South Australia Cooper Basin

Statement of Environmental Objectives: Production and Processing Operations

August 2016
South Australia Cooper Basin

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1. Introduction

1.1. About Santos

A proudly Australian company, Santos is a leader of the Australian natural gas industry, with 60 years of responsible gas exploration and production across the nation, since establishment in Adelaide in 1954.

We are one of Australia’s principal producers of natural gas to the domestic market, with the largest exploration and production acreage position in Australia. We have also developed major oil and liquids businesses throughout Australia, operating in all mainland Australian states and the Northern Territory.

In 2013, our total production was 54.1 million barrels of oil equivalent (mmboe), and as at 31 December 2014 the company had a proven and probable (2P) reserves base of 1,245 mmboe. Santos has exploration and production acreage covering approximately 300,000 square kilometres and is among the largest companies listed on the Australian Securities Exchange (ASX).

Safety and sustainability are integral parts of Santos’ operating ethos. We are committed to responsibly managing our environmental impact, working in partnership with the communities in which we operate and reliably managing our business.

1.2. Purpose

This Statement of Environmental Objectives (SEO) has been prepared to meet the requirements of sections 99 and 100 of the South Australian Petroleum and Geothermal Energy Act 2000 (the Act) and Regulations 12 and 13 of the Petroleum and Geothermal Energy Regulations 2013 (the Regulations).

The objects provided in section 3 of the Act are:

- to create an effective, efficient and flexible regulatory system for the industries involving exploration for, and the recovery or commercial utilisation of, petroleum and other resources (including geothermal resources and natural reservoirs suitable for storage or production purposes) to which the Act applies
- to encourage and maintain an appropriate level of competition in exploration for and production of petroleum and other resources to which the Act applies
- to create an effective, efficient and flexible regulatory system for the construction and operation of transmission pipelines for transporting petroleum and other substances to which the Act applies
- to minimise environmental damage from the activities involved in:
  - exploration for, or the recovery or commercial utilisation of, petroleum and other resources to which the Act applies
  - the construction or operation of transmission pipelines for transporting petroleum and other substances to which the Act applies
- to establish appropriate consultative processes involving people directly affected by regulated activities and the public generally
- to ensure as far as reasonably practicable, security of supply for users of natural gas
- to protect the public from risks inherent in regulated activities.

This SEO outlines the Environmental Objectives for Cooper Basin production and processing operations (PPO or operations), and the assessment criteria upon which achievement of these objectives are to be assessed. Environmental Objectives have been developed on the basis of the actual or potential impacts of PPO documented in the Environmental Impact Report (EIR): Production and Processing Operations (Santos 2016).

The EIR and SEO consider the environment to include natural, social, heritage and economic aspects in accordance with the Act. The Environmental Objectives outlined in the SEO incorporate all of these elements.
1.3. Scope

This SEO applies to the operations conducted by Santos on its own behalf and on behalf of the joint venture parties in the South Australian sector of the Cooper and Eromanga basins (the South Australia Cooper Basin parties) (see Figure 1). Operations that are covered by this SEO (and described in detail in the 2016 EIR) are those where inherent risks are higher than negligible, associated with:

- pipeline, trunkline and flowline construction, operation, maintenance and decommissioning
- plant and satellite construction, operation, maintenance and decommissioning
- produced formation water management
- enhanced oil recovery
- road construction, maintenance and restoration
- waste management operations
- water resource management
- Moomba airport and fire training ground.

Specifically, this SEO does not apply to activities covered by other Santos and Third Party SEOs for the Cooper Basin:

- South Australian Cooper Basin Operators Statement of Environmental Objectives: Geophysical Operations (Santos 2012), which covers:
  - exploration activities
  - seismic operations.
- South Australia Cooper Basin Statement of Environmental Objectives: Drilling, Completions and Well Operations (Santos 2015), which covers:
  - well site and access track construction
  - drilling activities
  - well completion
  - pre-wellhead production
  - sub-surface well/reservoir activities (with the exception of the aspects relevant to produced formation water enhanced oil recovery that are covered in this SEO)
  - down hole decommissioning
  - restoration of well sites and access tracks.
- SEOs for sales gas pipelines and the liquids pipeline to Port Bonython (noting that these are not operated by Santos).
Figure 1: Exploration and Production Acreage in the South Australian Cooper and Eromanga Basins
2. Environmental Objectives and Assessment Criteria

2.1. Environmental Objectives

Potential hazards and consequences associated with production and processing operations in the Cooper Basin were identified in the EIR (Santos 2016). Santos is committed to achieving a range of environmental objectives with respect to these potential hazards and consequences which are in keeping with the objects of the Act (see Section 1.2).

The Environmental Objectives for PPO are:

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.
2. Minimise impacts to native flora and fauna due to regulated activities.
3. No introduction of new species of weed, pathogen or pests (feral animal) and prevent the spread of existing species, as necessary.
4. Avoid adverse impacts to surface water and groundwater quality and minimise impacts to third party users.
5. Avoid damage, disturbance or interference to sites, objects or remains of Aboriginal and/or non-Aboriginal heritage.
6. Maintain stakeholder relationships and minimise disturbance to landowners and/or associated infrastructure.
7. Rehabilitate land affected by regulated activities to agreed standards.

