunkline – Moomba West

Pipeline ILI (Inline Inspection) Surveys

Stokes 02 Gas Flowline	Moomba 071 Gas Flowline
Big Lake 35 Gas Flowline	Nephrite South 03 Gas Flowline
Nephrite South 01ST1 Gas Flowline	

Inspection driven repairs

• Nil

Appendix 6 – Daily Drill, Production, Well Completion and Wire Line Log Submissions

Production Reporting

Report Month	Issued Date
Jan-16	29/02/2016
Feb-16	18/04/2016 (rev1), 19/04/2016 (rev 2)
Mar-16	16/05/2016
Apr-16	30/05/2016
May-16	15/07/2016
Jun-16	25/07/2016
Jul-16	13/09/2016
Aug-16	27/09/2016
Sep-16	24/10/2016 (rev 1), 09/12/2016 (rev 2)
Oct-16	14/12/2016
Nov-16	16/01/2016
Dec-16	13/02/2017

2016 Annual Report – South Australian Cooper Basin Joint Venture Operations Daily Drill Reports

Well Name	Well Location	Daily Report First	Daily Report Last
		Submission	Submission
McKinlay 10	PPL234	24/12/2015	18/01/2016
Moomba 208	PPL7	12/01/2016	04/02/2016
McKinlay 11	PPL234	18/01/2016	05/02/2016
Moomba 212	PPL9	04/02/2016	26/02/2016
Varanus South 2	PRL201	05/02/2016	24/02/2016
Berylium 1	PRL200	24/02/2106	16/03/2016
Jack Lake 4	PPL66	01/03/2016	15/03/2016
Jack Lake 5	PPL66	15/03/2016	29/03/2016
Sphalerite 1	PRL200	17/03/2016	04/04/2016
Lyra 1	PRL200	04/04/2016	19/04/2016
Tirrawarra 93	PPL20	20/04/2016	12/05/2016
Tirrawarra 92	PPL20	12/05/2016	06/06/2016
Tirrawarra 91	PPL20	07/06/2016	22/06/2016
Tirrawarra 90	PPL20	30/06/2016	18/07/2016
Big Lake 134	PPL11	19/07/2016	15/08/2016
Big Lake 138	PPL11	15/08/2016	16/11/2016
Big Lake 137	PPL11	22/08/2016	24/10/2016
Big Lake 136	PPL11	22/08/2016	05/10/2016
Big Lake 135	PPL11	25/08/2016	19/09/2016
Allunga 2	PPL189	16/11/2016	12/12/2016
Allunga 3	PPL189	12/12/2016	28/12/2016
Namur 4	PPL16	28/12/2016	10/01/2017

Well Completion Report and Wire Line Log Submission

	Well	Rig Release		
Well Name	Location	Date	Wireline log submission	WCR submission
Moomba 210	PPL 8	03/12/2015	9/09/2016	13/07/2016
Moomba 211	PPL9	11/01/2016	14/09/2016	30/06/2016
Moomba 207	PPL 7	16/01/2015	26/05/2016	10/07/2016
McKinlay 10	PPL 234	16/01/2015	14/04/2016	18/07/2016
Moomba 208	PPL7	3/02/2016	15/04/2016	22/07/2016
McKinlay 11	PPL234	4/02/2016	15/06/2016	03/08/2016
Varanus South 2	PRL201	23/02/2016	23/03/2016	23/08/2016
Moomba 212	PPL9	25/02/2016	14/04/2016	25/08/2016
Jack Lake 4	PPL66	13/03/2016	24/05/2016	14/09/2016
Berylium 1	PRL200	15/03/2016	30/03/2016	15/09/2016
Jack Lake 5	PPL66	26/03/2016	02/05/2016	08/09/2016
Sphalerite 1	PRL200	3/04/2016	13/04/2016	28/09/2016
Lyra 1	PRL202	18/04/2016	02/05/2016	12/10/2016
Tirrawarra 93	PPL20	11/05/2016	26/07/2016	11/11/2016
Tirrawarra 92	PPL20	6/06/2016	03/08/2016	23/11/2016
Tirrawarra 91	PPL20	21/06/2016	09/09/2016	20/12/2016
Tirrawarra 90	PPL20	17/07/2016	03/08/2016	
Big Lake 134	PPL11	12/08/2016	11/10/2016	
Big Lake 135	PPL11	17/09/2016	11/10/2016	
Big Lake 137	PPL11	22/10/2016	21/12/2016	
Big Lake 136	PPL11	04/10/2016	09/01/2017	
Big Lake 138	PPL11	15/11/2016	09/01/2017	
Allunga 2	PPL189	09/12/2016	09/01/2017	

Appendix 7 – Production & Processing Facility Projects 2016

#	Maintenance Project	Project Description	Location
1	Planned shutdowns	CSP Major CO2 Train 5 and 6 2 yearly shutdowns	Moomba Plant

Appendix 8 – Proposed Production & Processing Facility Projects 2017

#	Maintenance Project	Location
1	Alt stab Major shut down	Moomba Plant
2	CO2 Train Shutdown valve upgrades	Moomba Plant
3	Firewater tank replacement	Moomba Plant
4	Moomba 75C Major O/haul	Moomba Plant
5	Moomba 60B Major Overhaul	Moomba Plant

Appendix 9 – Wells Drilled in 2016

	Well Name	Well Location	Spud Date	Rig Release Date	TD	Status
1	McKinlay 10	PPL 234	31/12/2015	16/01/2016	6936'	C&S Oil Well
2	Moomba 208	PPL7	18/01/2016	3/02/2016	10263'	C&S gas well
3	McKinlay 11	PPL234	21/01/2016	4/02/2016	6786'	C&S gas well
4	Moomba 212	PPL9	7/02/2016	25/02/2016	10075'	C&S gas well
5	Varanus South 2	PRL201	10/02/2016	23/02/2016	3165.5m	C&S gas well
6	Berylium 1	PRL200	28/02/2016	15/03/2016	3134.5m	C&S gas well
7	Jake Lake 4	PPL66	1/03/2016	13/03/2016	10792'	C&S gas well
8	Jack Lake 5	PPL66	13/03/2016	26/03/2016	10562'	C&S gas well
9	Sphalerite 1	PRL200	19/03/2016	3/04/2016	3040m	P&A
10	Lyra 1	PRL200	7/04/2016	18/04/2016	3006.5m	C&S gas well
11	Tirrawarra 93	PPL20	23/04/2016	11/05/2016	10462'	C&S gas well
12	Tirrawarra 92	PPL20	18/05/2016	6/06/2016	11876'	C&S gas well
13	Tirrawarra 91	PPL20	7/06/2016	21/06/2016	10357'	C&S gas well
14	Tirrawarra 90	PPL20	4/07/2016	17/07/2016	10265'	C&S gas well
15	Big Lake 134	PPL11	22/07/2016	12/08/2016	11090'	C&S gas well
16	Big Lake 138	PPL11	16/08/2016	15/11/2016	10682'	C&S gas well
17	Big Lake 137	PPL11	19/08/2016	22/10/2016	10419'	C&S gas well
18	Big Lake 136	PPL11	22/08/2016	04/10/2016	10908'	C&S gas well
19	Big Lake 135	PPL11	24/08/2016	17/09/2016	10450'	C&S gas well
20	Allunga 2	PPL189	22/11/2016	9/12/2016	11140'	C&S gas well
21	Allunga 3	PPL189	9/12/2016	23/12/2016	11095'	C&S gas well
22	Big Lake 135	PPL11	24/08/2016	17/09/2016	10450'	C&S gas well
23	Namur 004	PPL 16	28/12/2016	07/01/2017	8104'	C&S gas well

Appendix 10 - Geophysical Operations SEO (2012): Review of 2016 Performance against Environmental Objectives