2.2. Assessment Criteria

The criteria against which achievement of the Environmental Objectives will be measured is set out in Table 1 and summarised below:

Monitoring - In some cases the assessment of the environmental objectives may require longer term monitoring and evaluation. In such instances, the assessment criteria may be in the form of longer term data and information gathering.

Defined conditions - In some cases, the achievement of an objective can be assessed through ensuring defined conditions are met or carried out. Such conditions include:

- Prohibitions to undertake a specific action(s): for example, the assessment criteria may be ‘unauthorised off-road driving is not permitted’ to achieve the objective of minimise impacts to native flora and fauna due to regulated activities.
- Requirements to carry out certain actions in accordance with approved procedures, industry accepted standards or Australian Standards.

Goal Attainment Scaling (GAS) criteria – Environmental Objectives requiring visual assessment are prone to uncertainties of subjective judgement. To minimise the potential for this, GAS is used to measure such objectives against a series of criteria explained by a written description and/or photographically. GAS is applicable to measuring objectives related to minimising disturbances to natural vegetation, soil, and the rehabilitation of right of ways (ROW), borrow pits and access tracks. GAS criteria are referenced where available (see Table 1). Where a GAS score of -1 or -2 is observed (for example, in the case of erosion control and pond skimming), actions will be taken to achieve the GAS goal (0), see Appendix A.
Each Environmental Objective for production and processing operations will be evaluated using a selection of one or more forms of assessment criteria options outlined above. This will enable Santos, and others, to consistently evaluate progress towards meeting Environmental Objectives. Comments on variances will be recorded and reported where required (refer to Section 3).

2.3. Guide to How Objectives Can Be Achieved

Details for how Environmental Objectives can be achieved are provided in Table 1. The Guide to How Objectives Can Be Achieved details risk management, controls and systems that are relevant to the specific Environmental Objective and Assessment Criteria.
Table 1: Cooper Basin PPO Environmental Objectives and Assessment Criteria

<table>
<thead>
<tr>
<th>Environmental Objectives</th>
<th>Assessment Criteria</th>
<th>Guide to How Objectives Can Be Achieved</th>
</tr>
</thead>
</table>
| 1. No injuries, deaths or adverse health impacts to the public or third parties from regulated activities that could have been reasonably prevented by the operator. | - No imminent risk to the health and safety of the public or third parties occurs as a result of failure to identify or maintain a physical or procedural barrier, so far as is reasonably practicable.  
- 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 Work Health and Safety Act 2012.  
- Compliance with the applicable legislation or approvals regarding noise and air quality.  
- 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 aging. | - Risk Management  
  - An assessment of risks to the public and other third parties that are associated with production and processing operations is undertaken prior to commencing new activities, ongoing operation and whenever there is a change in the scale and/or nature of the operations. This is managed through the Santos’ Environment, Health and Safety Management System (EHSMS), including the Management of Change (MOC) process, as well as the Environmental Impact Report (EIR). Santos’ EHSMS is explained further in Section 8 of the Production and Processing Operations EIR (2016).  
  - Mitigation measures are applied to reduce the risk So Far As Is Reasonably Practicable (SFAMIP Safe Work Australia). Where a risk cannot be eliminated the relevant Santos manager will be responsible for assessing whether the risk is acceptable to Santos.  
  - Controls  
    - Pipeline and facility design, construction, testing, operation, maintenance and decommissioning complies with applicable industry and company standards as outlined in the EIR and is subject to fitness for purpose review and assessment.  
    - Feeding of wildlife (e.g. dingoes) is not permitted (reducing the potential for bites/attacks).  
    - No domestic pets allowed at camps or worksites (reducing the potential for bites/attacks).  
    - Employees and contractor personnel complete applicable safety training and inductions (and refreshers) prior to commencement of work in the field.  
    - Site visitors undertake applicable safety inductions.  
    - Permit to work systems for staff and contractors where applicable.  
    - Applicable PPE (personal protective equipment) is issued and available as required.  
    - Regular emergency drills/exercises conducted.  
    - Signage in place to warn the public and third parties of access restrictions to operational areas, with particular warnings when potentially dangerous operations are being undertaken.  
    - Reasonable measures (e.g. fencing) taken to prevent the public accessing operational areas.  
    - Communication provided to potentially affected parties prior to commencement of operations, including heavy vehicle movements and other potential hazards to public or third party safety associated with production and processing operations (e.g. landholder liaison activities, marker signs for flowlines, etc.).  
    - Information available to potentially affected parties of road conditions and/or closures.  
    - Traffic restrictions or temporary road closures implemented when road works are undertaken.  
    - In Vehicle Monitoring System in Santos and contractor vehicles, speed limits and driving with headlights on.  
    - Fit for purpose wastewater treatment plant and equipment.  
    - Demarcation in place around treated effluent irrigation areas, where required.  
  - Systems  
    - Appropriate Emergency Response Procedures are in place.  
    - Systems and controls in place to mitigate potential safety hazards include:  
      - Implementation of the Santos EHS management system (EHSMS – includes reference to appropriate Engineering and industry standards).  
      - Implementation of the Integrated Risk Register and associated management systems  
      - Regular auditing and inspection to verify compliance with contractor and Santos standards.  
      - Implementation of applicable corrective actions.  
      - EHS management plans are updated and reviewed where required.  
      - Appropriate training and competency of personnel and contractors  
      - Reporting systems in place for recording injuries and accidents.  
    - Incident investigations conducted in line with industry best practice and compliant with the requirements of the Regulations  
    - Continually review and improve operations.  
    - For construction and operational activities that generate noise and air emissions that may have a negative impact on the health and amenity of nearby landholders and/or residents, an assessment of the monitored or predicted noise levels and/or air pollutant concentrations may be completed with comparison to applicable health and amenity criteria in accordance with company standards.  
      - Refer to Objective 6 for community and stakeholder-related aspects. |
### Environmental Objectives

**2. Minimise impacts to native flora and fauna due to regulated activities.**

<table>
<thead>
<tr>
<th>Construction and Operational Activities</th>
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<tbody>
<tr>
<td>- No native fauna casualties that could have been reasonably prevented.</td>
</tr>
<tr>
<td>- No impacts to important native vegetation as a result of regulated activities.</td>
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<td>- No uncontrolled fires resulting from regulated activities.</td>
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<td>- No production activities undertaken on salt lakes or steep tableland slopes.</td>
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<td>- Works are restricted to approved/cleared areas.</td>
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<td>- Unauthorised off-road driving is not permitted.</td>
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<tr>
<td>- Where a significant (2) or minor (1) shortfall with the GAS criteria for Borrow Pit Construction (Soil, Vegetation, Visual Impacts) and Management (Soil, Water Retention) is identified, a management strategy will be implemented as soon as practicable, which will include remedial actions, to meet the GAS Expected Goal (0) or Goal Exceeded (+1 or +2).</td>
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<tr>
<td>- Following pipeline right of way (ROW) reinstatement activities, the following applies:</td>
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<td>- No evidence of significant subsoil on surface (colour) on ROW</td>
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<tr>
<td>- No subsidence is evident over pipeline trench</td>
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<tr>
<td>- No visual evidence of soil compaction following remediation of the pipeline easement.</td>
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<tr>
<td>- The extent of erosion on the ROW is consistent with surrounding land.</td>
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**Native Vegetation Act SEB**

- Significant Environmental Benefit (SEB) for native vegetation clearance approved by the relevant delegated authority and SEB Offset obligation implemented.

**Water Affecting Activities**

- No new water affecting activities as defined under the NRM Act undertaken unless applicable permits have been obtained. |
| - No unauthorised impedance of surface water flow that results in adverse impacts to native flora or fauna and groundwater dependent ecosystems. |

### Assessment Criteria

### Guide to How Objectives Can Be Achieved

#### Construction and Operational Activities

- Areas of high sensitivity are identified using mapping or on-ground validation where applicable and may include wetlands, areas of priority flora, threatened species habitat and surface water bodies.
- To minimise potential impacts to native flora and fauna the following controls should be considered:
  - Fuels and chemicals to be stored, handled and transported in accordance with company and applicable regulatory requirements in designated areas.
  - Clean-up of fuel or chemical spills (free fluids) as soon as reasonably practicable.
  - Scheduled (and/or upon request) removal of waste from operational areas.
  - Maximise re-use of topsoil |
  - Minimise duration of time excavations are left open. |
  - Addition of fauna egress mechanisms and/or installation of fencing around temporary holding ponds, pits or other excavations, where required. |
  - Where possible, provision of fauna retrieval bags and exit ramps in open trenches to be used in conjunction with other mechanisms for fauna exit (branches, mesh etc.). |
  - Construction and operational activities that result in disturbance to land and/or drainage channels, or contamination of soil, surface water or groundwater, either by their nature (e.g. authorised land clearance) or through abnormal or emergency events (e.g. loss of containment) will be remediated and/or rehabilitated (if required) to ensure that activities associated with the identified end land use will not be negatively impacted. |
  - Construction activities are designed, located and managed as far as reasonably practicable to maintain/facilitate achieve: |
    - pre-existing water flows. |
    - minimise potential for soil profile inversion (i.e. subsoil evident on surface following construction works) and maximise topsoil re-use |
    - minimise potential for soil compaction and where identified employ measures to remedy |
    - minimise subsidence over pipeline trenches |
    - dune profiles at pipeline crossings have been restored and are consistent with surrounding profiles to the greatest extent practicable |
  - If potential impacts are identified in the course of undertaking an activity, the following may be considered: |
    - Justification – No activity that causes impacts shall be undertaken unless that activity is necessary (e.g. no environmental impact that would compromise safety and/or result in impact to a site of cultural or heritage significance). |
    - Optimisation – The extent, impacts and potential risks associated with the disturbance and/or contamination will be kept as low as is reasonably practicable by applying applicable mitigation measures. |
    - Limitation – Areas of significance for which the risks/impacts are unacceptable (if any) will be delineated and avoided |

**Native Vegetation Act SEB**

- Work (or payment to Native Vegetation Fund) undertaken to achieve an SEB for native vegetation clearance. |
- SEB requirements fulfilled based on:
  - Applicable guidelines (DWLBC 2005), or |
  - Negotiated with DEWNR or the Native Vegetation Council where SEB calculation differs from the standard methodology in the Guidelines. |