Environmental Objective	Assessment Criteria	Compliance Status	Performance
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.	Achieved	Due to the size of the survey, multiple campsites were established to temporarily house the crews. If feasible the camps were placed in existing disturbed areas. Graders utilised to remove any windrows created during line preparation and recording. Lines weaved around mature vegetation to minimise visual impact.
	The attainment of 0, +1 or +2 GAS criteria for 'visual impact' objective listed in Appendix 3.	Achieved	All rubbish was removed from lines. Impacts to native vegetation were minimised during the Snowball survey. Some vegetation removed for access, principally cut above ground or squashed with root stock retained. No GAS criteria scores of -1 or -2 were reported.
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.	Achieved	No cases of soil contamination reported. Only minimal rehab was required on completion, no drainage pits had been excavated, no wheel ruts visible after restoration.
	Proposed survey lines and campsites have been appropriately located and prepared to minimise the disturbance to soil resources.	Achieved	Line preparation / survey crews and recording crews camped at existing disturbed sites where feasible.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
Objective 2 continued: Minimise disturbance to and contamination of soil resources.	Fuel Storage and Handling No refuelling occurs outside designated refuelling/servicing areas.	Achieved	Refuelling occurred within designated refuelling/servicing areas during the reporting period. Bulk fuel stored in proximity to camp with appropriate spill containment measures. Refuelling within the survey area is undertaken in areas of lower environmental sensitivity, where practicable.
	Spills or leaks are immediately reported and clean up actions initiated.	Achieved	There were no spills or leaks outside areas designed to contain them during the reporting period.
	Records of spill events and corrective actions are maintained in accordance with company procedures.	Achieved	Records of spill events and corrective actions were maintained in accordance with company procedures during the reporting period.
	Appropriate spill response equipment is available on site.	Achieved	Spill kits are available at refuelling areas and in service vehicles.
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.	Achieved	Impacts to native vegetation were minimised during the Snowball survey and no GAS criteria scores of -2 were reported. A single GAS score of -1 was reported for unavoidable removal of spinifex on a dune flank. Multiple photo points established for future reference if required.
	No mature trees are removed.	Achieved	No mature trees were removed during the reporting period.
	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.	Achieved	Access to survey areas during the reporting period was via existing access tracks or pre-existing survey lines. No new access tracks were required to be constructed for the Snowball survey.
	Fuel and Chemical Storage and Management Refer to assessment criteria for objective 2.	Achieved	Refer to Objective 2.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
Objective 3 continued: Minimise disturbance to native vegetation and fauna.	Fire Danger Season restrictions and education All personnel are fully informed on the fire danger season and associated restrictions.	Achieved	Fire risk addressed during planning and regularly at toolbox meetings. No fire incidents occurred as a result of the 2016 surveys. No breaches of fire danger season restrictions occurred during the reporting period.
Objective 4: Avoid disturbance to sites of cultural and heritage significance.	Appropriately trained and experienced cultural heritage advisers have scouted proposed survey line locations and access tracks.	Achieved	Cultural Heritage clearance was completed by the YY people. The entire Beanbush survey area were pre-cleared. Typically a 50m corridor (25m either side of the programmed line) was cleared on the design access line location. Extra wide areas are cleared over sand dunes to allow for greater flexibility to traverse dune systems in order minimise environmental impact. Experienced dozer operators were used - all well versed in spotting sites as well.
	Any sites identified have been flagged and subsequently avoided.	Achieved	Multiple sites were recorded during pre-clearances and detour routes were made around the sites. Identified sites were avoided during the reporting period.
	Santos has a mechanism in place to appropriately report and respond to any sites discovered during survey operations.	Achieved	If additional sites were located during line preparation, work stopped and processes to re-assess the area by the Cultural Heritage Team were initiated.
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.	Achieved	Impact on infrastructure was minimised during the Snowball survey and no GAS criteria scores of -1 or -2 were reported.
	No reasonable concerns raised by stakeholders are left unresolved.	Achieved	No concerns raised by stakeholders during the reporting period.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
Objective 5 continued: Minimise disturbance to livestock, pastoral infrastructure and landholders.	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.	Achieved	Notice of Entry and Activity Notification requirements undertaken in accordance with the Petroleum Act and Regulations.
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.	Achieved	No evidence of weeds or feral animals being introduced or spread within operations areas due to seismic activities during the reporting period. Survey vehicles were located away from areas with weed infestations, where possible, and are washed down if required.
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.	Achieved	Preference given to crossing waterways at a natural crossing/low-point to reduce the amount of line preparation required. Windrows or rutting created by dozer and/or other vehicles are re-profiled by a grader to avoid disturbance to drainage patters
	The attainment of 0, +1 or +2 GAS criteria for 'disturbance to land surface' objective listed in Appendix 3.	Achieved	Disturbance to land surface was minimised during the Snowball survey and no GAS criteria scores of -1 or -2 were reported.
	No uncontrolled flows to surface from aquifers intersected in up holes/shallow boreholes.	Achieved	No up holes drilled or required due to existing information already acquired.
	There is no unnecessary interference with natural drainage features.	Achieved	Natural drainage features are avoided where practicable.
	Fuel Storage and Handling No spills occur outside of areas designed to contain them.	Achieved	Refer to Objective 2.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
Objective 7 continued: Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources.	Refuelling occurs at least 1km from watercourses or sensitive ecological environments (wetlands).	Achieved	Majority of refuelling occurs at the camp location, which is not in proximity to a watercourse or sensitive environment, however vibrator trucks were refuelled along the survey lines. Refuelling within the survey area is undertaken in areas of low sensitivity, where possible. Temporary bunding is used when refueling in the field.
	Appropriate spill response equipment is available on site.	Achieved	Refer to Objective 2.
	Spills or leaks are immediately reported and clean up actions initiated promptly.	Achieved	Refer to Objective 2.
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.	Achieved	Waste was segregated in camp and transported by KJM to their waste facility at Cooper Parks. No waste was burnt during the reporting period.
	0, +1 or +2 GAS criteria are attained for 'Negligible survey markers and rubbish in situ' objective listed in Appendix 3.	Achieved	GAS criteria audit indicated all rubbish, pin flags and pegs were collected and removed from the area, and no GAS scores of -1 and -2 were reported.

Appendix 11-Drilling and Well Operations SEO (2015) – Review of 2016 Performance Against Environmental Objectives