**Water Affecting Activities**

- Operations are managed to avoid diversion of surface water flows |
- Sensitive land systems (e.g. wetlands) are avoided where practicable |
- Potential water affecting activities undertaken in accordance with government regulations and permitting conditions. |
- New permanent ponds are constructed in accordance with applicable standards and guidelines including SA EPA Wastewater Lagoon Guidelines.
### Environmental Objectives

#### Loss of Containment

- Following an escape of petroleum, processed substance, chemical or fuel outside an area designed to contain it, an initial assessment will be undertaken to determine the nature and extent of the escape and identify environmental risks in a timely manner.
- An escape of petroleum, processed substance, chemical or fuel that cannot be immediately contained or remediated will be assessed and managed in accordance with the requirements of the National Environment Protection (Assessment of Site Contamination) Measure 1999, amended 2013 (NEPM), and where required, remediated in line with relevant guidelines.
- No impact to rare, vulnerable or endangered flora and/or fauna, or important vegetation (as defined under Table A3) due to an escape of petroleum, processed substance, chemical or fuel.
- No phase-separated hydrocarbons visible on water surface in freeform or final-stage evaporation pond.

#### Waste Management

- Waste managed and contained on site, transported and disposed of in accordance with EPA Licence requirements.

#### Guide to How Objectives Can Be Achieved

**Loss of Containment**

- Pipelines are designed, constructed, operated, inspected, maintained and decommissioned in accordance with applicable industry and company standards such as AS2885 and pipeline-specific Integrity Management Plans.
- Engineered facilities are designed, constructed, operated, inspected, maintained and decommissioned in accordance with applicable regulatory and company standards, such as AS 1210-2010,
- Fuel, oil and chemicals are stored, handled and transported in accordance with applicable standards and guidelines e.g. Australian Standard AS 1940, Australian Dangerous Goods (ADG) Code, EPA guidelines 080/12 Bundling and Spill Management.
- Incidents resulting in loss of containment are immediately reported to the relevant Santos Supervisor and clean up actions initiated.
- In the event of an environmental incident (e.g. loss of containment), the EHSMS requirements that will be implemented include:
  - Follow existing emergency response procedures (secure site, make site safe)
  - Implement response actions to contain/control the release (remove fluids, where possible)
  - Complete a preliminary environmental assessment (PEA), including:
    - Identification of presence and proximity to sensitive receptors in the affected area, such as surface water bodies, flora and fauna, etc.
    - Desktop groundwater assessment (approximate depth and quality, if known)
    - Livestock presence (and possible access)
    - Nearby buildings and infrastructure
    - Areas of cultural and heritage significance
    - Other stakeholders that may be affected/notable sources of risk
- Assessment of releases that cannot be immediately contained and remediated is to be undertaken in accordance with the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM)
- Records of loss of containment events and corrective actions are maintained in accordance with Santos’ EHSMS.
- Incident investigations conducted by Santos are in line with industry best practice and compliant with the requirements of the Regulations, where required, including identification of root cause and identification/implementation of preventative actions to drive continuous improvement.

**Waste Management**

- Waste streams are segregated on site (where appropriate) to maximise opportunities for waste recovery, reuse and recycling.
- Waste management to be undertaken with regard to the key elements of the Environment Protection (Waste to Resources) Policy (EP (Waste) Policy) for waste produced and disposed of within the licence area and in compliance with the EPA (Waste) Policy if transported and disposed of outside of the licence area.
- Waste transported outside of the licence undertaken by an EPA licenced transport company and relevant waste transport certificates obtained.
- PFW is managed in accordance with company standards and reused where practicable.
- Soil bioremediation and sludge processing facilities are managed in accordance with EPA Licence requirements and company standards.
- Management of impacted soils is undertaken in accordance with EPA licence requirements.

3. No introduction of new species of weed, pathogen or pests (fungal and insect) and prevent the spread of existing species, as necessary.

- Where pest plants and animals are identified in operational areas, and the presence and abundance is not consistent with pre-existing conditions and/or surrounding land, a management plan is implemented as soon as reasonably practicable.
- Declared plants/animals are reported and managed in accordance with applicable regulations.
- Where a significant (-2) or minor (-1) shortfall with the GAS criteria for Borrow Pit Management (Vegetation) is identified, a management strategy will be implemented as soon as practicable, which will include remedial actions, to meet the GAS Expected Goal (0) or Goal Exceeded (+2).
- Activities with the potential to result in the spread of pest plants and animals will be undertaken with controls proven to be effective at limiting the introduction and spread of pest species, including the washing of vehicles and/or equipment prior to entering/leaving particular activity areas and areas of known weed infestation.
- Where the introduction of pest plants and animals is identified through field surveys, remediation and/or rehabilitation activities will be undertaken (e.g. weed spraying or animal baiting).
- Where pest plants and animals are identified a Pest Plant and Animal Management Plan (PPAMP) will be developed (and implemented) and should consider the following:
  - Site survey.
  - Risk of pest(s).
  - Prioritised pest species control.
  - Targets and actions to manage pests.
  - Potential control methods.
  - Schedule for actions.
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</table>
| 4. Avoid adverse impacts to surface water and groundwater quality and minimise impacts to third party users. | **Producing, Injection and Inactive Wells**  
- No uncontrolled flow to surface.  
  
**Surface Water and Groundwater Quality and Use**  
- No unauthorised discharge or escape of any liquid (including wastewater, petroleum, processed substance, chemical or fuel) or solid wastes to surface and/or groundwater.  
- No reduction in the capacity of third-party surface water or groundwater users to undertake their respective activities, as a result of regulated activities.  
- No unauthorised extraction of water (or other liquids) from waterways. | **Producing, Injection and Inactive Wells**  
- Monitoring programs implemented (e.g. through well logs, pressure measurements, casing integrity measurements and corrosion monitoring programs) to assess condition of well casing and instigate repairs or maintenance, as required.  
- Well casing annulus pressures are monitored (integrity testing of well casing).  
- Where integrity monitoring identifies potential issues, a risk assessment to evaluate safety and environmental impacts is undertaken to develop and implement prevention and mitigation controls where appropriate.  
  
**Surface Water**  
- See Objective 2 – Water Affecting Activities.  
- The assessment and remediation of discharge to waters will be undertaken in accordance with the NEPM.  
  
**Groundwater Use**  
- Extraction from existing groundwater bores undertaken in accordance with government regulations and permitting conditions.  
- Moomba Plant water usage is monitored, reviewed and management strategies implemented to maximise efficiencies.  
- Options for recycling and reuse of water resources are investigated and implemented where feasible.  
- The use of Satellite Facility pond water is preferential to groundwater bores. Where use of Satellite Facility pond water is not possible due to quality or logistical constraints, use of existing groundwater bores may be considered.  
- Potential impacts to existing groundwater bores is evaluated where new groundwater bores are proposed. Where potential impacts are identified, measures are taken to avoid impacts to stakeholders.  
- Proposed groundwater bores proximal to surface water systems or ecosystems that are baseflow dependant are excluded where risk is apparent.  
- New groundwater bores are to be constructed, managed and decommissioned in accordance with the Minimum Construction Requirements for Water Bores in Australia, Edition 3 - February 2012.  
- New permanent ponds are constructed in accordance with applicable standards and guidelines including SA EPA Wastewater Lagoon Guidelines.  
  
**Cooper Creek Water Extraction**  
- Internal authorisation for extraction from the Cooper Creek must consider the following:  
  - Alternative water sources within an economically viable haulage distance  
  - The total volume of water required  
  - Impacts to existing and/or future downstream users and mitigation of potential impacts  
- Water should not be extracted from permanent water refuges (e.g. Cullyamurra). Maps of approved surface water extraction points at Innamincka, Kudrieke and Mitchie Crossings are provided in Appendix B.  
- Cumulative extraction volume to be capped at 15 ML per year.  
- Any approved extraction occurs where water flow at Cullyamurra is >= 2.15m (>0.1m flow at Innamincka Causeway) and rising  
- Cumulative extraction volumes to be recorded in a monitoring database and included in annual regulatory reporting.  
  