Environmental Objective	Assessment Criteria	Compliance Status	Performance
Objective 1: No injuries, deaths or health impacts to the public or third parties from regulated activities that could have been reasonably prevented by the operator.	All reasonable measures implemented to ensure no injuries to the public or third parties.	Achieved	There were no injuries to the public or any third parties arising from Drilling and Well operations during the reporting period. 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. Emergency Response Plans and procedures are in place. These procedures are regularly exercised with identified improvements included into the ERPs. Communication of potentially hazardous or unusual tasks is made
			to affected parties prior to being undertaken e.g. rig moves around the Cooper Basin are communicated via Moomba Comms.
	Investigation conducted by a relevant government authority into any injury or death does not result in a prohibition notice pursuant to Section 195 of the <i>Work Health</i> <i>and Safety Act 2012.</i>	Achieved	There were no investigations conducted by a relevant government authority into any injury or death during the reporting period.
	Compliance with the relevant legislation or approvals regarding noise and air quality.	Achieved	There were no reports of noise and air quality non-compliances during the reporting period
	No unnecessary venting during well operations.	Achieved	There was no unnecessary venting during well operations.
	Sewage and grey water to be managed in accordance with the South Australian Public Health (Wastewater) Regulations 2013 or to the satisfaction of the Department of Health and ageing.	Achieved	Sewage and grey water was managed in accordance with relevant regulations. Domestic wastes were disposed of in accordance with EPA License Requirements.
Objective 2: Minimise impacts to native flora and fauna (terrestrial and aquatic) due to regulated activities or escape of petroleum, processed substance, chemical or fuel.	Any escape of petroleum, processed substance, chemical or fuel is either immediately contained and removed or assessed in accordance with NEPM guidelines and remediated in accordance with relevant guidelines in a timely manner	Achieved	Escapes of petroleum, processed substance, chemical or fuel relating to drilling, completions or well operations during the reporting period were immediately contained and removed or treated in situ. Remedial actions for specific incidents was provided in the quarterly reports.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
	No impact to rare, vulnerable or endangered flora and/or fauna, or important vegetation (as defined under Table A1) due to an escape of petroleum, processed substance, chemical or fuel.	Achieved	There was no impact to rare, vulnerable or endangered flora and/or fauna or important vegetation relating to Drilling, completions and well operations reported during the reporting period,
	No overflow, spill or seepage of completions fluids from temporary holding ponds	Achieved	No overflow, spill of seepage of completions fluid from a temporary holding pond was recorded during the reporting period.
	No native fauna casualties that could have been reasonably prevented	Achieved	No native fauna casualties that could have reasonably been prevented relating to Drilling, Completions and Well Operations, were reported during the reporting period.
	The attainment of 0, +1 or +2 GAS criteria under well site construction (Table A1) for: o minimising impact to soil o minimising impact on native vegetation and native fauna	Achieved	Impacts to soil and native vegetation and fauna were minimised during well lease and access track site selection, construction and restoration and no GAS criteria scores of - 1 or -2 were reported. An environmental assessment is undertaken for new disturbances to evaluate potential impacts to the environment and optimise lease access and well pad construction. Disturbance is minimised wherever possible. Rootstock is left intact, where practicable, and top soil is stockpiled for respreading. This topsoil is respread during partial and/or final restoration. There were no scores recorded during the reporting period.
	The attainment of 0, +1 or +2 GAS criteria under borrow pit construction (Table A3) for: o minimising impacts on soil o minimising impacts on vegetation.	Achieved	There were no scores recorded during the reporting period. Impacts to soil and native vegetation were minimised during borrow pit site selection, construction and restoration and no GAS criteria scores of -1 or -2 were reported. An environmental assessment is undertaken for new disturbances to evaluate potential impacts to the environment and optimise lease access and well pad construction. Disturbance is minimised wherever possible.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
	The attainment of 0, +1 or +2 GAS criteria under borrow pit management (Table A3) for: o minimising water retention in the pit	Achieved	There were no scores recorded during the reporting period.
	o minimising impacts to soil o minimising impacts on vegetation		
	Solid wastes and foreign material to remain contained onsite within the well lease/operational area boundaries until disposed of at an EPA licensed facility, with the exception of drilling and completions benign solids to be disposed of in drilling sump.	Achieved	Wastes were disposed of in accordance with license requirements.
	No uncontrolled fires resulting from regulated activities.	Achieved	There were no fires resulting from Drilling, Completions and Well Operations during the reporting period.
	The extent of soil erosion is consistent or less than surrounding land	Achieved	Lease erosion was observed around blow down anchor blocks at Moomba 170 and actioned for repair.
	For well site restoration and borrow pit rehabilitation GAS criteria refer to Objective 8		
Objective 3: Minimise disturbance to	The attainment of 0, +1 or +2 GAS criteria under well site construction for minimising disturbance to drainage patterns (Table A1).	Achieved	No scores recorded during reporting period.
contamination of surface waters	No new water affecting activities as defined under the NRM Act undertaken unless relevant permits have been obtained.	Achieved	There were no new water affecting activities in the relevant tenures in the reporting period.
	No unauthorised discharge of water (or other liquids) or solid wastes to surface waters	Achieved	There were no unauthorized discharges to surface waters.
Objective 4: No introduction of new species of weed, plant, pathogen or pests (feral animal) and prevent the spread of existing species, as necessary.	Presence/absence and abundance of pest plants and animals are consistent with pre- existing conditions and/or adjacent land or where pest plants and animals are identified on operational areas, management plan is implemented immediately.	Achieved	No records of increased presence/abundance of pest plants and animals in Drilling, Completion and Well Operations areas during the reporting period.
	Declared plants /animals are reported and managed in accordance with relevant regulations.	Achieved	No declared plants/animals were reported on Drilling, Completions and Well Operations area during the reporting period. A Pest Plants and Animals register is maintained and any new observations would be reported and managed in accordance with relevant regulations.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
	The attainment of 0, +1 or +2 GAS criteria under management and rehabilitation of borrow pits for minimise impacts on vegetation (Weeds)(Table A3).	Achieved	No scores recorded during the reporting period.
Objective 5: Avoid damage, disturbance or interference to sites objects or remains of Aboriginal and/or non-Aboriginal heritage	Aboriginal heritage surveys undertaken and sites are identified and avoided	Achieved	Sites identified are recorded on the internal GIS and avoided. Cultural heritage surveys are completed as part of the internal approval for new land disturbances.
	Avoid damage, disturbance or interference to Aboriginal sites, objects or remains ("Aboriginal heritage") as required by the Aboriginal Heritage Act 1988 (SA) ("AHA").	Achieved	No damage, disturbance or interference to Aboriginal sites, objects or remains occurred during the reporting period.
	Where damage, disturbance or interference to Aboriginal heritage is unavoidable then application for authorisation in accordance with section 23 of the AHA will be sought and appropriate consultation with Aboriginal parties as required by section 13 of the AHA*. (*in appropriate circumstances, a 'risk management' approach may be undertaken (see DSD-AAR Risk Management Guidelines) in which case a section 23 application is not necessary.)	Achieved	
	Avoid damage/ disturbance to non- aboriginal sites where practicable	Achieved	There was no damage/disturbance to non-aboriginal sites during the reporting period.
	0, +1 or +2 GAS criteria are attained under construction of borrow pits to protect sites of natural scientific or heritage significance.	Achieved	No scores were recorded during the reporting period.
Objective 6: Minimise loss of aquifer pressure and avoid aquifer contamination.	No uncontrolled flow to surface (e.g. blow out).	Achieved	There was no uncontrolled flow to surface on the relevant tenures during the reporting period.

Environmental Objective	Assessment Criteria	Compliance Status	Performance
	Effective barriers exist to prevent crossflow between separate aquifer systems or hydrocarbon reservoirs as listed in Appendix B.	Achieved	Effective barriers exist to prevent crossflow in accordance with the Drilling and Completions Managements System. Well integrity is managed throughout the life of the well.
	No change in the capacity of third- party groundwater users to undertake their respective activities	Achieved	No change in capacity of third-party groundwater users due to drilling, completions or well operations on the relevant tenures.
	No unauthorised discharge or escape of any liquids (including water, petroleum, processed substance, chemical or fuel), or solid wastes to groundwater	Achieved	No unauthorised discharge or escape of any liquids of solid wastes to groundwater recorded during the reporting period
	Any escape of petroleum, processed substance, chemical or fuel is either immediately contained and removed or assessed in accordance with NEPM guidelines and remediated in accordance with relevant guidelines in a timely manner.	Achieved	Escapes of petroleum, processed substance, chemical or fuel relating to drilling, completions or well operations during the reporting period were immediately contained and removed, or treated in situ. Specific remedial actions were provided in the quarterly reports.
	Relevant government approval obtained for abandonment of radioactive tools if left downhole.	Achieved	There were no radioactive tools left downhole. No approvals for abandonment of radioactive tools to be left downhole were required during the reporting period.
	No impact on groundwater dependant ecosystems as a result of groundwater extraction or contamination* (ie aquifers that may provide base flow to nearby waterholes). o Definition of contamination – as per section 5B of the Environment Protection Act 1993.	Achieved	During the reporting period, no impact to groundwater dependent ecosystems as a result of drilling, completions and well operations on the relevant tenures was recorded.
Objective 7: Maintain stakeholder relationships and minimise disturbance to landowners and/or associated infrastructure.	No unresolved reasonable stakeholder complaints.	Achieved	During the reporting period, there were no stakeholder complaints received.
	No disturbance to landholder activities as a result of regulated activities unless by prior arrangement	Achieved	There was no disturbance to landholder activities during the reporting period.

2016 Annual Report – South Australian Cooper Basin Joint Venture Operations

Environmental Objective	Assessment Criteria	Compliance Status	Performance
	 Where disturbance is unavoidable or accidental, infrastructure or land use is restored to the satisfaction of the landholder. For well site restoration and borrow pit rehabilitation GAS criteria refer to Objective 8 	Achieved	There was no disturbance to landholder activities or infrastructure during the reporting period.
Objective 8: Rehabilitate land affected by regulated activities to agreed standards.	The attainment of 0, +1 or +2 GAS criteria under well site and access track restoration (Table A2) for: o minimising visual impact o revegetation of indigenous species o site left in a clean tidy condition.	Achieved	There was no access track restoration during the reporting period.
	 The attainment of 0, +1 or +2 GAS criteria under rehabilitation of borrow pits (Table A3) for o minimising water retention in pit o minimise impacts to soil o minimise impacts on vegetation o minimise visual impacts o site to be left in a clean and tidy 	Achieved	There was no rehabilitation of borrow pits during the reporting period.
	No unresolved reasonable stakeholder complaints	Achieved	During the reporting period, there were no stakeholder complaints received.