**Enhanced Oil Recovery**  
- Enhanced oil recovery schemes are undertaken in accordance with applicable regulatory requirements.  
- Fluid compatibility testing undertaken where appropriate during EOR activities.  
- See Objective 2 - Loss of Containment.
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<tr>
<td><strong>5. Avoid damage, disturbance or interference to sites, objects or remains of Aboriginal and/or non-Aboriginal heritage.</strong></td>
<td></td>
<td><strong>Systems are in place to avoid harm to identified sites of cultural and heritage significance including ongoing consultation with relevant Aboriginal heritage organisation, Native Title group or Heritage Department (DEWNR).</strong></td>
</tr>
<tr>
<td>Aboriginal heritage surveys undertaken and sites are identified.</td>
<td></td>
<td>Processes are in place to meet requirements of legislation and agreements with native title claimant groups with respect to protection and reporting of discovery of unknown heritage sites during disturbance and production and processing operations.</td>
</tr>
<tr>
<td>Avoid damage, disturbance or interference to Aboriginal sites, objects or remains (&quot;Aboriginal Heritage&quot;) as required by the Aboriginal Heritage Act 1988 (SA) (&quot;AHA&quot;).</td>
<td></td>
<td>Aboriginal heritage surveys and/or assessments are conducted in collaboration with the relevant Native Title group prior to conducting regulated activities, in accordance with Santos’ ESHMS.</td>
</tr>
<tr>
<td>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. (&quot;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.)</td>
<td></td>
<td>Cultural heritage training provided is appropriate to the level of access required (e.g. additional training for first disturbance or authorised off-road / off-lease activities).</td>
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<tr>
<td>Avoid damage/disturbance to non-aboriginal heritage sites where practicable.</td>
<td></td>
<td>Systems are in place to avoid damage, disturbance or interference to Aboriginal heritage, for example the conduct of cultural heritage surveys and desk-top assessments of sites present through a search of the DSD-AAR sites register.</td>
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<tr>
<td>0, +1 or +2 GAS criteria are attained under construction of borrow pits to protect sites of natural, scientific or heritage significance.</td>
<td></td>
<td>Processes are in place to meet the requirements of the Aboriginal Heritage Act and agreements with respect to protection and reporting of discovery of Aboriginal heritage during disturbance, and production and processing operations.</td>
</tr>
<tr>
<td><strong>6. Maintain stakeholder relationships and minimise disturbance to landowners and/or associated infrastructure.</strong></td>
<td></td>
<td><strong>Landholders are consulted where activities may affect pastoral (or other) operations, including but not limited to the installation of new pipelines or Satellite Facilities, use and/or modification of fences, gates, cattle grids, the location and management of excavation activities, and the like, in order to avoid or minimise disruption to pastoral activities and address livestock and native fauna safety, property certification conditions and other concerns as applicable.</strong></td>
</tr>
<tr>
<td>No imminent risk of prejudice to security of natural gas supply as a result of failure to identify or maintain a physical or procedural barrier, so far as is reasonably practicable.</td>
<td></td>
<td>Consideration of pastoral and/or other business reputation when undertaking production and processing operations.</td>
</tr>
<tr>
<td>On-going fitness-for-purpose of facilities, plant, equipment, machinery or other infrastructure, and management systems, is assessed to ensure security of supply of natural gas.</td>
<td></td>
<td>Temporary facilities are constructed, fenced (where required) and managed in accordance with applicable regulatory and company standards of the day.</td>
</tr>
<tr>
<td>No unresolved reasonable stakeholder complaints.</td>
<td></td>
<td>Relevant owners of land are notified prior to the conduct of authorised activities in accordance with the Petroleum and Geothermal Energy Act 2000, as may be amended from time to time.</td>
</tr>
<tr>
<td>No disruption to landholder activities as a result of regulated activities unless by prior arrangement.</td>
<td></td>
<td>Local community projects and events are sponsored and supported where applicable.</td>
</tr>
<tr>
<td>Where disturbance is unavoidable or accidental, infrastructure or land use is restored to the satisfaction of the landholder, or as otherwise agreed.</td>
<td></td>
<td>Santos membership of applicable regional land management committees and boards.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processes in place for inductions of employees and contractors personnel with respect to road use and driver behaviour, conservation, tourism and landholders, including use of gates and infrastructure.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In recognised conservation reserves (e.g. Innamincka Regional Reserve) excavations are left in a state as agreed with the responsible statutory body (e.g. DEWNR).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ongoing communication with applicable traditional groups and opportunities to achieve direct and indirect benefits through operations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Processes in place to ensure security of supply in the case of short and unforeseen interruption events.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pipeline/Facility repaired in a timeframe that represents good industry practice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emergency response procedures are effectively implemented in the event of an emergency to reinstate gas supply in a timeframe consistent with good industry practice, as assessed by post incident debrief.</td>
</tr>
</tbody>
</table>

**Surface Water / Groundwater Use**

- See Objective 2 - Waterways
- See Objective 4 - Surface Water and Groundwater Quality and Use
Environmental Objectives | Assessment Criteria | Guide to How Objectives Can Be Achieved
--- | --- | ---
7. Rehabilitate land affected by regulated activities to agreed standards. | During decommissioning or rehabilitation activities the following applies:  
- Where a significant (-2) or minor (-1) shortfall with the Gas Criteria for Rehabilitation of Borrow Pits (Soil, Vegetation, Water Retention, Visual Impacts, Clean and Tidy) is identified, a management strategy will be implemented as soon as practicable, which will include remedial actions, to meet the GAS Expected Goal (0) or Goal Exceeded (+1 or +2).  
- Where a significant (-2) or minor (-1) shortfall with the GAS criteria for Assessing the Rehabilitation of Decommissioned Facilities is identified, a management strategy will be implemented as soon as practicable, which will include remedial actions, to meet the GAS Expected Goal (0) or Goal Exceeded (+1 or +2).  
- Redundant surface plant, equipment and/or ancillary infrastructure to be removed from site and associated area reinstated and rehabilitated.  
- No evidence of waste, redundant equipment/infrastructure or signs and markers on pipeline right of way  
- Reinstatement and rehabilitation is progressively undertaken, where appropriate.  
- Rehabilitation undertaken to the satisfaction of GAS Criteria unless agreement in place with landholder.  
Note: Contaminated sites rehabilitated in accordance with Objective 2. | Decommissioning/Rehabilitation  
- Construction and operational activities that result in disturbance to land and/or drainage channels, or contamination of soil, surface water or groundwater, either by their nature (e.g. authorised land clearance) or through abnormal or emergency events (e.g. loss of containment) will be remediated and/or rehabilitated (if required) to ensure that activities associated with the identified end land use will not be negatively impacted.  
- Where possible and subject to operational schedules, progressive rehabilitation of disturbed sites will be undertaken.  
- Redundant plant and equipment, and associated infrastructure, is considered for reuse, recycling or disposal in accordance with applicable regulations.  
- Areas where plant and equipment have been decommissioned and removed, the site will be reinstated and rehabilitated.  
- In assessing, and subsequently mitigating, the potential for impact and the success of rehabilitation activities, consideration will be given to the GAS criteria. A GAS criteria outcome of -2 or -1 will trigger the requirement to undertake an assessment to qualify what is the potential long-term and/or post activity impacts to sensitive environmental receptors. Where the assessment identifies that the long-term health of sensitive environmental receptors and/or post activity use of land may be compromised remedial works will be undertaken to meet the Expected Gas Goal (0).  
- Site-specific decommissioning and rehabilitation plans will be developed, as required, in accordance Santos’ EHSMS.  
Systems  
- During, or following the completion of an activity, an audit may be undertaken to assess compliance against the internal authorisation in accordance with company standards and external compliance requirements.
3. Reporting

Regulation 12(2) requires an SEO to identify events which could arise from the relevant regulated activities and (if not properly managed or avoided) that could cause a serious incident or a reportable incident within the meaning of Section 85 of the Act.

3.1. Definitions

The following descriptions have been provided to help clarify and elaborate on the definitions given in Section 85(1) of the Act and Regulation 32(1).

**Serious Incidents**

Section 85(1) of the Act defines a ‘serious incident’ as an incident in which:

(a) a person is seriously injured or killed
(b) an imminent risk to public health or safety arises
(c) serious environmental damage occurs or an imminent risk of serious environmental damage arises
(d) security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises
(e) some other event or circumstance occurs or arises that results in the incident falling within a classification of serious incidents under the regulations or a relevant statement of environmental objectives.

**Reportable Incidents**

Section 85(1) of the Act defines reportable incidents as incidents (other than a serious incident) arising from activities conducted under a licence that are classified under the Regulations as a reportable incident. Regulation 32(1) classifies the following as reportable incidents:

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

Pursuant to Regulation 12(2) and Regulation 32(1)(b), the following events could arise from the relevant regulated activities and (if not properly managed or avoided) cause a reportable incident within the meaning of section 85 of the Act:

- a reasonable complaint from a stakeholder as a result of operations
- unauthorised third party access to facilities
- malfunction or failure of critical plant or equipment that had (or still has) potential to cause a serious incident.

Table 2 expands on section (85)(1)(e) of the Act and Regulation (32)(1)(b) for which Santos, in conjunction with DSD has developed the following set of incident definitions relative to operations. These definitions are intended to provide consistency for Licenccie reporting.

*Loss of containment events with the potential to impact waters and/or undisturbed or restored land, will be notified to the Petroleum Regulator as soon as reasonably practicable, with the results of any assessment or investigation used to determine the correct classification of the incident (Serious or Reportable) being made available to the regulator as appropriate.

---

1 As per the definition in Section 36 of the Work Health and Safety Act 2012.
2 That is, after taking into account relevant factors on a day and rights and obligations under contracts, a significant curtailment of firm service that detrimentally impacts or is likely to impact upon the security of electricity supply to South Australia or to gas supplies to a significant number of commercial and/or domestic gas users in SA
3 In gaseous, liquid or solid state, as per Petroleum and Geothermal Energy Act definition
Table 2: Incident definitions for Santos’ Cooper Basin activities

<table>
<thead>
<tr>
<th>Serious Incidents</th>
<th>Reportable Incidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. A person is seriously injured(^6) or killed.</td>
<td>1. An escape of petroleum(^{11}), processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape(^{12}) (other than a serious incident).</td>
</tr>
<tr>
<td>2. An imminent risk to public health or safety arises.</td>
<td>2. An event that has the potential to compromise the physical integrity of an asset or facility. For example:</td>
</tr>
<tr>
<td>3. Serious environmental damage occurs or an imminent risk of serious environmental damage arises. Examples that may result in serious environmental damage include:</td>
<td>a) Activity on a pipeline easement that has been identified(^{10}) as exceeding the pipeline’s penetration resistance, determined in accordance with Australian Standard (AS) 2885.</td>
</tr>
<tr>
<td>a) Disturbance to sites of cultural or heritage significance without appropriate permits and approvals(^5).</td>
<td>b) Identification of through-wall defect on a pipeline (^{11}) or plant component (other than a serious incident).</td>
</tr>
<tr>
<td>b) An escape of petroleum, process substance, a chemical or a fuel to a water body, or to land in a place where it is reasonably likely to enter a water body by seepage or infiltration, or onto land that affects the health of native flora or fauna species.</td>
<td>c) Identification(^{14}) of a partial through-wall defect (e.g. through visual inspection, inline inspection, non-destructive testing) that requires repair or replacement action, or a reduction of the Maximum Allowable Operating Pressure, to maintain safe operation (other than a serious incident).</td>
</tr>
<tr>
<td>c) Detection of a declared weed, animal/plant pathogen or plant pest species that has been introduced or spread as a direct result of activities.</td>
<td>d) Activity on a pipeline easement with equipment or vehicles that have been identified(^{10}) as exceeding allowable stress limits, determined in accordance with AS 2885.</td>
</tr>
<tr>
<td>d) Removal of rare, vulnerable or endangered flora and fauna without applicable permits and approvals.(^5).</td>
<td>e) An unapproved(^{15}) excursion outside of critical design or operating conditions/parameters.</td>
</tr>
<tr>
<td>4. Security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises(^7).</td>
<td>f) Failure of a critical procedural control in place to reduce a credible threat to low or as low as reasonably practicable (ALARP)(^{16}).</td>
</tr>
<tr>
<td>5. An event that results in a rupture of a pressure containing asset or facility.</td>
<td>3. Unauthorised activity on a pipeline easement where the pipeline is contacted but repair action is not required.</td>
</tr>
<tr>
<td>6. A regulated activity(^8) being undertaken in a manner that involved or will involve a serious risk to the health or safety of a person emanating from an immediate or imminent exposure to a hazard(^9).</td>
<td>4. Malfunction or failure of critical plant or equipment that had (or still has) potential to cause a serious incident.</td>
</tr>
<tr>
<td>7. Activity on a pipeline easement where the pipeline is contacted and repair action is required(^{10}).</td>
<td></td>
</tr>
<tr>
<td>8. An uncontrolled gas release resulting in the activation of emergency response and/or evacuation procedures of an area in or adjacent to the release, and/or fire or explosion.</td>
<td></td>
</tr>
</tbody>
</table>

\(^{4}\) As per the definition in Section 36 of the Work Health and Safety Act 2012.