Appendix 12-Production and Processing Operations SEO

2016 Review of Performance against Environmental Objectives

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
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.	Achieved	There were no injuries to the public or any third parties arising from Production and Processing operations during the reporting period. Signs are installed at strategic locations in the operating area to deter the public from accessing production areas and when potentially hazardous tasks are undertaken. There were, however, three occurrences of unauthorised access to operational areas (i.e. well leases) by the public. Communication of potentially hazardous or unusual tasks is made to affected parties prior to being undertaken e.g. rig moves around the Cooper Basin are communicated via Moomba Comms.
<u>Objective 2</u>: Minimise disturbance and avoid contamination to soil.	<u>Construction Activities (e.g. pipelines and roads)</u> No evidence of significant subsoil on surface (colour) on the pipeline ROW following construction.	Achieved	There was no recorded evidence of significant subsoil on the surface following flowline construction during the reporting period. Soil disturbance is minimised wherever possible. During the clear and grade process, vegetation and topsoil is stockpiled separately to the subsoil excavated from the flowline trench, and the subsoil is placed back into the trench prior to the respread of topsoil and vegetation. As a result, the potential for soil inversion is considerably reduced.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
Objective 2 continued: Minimise disturbance and avoid contamination to soil.	No subsidence is evident over pipeline trench.	Achieved	ROW surveys are undertaken annually. Observed subsidence is noted in the survey reports and addressed on a prioritised basis.
	At pipeline dune crossings, dune profiles have been restored consistent with surrounding dune profiles.	Achieved	As part of the right of way reinstatement process, dune crossings and profiles are restored to a condition consistent with surrounding dune profiles, as far as is reasonably practicable.
	No visual evidence of soil compaction following remediation of the pipeline easement (e.g. hard soil, local water pooling).	Achieved	During the reporting period there was no visual evidence of soil compaction reported.
	The extent of erosion on the ROW is consistent with surrounding land.	Achieved	ROW surveys are undertaken annually. Observed erosion is noted in the survey reports and addressed on a prioritised basis. Area of observed erosion over pipelines were restored during the reporting period: Kidman 9
	No unauthorised off-road driving or creation of shortcuts.	Achieved	 There were no off-road/off-lease driving incidents related to Santos production and processing operations reported in 2016. Off-road driving is actively discouraged. To meet compliance with this assessment criteria during the reporting period, the following actions were carried out to prevent reoccurrence: EHS bulletins; and raising awareness of the importance of driving on existing well leases and access tracks.

No construction activities are carried out on salt lakes or steep tableland slopes (as defined in EIR).	Achieved	No construction activities were carried out on salt lakes or steep tablelands.
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Environmental Objectives	Assessment Criteria	Compliance Status	Performance
Objective 2 continued: Minimise disturbance and avoid contamination to soil.	0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 1 and Appendix 4.	Achieved	No GAS scores of -1 and -2 were recorded during the reporting period. The handover process from construction phase to operations includes a review against internal engineering standards which allows for assessing against the requirements of the GAS criteria.
	Fuel and Chemical Storage, Handling and Transportation No spills/leaks outside of areas designed to contain them	Not achieved	There were spills outside areas designed to contain them during the reporting period; however there was no adverse impacts to the receiving environment.
			Spills or leaks were contained, cleaned up and appropriate remedial actions initiated.
			Spills are reported in accordance with internal and external reporting requirements. Records of spills are maintained.
			Where required, an assessment of potential impacts is undertaken in accordance with applicable regulatory requirements and company standards.
	Soils remediated to a level as determined by the SHI Decision Framework.	Achieved	Soils were assessed and remediated in accordance with the SHI decision framework.
	Also refer to Objective 12.	Achieved	Refer to Objective 12.
	Oil/Condensate Spills (Pipeline/Road Transport) No spills/leaks outside of areas designed to contain them.	Not achieved	Spills that occurred outside areas designed to contain them did occur in 2016 and are reported to the regulator(s) either immediately or on a quarterly basis, depending on the volume and/or nature of the spill.
			Incident response and assessment procedures are in place (EHS08) to ensure proper assessment of potential environmental impacts and plan remediation efforts accordingly.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
Objective 2 continued: Minimise disturbance and avoid contamination to soil.	Level of hydrocarbon continually decreasing for in situ remediation of spills.	Achieved	Where required, the residual impacted soil at the release site is treated in-situ with soil ameliorant to enhance natural attenuation. Remedial action for specific incidents is provided in the quarterly reports. During the reporting period, several impacted sites underwent a detailed site assessment, subsequent to the initial site assessment that occurred at the time of the incident.
	Soils remediated to a level as determined by the SHI Decision Framework.	Achieved	Soils were assessed and remediated in accordance with 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, as listed in Appendix 2 .	Not achieved	 During the reporting period, a number of occurrences of GAS criteria scores of -1 or -2 were reported. This was predominantly due to hydrocarbon emulsion carryover. Actions undertake to rectify this issue included manual skimming of the hydrocarbons, as well as reducing the input of soap at well head to reduce the presence of emulsions in the ponds or increased emulsion breaker dosing. To improve compliance with PFW GAS criteria, monitoring of water quality in ponds has been undertaken, as well as the implementation of emulsion breaker trials at some locations. See notice of non-compliance F2016/000084. Updates on emulsion breaker trial and assessment are provided to DSD as requested.
	PFW EMP developed and objectives achieved.	Achieved	Company standards and operations manuals outline the process for managing PFW appropriately. These are implemented at PFW facilities.
	Waste Disposal (domestic, sewage and sludges) All domestic wastes are disposed of in accordance with EPA licensing requirements.	Achieved	Domestic wastes are disposed of in accordance with EPA License Requirements. Procedures are in place for sewage treatment facilities to operate in accordance with design criteria.

Objective 2 continued: Minimise disturbance and avoid contamination to soil	No evidence of rubbish or litter on ROW or at campsites / facilities.	Achieved	No evidence of rubbish or litter on ROW or at campsites / facilities during the reporting period.
			Waste bins and containers are covered during transport.
			Waste pits are located only at authorised facilities and are fenced to exclude stock and wildlife.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	No spills or leaks from sludge treatment process and sludge pits.	Achieved	No spills or leaks from sludge treatment process and sludge pits were recorded during the reporting period.
	No increase in contamination at LTUs designated treatment area.	Achieved	No increase in contamination at LTUs designated treatment area was recorded during the reporting period.
	Refer to assessment criteria for Objective 11.	Achieved	Refer to Objective 11.
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.	Achieved	No feral animals were introduced to, or spread as a result of production and processing operations during the reporting period. Where new weed infestations were identified, site- specific management strategies and controls were initiated, e.g. pre-work toolbox information sessions and weed-spraying events. Pest plants and animals were managed in accordance with Santos' Environment, Health and Safety Management System, and the Cooper Basin Pest Plants and Animals Management Plant (PPAMP). Environmental bulletins distributed and site-specific inductions undertaken to discourage feeding of wild dogs and dingos, and raise awareness of notable/declared weed species.
	Weed management plans are implemented where priority weed species are identified.	Achieved	Buffel Grass Control Plan implemented during the reporting period in accordance with PPAMP.
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.	Achieved	Refer to Objective 2.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	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).	Achieved	An environmental assessment is undertaken for new disturbances to evaluate potential impacts to the environment and optimise access track and pipeline construction. Drainage channels and patterns were either avoided, maintained or restored to minimise impeding or changing natural drainage patterns associated with access tracks and pipelines and at creek crossings. Work programs were modified to avoid periods of flooding and other seasonal influences and variations.
	No water (surface or groundwater) contamination as a result of construction activities.	Achieved	No surface water or groundwater contamination was reported during the reporting period, as a result of construction activities.
	Produced Formation Water (PFW) Refer to assessment criteria for Objective 2.	Not Achieved	Refer to Objective 2. Notice of Non-Compliance is F2016/000084.
	No unlicensed discharge of water to a creek, river or lake.	Achieved	No unlicensed discharge of water to a creek, river or lake was reported during the reporting period.
	PFW Waterflood No significant change in surface or groundwater contamination as a result of water flood activities.	Achieved	There was no significant change in surface or groundwater contamination recorded as a result of water flood activities during the reporting period.
Objective 4 continued: Minimise disturbances to drainage patterns and avoid contamination of surface waters and shallow ground water resources.	<u>Fuel and Chemical Storage, Handling and</u> <u>Transportation</u> Soils remediated to a level as determined by the SHI Decision Framework. Also refer to Objective 12.	Achieved	Refer to Objective 2.
	No water (surface or groundwater) contamination as a result of these activities.	Achieved	There was no significant change in surface or groundwater contamination recorded as a result of fuel and chemical storage handling and transportation activities during the reporting period.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	Cooper Creek Water Extraction No significant change in flow or contamination as a result of extraction activities.	Achieved	No water was extracted from the Cooper Creek for use in Santos' South Australian production and processing operations during the reporting period.
	Waste Disposal (domestic, sewage and sludges) Refer to assessment criteria for Waste Disposal for Objective 2.	Achieved	Refer to Objective 2.
	Refer to assessment criteria for Objective 11.	Achieved	Refer to Objective 11.
	Oil/Condensate Spills (Pipeline/Road Transport) No spills/leaks outside of areas designed to contain them.	Achieved	Refer to Objective 2.
	Level of hydrocarbon continually decreasing for in situ remediation of spills.	Achieved	Refer to Objective 2.
	Soils remediated to a level as determined by the SHI Decision Framework.	Achieved	Refer to Objective 2.

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.	Achieved	 One reported incident of ground disturbance outside Cultural Heritage cleared areas occurred during the reporting period. To assist with compliance during the reporting period, the following actions are carried out to prevent reoccurrence: release of EHS bulletin(s); and raising awareness of the importance of receiving cultural heritage clearance prior to undertaking any works or activity outside of pre-disturbed areas.
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Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	Any identified cultural and heritage sites have been avoided.	Achieved	No recorded incidents of impact to identified avoidance sites occurred during the reporting period. Identified sites are avoided. Significant sites are fenced to prevent access.
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).	Achieved	There was no uncontrolled flow to the surface from well bores during the reporting period.
Objective 7: Minimise disturbance to native vegetation and native fauna.	<u>Construction Activities</u> Any sites of rare, vulnerable and endangered flora and fauna have been identified, flagged and subsequently avoided.	Achieved	Ecological assessments are undertaken to evaluate habitats for rare, vulnerable and endangered species. Areas identified as environmentally sensitive are avoided where possible. Proposed disturbances are subject to an internal environmental approval process whereby potential impacts to native vegetation and fauna are assessed through conditions and/or relocation, where necessary. Wherever possible, significant vegetation is avoided and trees are preferentially trimmed rather than cleared.
	No removal of trees / vegetation of priority 1, 2 or 3 in Field Guide1 in areas where removal could have been avoided.	Achieved	Wherever possible, significant vegetation is avoided.
Objective 7 continued: Minimise disturbance to native vegetation and native fauna.	No removal of trees at campsites.	Achieved	During the reporting period there were no instances native tree removal at campsites reported.
	No evidence of tree removal where trimming appropriate.	Achieved	Wherever possible, trees are preferentially trimmed rather than cleared.
	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.	Achieved	For ROWs that have received sufficient rainfall to promote revegetation, the type and density of vegetation is mostly consistent with the surrounding landscape, taking into account that it is less mature than the surrounding vegetation.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	0, +1 or +2 GAS criteria are attained for goals related to this objective as listed in Appendix 1 and 2.	Achieved	No scores recorded during the reporting period.
	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.	Achieved	Borrow pit site selection provides for the avoidance of vegetation impacts. Borrow pits are restored on an ongoing basis to allow natural vegetation regrowth to recommence. Where necessary, borrow pits are reopened to minimise vegetation impacts.
			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.
	Fuel and Chemical Storage and Management Refer to assessment criteria for objectives 2 and 4.	Achieved	Refer to Objectives 2 and 4.
Objective 7 continued: Minimise disturbance to native vegetation and native fauna.	Waste Management Refer to assessment criteria for Objective 2, 4 and 11.	Achieved	Refer to Objectives 2, 4 and 11.
	Native Vegetation Act SEB Significant Environmental Benefit (SEB) for native vegetation clearance approved by PIRSA (where delegated authority applies) or Native Vegetation Council (NVC).	Achieved	SEB requirement negotiated and approved with DSD or the Native Vegetation Council.
	Significant environmental benefit obligation is ultimately satisfied / implemented.	Achieved	Significant environmental benefit obligation satisfied and implemented during the reporting period.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	Fauna Management Native fauna casualties associated with construction activities restricted to as low as reasonably practical (ALARP).	Achieved	Personnel made aware of these requirements at induction training and by ongoing EHS bulletins and toolbox talks.
Objective 8 : Minimise air pollution and greenhouse gas emissions.	Gathering Systems/Satellite Facilities/Moomba Plant Compliance with EPA requirements.	Achieved	Operations conducted in accordance with EPA requirements during the reporting period.
Objective 9: Maintain and enhance partnerships with the Cooper Basin community.	No reasonable stakeholder complaints left unresolved.	Not achieved	During the reporting period, a complaint from Gidgealpa station was received regarding flare pit fencing and gate integrity to prevent stock access. Appears little action taken since initial reports. Relevant parties were notified and consulted on proposed activities. Local community events and activities were actively supported. Membership and active participation is made to regional management committees and Boards.
Objective 10: Avoid or minimise disturbance to stakeholders and/or associated infrastructure	No reasonable stakeholder complaints left unresolved.	Not achieved	During the reporting period, a complaint from Gidgealpa station was received regarding flare pit fencing and gate integrity to prevent stock access. Appears little action taken since initial reports. The importance of developing and maintaining good relationships with landholders is regularly communicated to employees and contractors. Relevant stakeholders are notified of and consulted regarding projects and are provided with information and maps, in accordance with Notice of Entry requirements.

Objective 11: Optimise (in order of most to least preferable) waste avoidance, reduction, reuse,	Domestic wastes are disposed of in accordance with EPA licensing requirements.	Achieved	Waste material was disposed of in accordance with EPA licensing requirements during the reporting period.
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Environmental Objectives	Assessment Criteria	Compliance Status	Performance
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recycling, treatment and disposal	Wastewater (sewage and grey water) disposed of in accordance with the <i>Public</i> <i>and Environmental Health (Waste Control)</i> <i>Regulations 1995</i> or to the Department of Health's satisfaction.	Achieved	Wastewater was managed in accordance with current regulations or to the Department of Health's satisfaction during the reporting period.
	No spills or leaks from sludge treatment process and sludge pits.	Achieved	No spills or leaks from the sludge treatment process and sludge pits reported during the reporting period.
	No increase in contamination at LTUs designated treatment area	Achieved	Monitoring during the reporting period indicated contamination levels are decreasing at LTUs.
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.	Achieved	Contaminated site remediation works during the reporting period included transport of soil from approximately 8 incidents to landfarms for ongoing treatment, with the remainder of incidents either being actively treated or naturally attenuating <i>in situ</i> .
	Construction Site and Access Track Restoration Refer to assessment criteria for Objectives 2, 4, 7 and 11.	Achieved	Access tracks are restored in accordance with restoration guidelines. Compacted soil areas are ripped (except on gibber and tablelands) and soil profile and contours are reinstated following completion of operations.
Objective 12 continued: Remediate and rehabilitate operational areas to agreed standards.	0, +1 or +2 GAS criteria are attained for 'minimise the visual impact' and 'revegetation of indigenous species' as listed in Appendix 4.	Achieved	No scores recorded during the reporting period.
	Borrow Pit Restoration The attainment of 0, +1 or +2 GAS criteria as in Appendix 1.	Achieved	No scores recorded during the reporting period.

Environmental Objectives	Assessment Criteria	Compliance Status	Performance
	 <u>Pipeline Abandonment</u> 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. 	Achieved	One flowline was abandoned during the reporting period, in accordance with the SEO and the requirements of AS2885.
	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.	Achieved	No production facilities were abandoned during the reporting period.
	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.	Achieved	No production facilities were abandoned during the reporting period.
	Refer to criteria for contaminated site remediation under this objective (above).	Achieved	No production facilities were abandoned during the reporting period.
Objective 12 continued: Remediate and rehabilitate operational areas to agreed standards.	Refer to the assessment criteria for Objective 11.	Achieved	No production facilities were abandoned during the reporting period.
Objective 13: Minimise as far as reasonably practicable interruptions to natural gas supply.	No interruptions to natural gas supply that cause significant social disruption.	Achieved	No interruptions to natural gas supply, that caused significant social disruption, occurred during the reporting period.

Date I 19/012/2016 M	Drill Type		Appendix 13 – Emergency Response					
19/012/2016		Description of Scenarios	Objective Outcomes:	Observations, Learnings and Actions				
	Moomba Plant OPREX ER - 16484	Description of Scenarios Major Exercise - Moomba North Facility The aim of this operational exercise was to validate current emergency plans and procedures, to test current resources available on site to respond to an emergency of this nature and provide a skills maintenance opportunity for all involved. The 2016 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 was the effectiveness of evacuation procedures for a major hazardous facility. Scenario: The exercise will commence on Monday the 19th of December 2016 at approximately 1300 hours at the Moomba North facility. A leak develops in a flange, escaping gas finds an ignition	 Objective Outcomes: Objective Outcomes: To validate the effectiveness of the current Moomba Emergency Plan, Emergency Response Procedures and the Moomba Plant Contingency Pre-Plans. Measure the effectiveness of response initial actions by Process and Production Operators. The strategy developed and the tactics undertaken by Emergency Services with a focus on fire suppression and casualty rescue. Measure the effectiveness of sourcing Advanced Fire trained personnel to assist in suppression efforts Measure the effectiveness of medical response and the ability to source current first-aiders from Muster-points. Ensure full evacuation of Moomba Plant & surrounding environs, (including Contractor compounds if required by the On Scene Commander), is done in a timely manner & muster points are reviewed for suitability to ensure they are outside the primary impact zone Development of a plan for what actions would need be taken to maintain and or recover operations and steps taken to prevent any knock on effects 	 Observations, Learnings and Actions Observations: Plan was followed by the ERT in the EOC. Plans were relevant with no requirement to update. All required teams were paged as required. Process and Production responded, both teams liaised with Emergency Services to provide a positive outcome. Notional ESD was rapid. Emergency Services undertook fire suppression and casualty rescue. Medical response was effective. RFDS did not require the assistance of trained first-aiders, so they were not called for. Evacuation of the Moomba plant was rapid and effective. Only 1 x person was unaccounted for and their location was discovered rapidly. A sweep of the Moomba plant was also undertaken. To ensure total clearance of personnel. Discussed by the ERT in the EOC with required input from Engineering, Process and Production. Learning's: Ensure APA are notified of all plant exercises Need to be mindful if further security officers are required they will be night-shift and will need to be paged and their response would be approximately 6 minutes. Noted there would be a delay from Production if no work was occurring in the Moomba North Area. Emergency Services Officers responded with reduced resources due to having a Team Leader and only 3 x ESO's available due to 1 x sick in the field and another on annual leave. This caused 2 x ESO's to reach a high level of fatigue. This was compounded by a limited support of advanced fire-fighters, only 3 in total responded and the last 2 took some time to arrive at the FCP. Available advanced fire trained personnel levels 				

30/12/2016 Alternate EOC TEWT - ER- 16487 Moomba Alternate EOC Exercise – (Recently relocated to the old Moomba Airport Terminal) Objective Outcomes: Observations: Aim: To practise and assess the effectiveness of relocating to the Alternate EOC (as per the Cooper Basin Ops Support Relocate procedure 49). • To practise and assess the effectiveness of relocating to the Alternate EOC (as per the Cooper Basin Ops Support Relocate procedure 49). • All required personnel found it easy to make the way to location. • To practise and assess the effectiveness of relocating to the Alternate EOC (as per the cooper Basin Ops Support Relocate procedure 49). • All required personnel found it easy to make the way to location. • To practise and assess the effective manner. • To practise and assess the alternate EOC in a timely and effective manner. • To practise and assess the functionality of new • All required personnel found it easy to make the way to location.			casualties. Operators raise the alarm, activate fixed monitors and deluge systems Expected duration is to be 60 minutes and the exercise will be deemed complete when persons occupying the Moomba Plant and surrounding environs have been evacuated to places of safety, and sufficient actions have been taken to control the event including identifying "burn down" time.		 Further exercises will need to increase the casualty numbers, so the on-site nurses require the assistance of first-aiders. Due to the nature and size of incident Contractor yards did not require evacuation. Discussed was due to the reduced number of security on site. Santos personnel will be required to assist with clearing the Contractors yards North and South of the plant in the event of a significant incident. Actions: Ensure procedures are in place so APA in Moomba are notified of all plant exercises. Investigate possibilities of bolstering those trained as advanced firefighters due to low attendance and the negative affect it had on the Emergency Services Officers due to delayed response, very limited assistance and potential fatigue management issues of Emergency Services Officers. Review of the APA Moomba Pump Station ERP, was meant to be supplied in 2015 by APA. This needs to be investigated
incident that has occurred or could potentially occur in the Moomba Plant.	30/12/2016	Alternate EOC TEWT - ER- 16487	Moomba Alternate EOC Exercise – (Recently relocated to the old Moomba Airport Terminal) Aim: This exercise is being conducted is to provide members of the Moomba Emergency Response Team (ERT) the opportunity to practice the actions required with the relocation of operations to the Alternative EOC in the event of the EOC in the administration building is under threat due to an incident that has occurred or could potentially occur in the Moomba Plant.	 Objective Outcomes: To practise and assess the effectiveness of relocating to the Alternate EOC (as per the Cooper Basin Ops Support Relocate procedure 49). To facilitate the relocation and subsequent re-activation of emergency communications and journey management systems. To practise and assess the ability of all ERT members to relocate to the alternate EOC in a timely and effective manner. To assess the functionality of new alternative EOC and that it meets the operational requirements of the ERT 	 Observations: Transition worked well. All radio systems were operational. Communication with all muster points. All required personnel found it easy to make their way to location. All position holders were content with areas to operate, just need to ensure Chief Warden has an area. Airport area is backed up by a generator that the I/E department check monthly. Learning's & associated Actions: Cordless 222 phone not working. Action – B. Freschi, Comm's Tech's. Evacuation of EOC messages, could be completed before evacuation of Security, as a warning for all

		At approximately 1300 hours on the 30th of December 2016. A gas leak has occurred in the LRP section of the Moomba plant, this leak has found an ignition source and has caused a fire that is impacting on Refrigerant Accumulator-A (V-65-2278A). The water deluge system and fixed water monitors 55, 56 and 111 were activated by retreating Process Operators.	 discussed the ability to use Delta FM maintenance personnel as support personnel for the Moomba EOC. They can be engaged in non-combatant roles assisting with logistical tasks etc. Development of triage/treatment area in the Moomba airport terminal in the event the Moomba Camp has to be evacuated. RFDS Team Leader to develop plan and area required. 	 Alternative EOC. Ability to receive 222/000 calls and to monitor fire alarm system was raised. To remove laptop computers and relocate to alternative EOC. Emergency Response Coordinator to ensure required equipment is removed and this is added to CB ERP. Discussed developing routes for evacuation to Main Security Gate and Moomba Airport for Moomba yards and the Moomba accommodation camps. Discussed this afterwards that access and egress paths will be decided on by the Emergency Response Coordinator on feedback from the On Scene Commander. The obvious routes will be those furthest from the plant perimeter. Need to develop a working area for the Chief Warden Replicate positional folders as in Main EOC Emergency Services to develop. More stationery supplies required. Access to a printer Could the area have carpet laid to reduce noise and it is now a low traffic flow area. Action – to investigate if funding can be made available. Working clocks. Printing out of plant evacuation report (printer in alternative EOC mapped or next door in security office)
30/12/2016	Tirrawarra OPREX	Uncontrolled Gas leak in the	Objective Outcomes:	Observations:
	ER - 16455	Tirrawarra plant – Unit 8	-	
		The aim of this operational	To validate the Tirrawarra Emergency Evolution precedure	Tirra EEP worked well
		exercise was to provide a	(EEP)	An members knew meir various responsibilities Area operators evacuated the plant in a timely
		training opportunity for the	To validate operators areas of	manner and gave assistance to others to evacuate
		Tirrawarra operators to put the	responsibility during this emergency	safely aswell.
		discuss any results	 I o test the response capabilities of the Tirrawarra area operators and 	Comms between the operators and control room was very good. Clear instructions were given
			assist the work group with safe	regarding the incident.
		Scenario:	methods of exiting the plant safely	• The incident information was passed from the
		During normal operations at the Tirrawarra satellite there is an	To test the communication between the area operators and the work crews in the event of this type of	operator to the control room then to IL NF and then onto comms in a very timely and clear manner.

		uncontrolled gas leak	incident	Learning's:
			 General notes: This exercise was conducted very efficiently and safely. The operators showed that they understand their responsibilities for this type of incident. The plant has actually been through a couple of real life satellite evacuations over the past 12 months so they are all well practised with their EEP. Due to there only being one operator in the plant at the time of the exercise there was a discussion during the debrief as to how they would have dealt with a work party evacuation and the direction they would have taken out of the plant. There was also discussion as to how they account for people working in the satellite and what they would have done if someone was unaccounted for. Overall the exercise went very well 	 All the operators knew what was required of them in this situation and carried out associated task as required meeting the exercise objectives – No significant learning opportunities identified. Actions: No Action were raised
03/07/2016	Moomba South Central Satellite OPREX ER-16020	Moomba South Central Satellite - Loss of containment (LOC) Gas (OPREX)The aim of this operational exercise was to provide a training opportunity for the Moomba South Central operator(s) to participate in a 	 Objective Outcomes: To validate the Cooper Basin ERP for a "Pipeline Integrity compromise" situation To validate members areas of responsibility during this emergency To test the response capabilities of the Moomba South Central area operators To test the response of Moomba Coms CRD General notes: The Area Operators proved to be very knowledgeable of their area and to cause and effect of actions taken in an emergency. They also proved good use of initiative in choosing 	 Observations: The operators was very aware of the procedures to be undertaken to mitigate the risk. They isolated the affected valve remotely and ESD the satellite. They also made calls to Moomba Coms and to Field Control and to CF T/L before retreating to a safer distance. All actions were made in a timely manner. Area Operators knew what was required of them to a very good knowledge level and also how to adapt to different incident conditions. Area Operators are very capable operators and know what needs to be done in this situation. They also showed initiative when communications were lost due to gas cloud impeding vehicle access. Key personnel listed the CBERP received page to attend EOC.

		you determine that large amounts of gas is escaping from a fatigued fitting in the bypass line on the reinjection side of the MOD Change Skid.	to use mobile phones at a safe distance to stay in contact with Moomba until the request for a Security vehicle arrived to block roads. Area Team Leader also showed good leadership and initiative, prompting a checklist to the operators. Area Team Leader was also happy with SITREP he received. We also had discussions about planned implementation of use of field radio from the Moomba Office (presently ongoing) which is believed will be enhanced by the implementation of the new digital network system. I learnt the implications of having a leak of a gas leak and of shutting down a satellite not only on production but also to the larger business. No actions were needed to be assigned	 Learning's: The facilitator learnt the knock on effect to the operation of the Satellite/Moomba and to the Business due to actions undertaken. Presented the facilitator a learning opportunity with satellite operations in particular how a the Operator shuts gas in/out. Actions: No action were required to be raised resulting from this exercise.
06/08/2016	Moomba Plant / Environs OPREX ER - 16082	Bomb Threat The aim of this operational exercise was to provide a training opportunity for the Moomba emergency response teams as a result of a reported bomb threat. Scenario: At approximately 0800 hrs a call will be made to Moomba Comms of a Bomb threat. Comms would then using the Bomb threat procedure determine the bomb location to be at the Telstra Communications Tower.	 Objective Outcomes: To validate the Moomba CRD procedures for this type of incident To validate the Cooper Basin ERP for this type of incident To test the response capabilities of the Moomba Emergency teams Evaluator Notes: The initial call to Comms probably caught them a little off guard as they had no idea of what the Oprex was based around. (real life scenario) The Comms operator was very calm and professional on the phone while trying to extract information from the caller. They followed their procedures well, however it was highlighted that is was hard to gain the attention of the second Comms operator to assist with the emergency. It was also highlighted that during this type of emergency after hours, it would be hard to gain the attention of other people due to 	 Observations: CRD procedures worked well, with the appropriate people being paged in a timely manner (9 mins after initial call was received). The second Comms operator actually paged the area members where the bomb was reported to get them to attend the EOC. Call tracing was initiated and SAPOL were notified of the incident. The change over from CRD procedures to CBERP seemed to work very well. The procedures were steeped through in a timely manner with the appropriate people being notified. All teams responded as required to the emergency. It is very much a hurry up and wait type scenario, so could be a very drawn out and lengthy process. Overall the training opportunity was good as there has not been a bomb threat exercise in the Moomba environs for quite a while. A toolbox discussion topic was raised to remind people to be vigilant around their areas of work. Information gathering by the comms operator was good. All teams and personnel responded as required. There is not a lot that can be done

			 the reduced manning levels at Moomba. Some form of attention/duress alarm was discussed. This will be looked into through an action item. It was also highlighted during the debrief, that the plant superintendent needs to be notified of this type of emergency in the initial stage as it may affect plant operations/communications. This will be addressed through an action item. All teams responded well and stayed well away from any potential blast zone. 	 physically during this type of emergency, however there is a lot of behind the scenes work that is happening in the EOC. Learning's: A security plan is mentioned in the CBERP but there doesn't seem to be a hard copy of this plan anywhere. This will be actioned Plant superintendent needs to be notified for this type of incident. Identify any suspect packages around the area where the bomb has been reported either during evacuation or by using binoculars and the people who frequent the area. Andrew Yule to investigate the security plan that is made reference to in the CBERP. (Act 84352) Andrew Yule consider sending out a tool box discussion topic email regarding bomb threats/suspicious packages and remaining vigilant. Andrew Yule to check the validity of trace number this number (Act-84354)
08/06/2016	OPREX ER- 15952	OSCAR In Field Exercise The aim of this operational exercise was to provide a training opportunity for the Moomba emergency response teams for the requirement of Oil Spill Containment and Recovery (OSCAR) response capability preparedness with in the Cooper Basin Scenario: Oil Spill vessel operational inductions and sign-off are required under the vessel's	 Objective Outcomes: Provide OSCAR vessel induction training for all Emergency Services and Civil Services licensed boat operators Practically assess all Emergency Services and Civil Services licensed boat operators in the operation of the OSCAR vessel in-line with appropriate vessel operational procedures Identify any gaps or possible improvements with new OSCAR ancillary equipment trailer stowage Provide an opportunity to practice 'on water' deployment of curtain booms. 	 Observations: Learning's: Learning's were identified resulting in the following actions. A subsequent exercise scheduled for 2017 will further refine procedure and measure remedial actions as per below. Actions: Replace 9kg DCP with 2.5kg DCP & store in well to minimise snag point for anchor/trip lines. Please source an adjustable length boat hook for the OSCAR vessel. Please source and fit a marine compass to the "RESPONSE" vessel. Please clearly label All OSCAR vessels with Load Capacity stickers.

		remain compliant with AMSA certificate of operations. Individual licensed boat operators will be ran through the induction package and tested on the vessel operations procedures during the exercise. Recently acquired specialist OSCAR booms and skimmer pump will also be deployed and set-up as a practice opportunity for team members who completed last year's theory based OSCAR training in Moomba. The operations will be conducted on the Cooper Creek, South of Innamincka at the Policeman's camping area	deployment and oporation of Skimmer Pump and associated equipment General Notes: Santos Moomba emergency services, Civil Works and SA Government DEWNER personnel participated in a minor OPREX involving deployment and operations of OSCAR vessel and ancillary equipment operations on the Cooper Creek at Policeman's Point just south of Innamincka. During the exercise, vessel operations procedures and inductions were worked through and, all participating licensed boat operators were practically assessed against same to meet requirements of the "RESPONSE" vessel's safety management plan in compliance with Santos' certificate of operation under AMSA regulations. As well as "RESPONSE" vessel operations, crews also deployed lengths of floating collar booms in conjunction with skimmer pump set up at a pre-determined collection point. A hot De-brief was conducted on site with all involved parties and all identified opportunities for improvement were captured for future actions.	 Please. Female Camlock fitting on underside of skimmer needs cable tie to prevent accidental loss during manoeuvring of skimmer on bank please. Please obtain a heap of large snap hooks and replace existing shackles on all topside anchor/trip line and boom connections. Shackles can 4remain on all bottom equipment. Keep spare shackles. Replace hook on winch strap with snap hook as well. Please source and stow a sack truck with pneumatic tyres, packs of cable ties and star pickets / dropper with OSCAR equipment. Please investigate possibility of repositioning skimmer pump to back of trailer for ease of loading/unloading. Airlines for skimmer to go onto reels if possible please to facilitate ease of handling/minimise twisting during set up. Please source and install a low cost sounder for the "RESPONSE" vessel. Please investigate suitabile tree trunk protector anchor strap and pulley block and rope to assist with boom deployment when possible. Please investigate suitability of current "RESPONSE" vessel outboard engine prop and replace if necessary. Please source and fit a suitable outboard motor prop guard on the "RESPONSE" vessel.
10/09/2016	TEWT ER -	Moomba Aerodrome Exercise CASA regulations require a full scale Aerodrome Emergency Exercise at intervals not exceeding 24 months. The last exercise was conducted 2015 so evey other year a DISCEX is held. This exercise is to test all elements of the Santos Moomba Aerodrome Emergency Plan as required by • Civil Aviation Safety Authority (CASA) regulation 139.215 • Santos EHSMS 13 Emergency Preparedness	Objective Outcomes: • Moomba EOC - Emergency Response Team (ERT) • ERT structure is to be practiced in accordance with the Moomba Aerodrome Emergency Plan. • ERT follows the Moomba Aerodrome Emergency Plan • Development of a strategy by the On Scene Commander • Aviation Rescue & Firefighting (ARFF) response to a fixed wing aircraft incident.	 Observations: Team work Adequate support Strategic plan was readily developed and tactics that would be undertaken were discussed. RFDS nurse discussed direction would be from ES-1 in regards to staging area. All positional holders readily took up their role within the EOC and undertook their functions. Moomba AERP was followed Strategic plan was developed by the OSC and the Coordinator took control of EOC operations. Learning's: Human resources for a real event consider sourcing

		Scenario:	 Liaise with RFDS Nurse #1 to set up a triage area and provide primary care to any casualties All roles within the Moomba EOC and those at the FCP to understand the function of their role and practice the responsibilities required. Consult the Moomba Aerodrome Emergency Plan. Seek required guidance from the Emergency Response Co-ordinator and On Scene Commander were applicable. Moomba EOC (ERT) and Responders that would be at the Aerodrome (FRT) to walk through the time line of the incident response. FRT to develop strategies and tactics. ERT to develop plan to assist operations 	 contractor support. Consider critical stress management teams early on. Resulting from emergency exercise for the Moomba Aerodrome, we had feedback that the maps and drawings were too small to read in the Moomba Aerodrome manual. It was asked if it would be possible to expand these to A3 foldout Actions: It was highlighted that the Moomba Aerodrome manual needed improvement not the AERP. .
			 ERT was in the EOC, FRT was in an adjacent meeting room. FRT developed strategies and discussed tactics. This was relayed to the EOC by portable radios in a sequence that would occur with an incident of this nature. This was the first time an exercise was conducted as such and feedback from participants were positive. Usually both teams are used to be addressed to the positive. 	
Multiple	Moomba Process	Process DISCEX Example	Objective Outcomes:	Observations:
(Process)	Department	This eversion will be a Dealiter		
	Scenarios included:	exercise discussion, designed to	 I o evaluate the situation at hand and promptly notify the correct personnel 	 Storage of full Methanol drums within the area could be introducing another hazard, operators continue to decant
	#Sepco Gas	practice established emergency response procedures and	Moomba Fire Contingency Pre-plan	asap when storage in day tank available

Comprossor	individual skills in relation to a		CPP 20 roviow		
Con Delegas	reasonable to an amorganou in the			Doro	annal Mayamanta in first 10 minutas of responses
Gas Release	response to an emergency in the	•	Roles and responsibilities of process	reis	onner wovements in first to minutes of response.
& Fire	Cooper Basin Environ EHSMS		operators.		
ER - 16633	13 EMERGENCY	•	Bow tie report MBA-ETP-002 review	•	CSP Operator Monitor incident from safe location upwind
	PREPAREDNESS.			•	Utilities Operator Report to OCC
 Oil Leak from 		Ger	neral Notes:	•	1-4 CO2 Operator Report to OCC, check Admin fire
Stabilised Oil	Scenario:				
Transfer		•	Operator alerts control room via radio	•	5-7 CO2 Operator Report to OCC, check utilities fire
Pump 2850-	ETP Amine Absorber (V-148)	•	monitors release from safe distance	•	
C	gas release (let Fire) FR - 16084	_	Inonitors release norm sale distance		pump LBD4 On anotan Dan ant to OOO, avail further instruction
ER - 16032	Operator alerts control room via	•		•	LRP 1 Operator Report to OCC, await further instruction
ER = 10032	radio, monitors release from safe	•	Emergency Response:	•	LRP 2 Operator Report to OCC, await further instruction
Linuid	distance	٠	Operator raises alarm, UC confirms	•	LRP 3 Operator Report to OCC, await further instruction
• Liquia			incident details	•	Offsite Operator Check Adelaide road firewater pump,
release from	upwind	•	UC sounds evacuation alarm, contacts		report to OCC
PFD A ER-			emergency services (222)	•	PTW Coord, account for personnel/permits/report to
16314			3		OCC
		Initi	al response:	•	Unit Controllers First response monitor plant conditions
Gas Release					Supervisor Access situation, establish forward command
and Ignition			ETP ESD activated from OCC	•	Supervisor Assess situation, establish forward command
Moomba			Supervisor confirms siren initiated		
North		•			
Compressors		•	Ensure all personnel are accounted for	Actic	ons:
ER-16438		•	All personnel have reported to control		
ERTOTOO			room and	•	Confirm isolations
		•	obtained turnout PPE (spares obtained	•	Raise work order for repair
			for those	•	Debrief and raise IMS
		•	monitoring incident)		
148) gas		•	Confirm ETP Inlet XV-0007 and ETP		
release (Jet		-	outlet XV-0030		
Fire)			have closed		
ER-16084					
		•	Commence depressuring to hare via UV-		
• #7 Train, gas			18028 and PV-		
release from		•	0028		
exchanger		•	Shutdown potential ignition sources,		
ER-16153			ETP Heaters		
		•	ESO and supervisor establish forward		
Gidgealpa			command point		
Gas Pig		•	Apply water for cooling/dispersion		
Beceiver			Consider impact on nearby equipment		
		-	such as methanol		
ond			storage propage storage and pipeline		
		•	storage, proparte storage and pipelline		
Subsequent			ieed drums, apply		
Gas Release		•	deluge if deemed necessary		
ER- 16117		•	Shutdown pump station depending on		
			conditions		

	 Plant Recovery After Instrument Air Loss (Black Start) ER – 15644 Ethane Concentrate Filter F112A/B Gas Release ER – 15804 Instrument Air Loss Moomba Plant ER – 16341 		 Operators to check operation of fire water pumps and CSP pad firewater sump pump Call for additional advanced fire fighters Communicate hazards and status to ESO to relay to EOC Continue to apply water for dispersion until inventory no longer coming from flange Confirm with control room plant depressured Process to secure exchanger when safe to do so Advise control room and EOC to sound all clear 	
Multiple	Camp Evacuation	Camp evacuation Camp evacuation exercises were carried out on all shifts at Moomba Dullingari and Tirrawarra throughout the year.	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. Exercises targeting all personnel with MPW responsibilities including ongoing newly appointed personnel with MPW position responsibilities.	 Review, update of evacuation procedures and updated Muster Point Controller equipment. Search requirement / procedures Affirm personnel responsibilities Extra radios / torches purchased. More powerful Loud Halers Evac Siren upgrades
Multiple	Other	Individual CB ERP & EOC Roles and Responsibilities Training. "Australasian Inter service Incident Management System"	An extensive training campaign was continued during 2016 to deliver individual EOC & ERP responsibilities with the company CB Operations Emergency Response Plan. Training targeting all personnel with ERP responsibilities and ongoing newly appointed personnel with EOC position responsibilities. Including Muster Point Warden. Also covered off number of EOC exercises 2016	A list of EOC position holders is kept in the EOC A copy of training records/attendance is kept in the TL ES office 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,	Develop 2017 schedule for weekly ESO skills maintenance training sessions.

disciplines - Rope Rescue ace Rescue, Road Crash A search and rescue, Live Oil & ting, HAZMAT Response, etc.