\(^{5}\) Pursuant to Aboriginal Heritage Act 1988 and Heritage Places Act 1993.

\(^{6}\) Pursuant to Native Vegetation Act 1991 (flora) and National Parks and Wildlife Act 1972 (fauna).

\(^{7}\) That is, after taking into account relevant factors on a day and rights and obligations under contracts, a significant curtailment of firm service that detrimentally impacts or is likely to impact upon the security of electricity supply to South Australia or to gas supplies to a significant number of commercial and/or domestic gas users in SA.

\(^{8}\) Regulated activity as defined in Section 10 of the Petroleum and Geothermal Energy Act 2000.

\(^{9}\) Resulting in the issuing of a prohibition notice by SafeWork SA pursuant to Section 195 the Work Health and Safety Act 2012.

\(^{10}\) For the case where a detailed assessment is required to determine this, DSD recommends the incident be reported initially and amended at a later date if required.

\(^{11}\) In gaseous, liquid or solid state, as per Petroleum and Geothermal Energy Act 2000 definition.

\(^{12}\) An area assigned during a Hazard and Operability Process (HAZOP) study as a hazardous area for the purpose of gas venting, and designed as such, is considered to be an area specifically designed to contain a gas escape.

\(^{13}\) As per Petroleum and Geothermal Energy Act 2000 definition, the term ‘pipeline’ includes tanks, machinery and equipment necessary for, or associated with, operation of the pipeline.

\(^{14}\) For reporting purposes, the incident is considered to have occurred at the time that a decision is made to repair or replace the defect, or reduce the Maximum Allowable Operating Pressure.

\(^{15}\) “Approval” as per AS2885 definition. Note that there may be situations where excursions are allowable under AS2885.

\(^{16}\) As per the Safety Management System process articulated in AS2885. 1-212, or similar risk assessment process.
3.2. Reporting Requirements

*Serious Incidents* must be reported to the Minister as soon as practicable after the occurrence, as per Section 85 of the Act and Regulation 32.

*Reportable Incidents* must be reported to DSD on a quarterly basis within 1 month of the end of the quarter, as per Regulation 32.

3.3. Reporting to EPA

Where applicable, incidents causing or threatening serious or material environmental harm under the *Environment Protection Act 1993* must be reported to the EPA in accordance with section 83 or 83A of the *Environment Protection Act 1993*.

The reporting obligation under the *Environment Protection Act 1993* does not apply to

a) petroleum exploration activity undertaken under the *Petroleum and Geothermal Energy Act 2000* or the *Petroleum (Submerged Lands) Act 1982*;

b) wastes produced in the course of an activity (not being a prescribed activity of environmental significance) authorised by a lease or licence under the *Mining Act 1971*, the *Petroleum Act 2000* or the *Roxby Downs (Indenture Ratification) Act 1982* when produced and disposed of to land and contained within the area of the lease or licence.
## List of Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AHA</td>
<td>Aboriginal Heritage Act 1988 (SA)</td>
</tr>
<tr>
<td>AS</td>
<td>Australian Standards</td>
</tr>
<tr>
<td>DEWNR</td>
<td>Department for Environment, Water and Natural Resources (South Australia)</td>
</tr>
<tr>
<td>DMITRE</td>
<td>Department of Manufacturing, Innovation, Trade, Resources and Energy (now DSD)</td>
</tr>
<tr>
<td>DSD</td>
<td>Department for State Development (South Australia)</td>
</tr>
<tr>
<td>EIR</td>
<td>Environmental Impact Report</td>
</tr>
<tr>
<td>EHSMS</td>
<td>Environment, Health and Safety Management System</td>
</tr>
<tr>
<td>EOR</td>
<td>Enhanced Oil Recovery</td>
</tr>
<tr>
<td>EPA</td>
<td>Environment Protection Authority (South Australia)</td>
</tr>
<tr>
<td>ERP</td>
<td>Emergency Response Plan</td>
</tr>
<tr>
<td>GAS</td>
<td>Goal Attainment Scaling</td>
</tr>
<tr>
<td>MOC</td>
<td>Management of Change</td>
</tr>
<tr>
<td>NEPM</td>
<td>National Environment Protection Measure</td>
</tr>
<tr>
<td>NRM</td>
<td>Natural Resources Management</td>
</tr>
<tr>
<td>PEL</td>
<td>Petroleum Exploration Licence</td>
</tr>
<tr>
<td>PIRSA</td>
<td>Primary Industries and Regions South Australia</td>
</tr>
<tr>
<td>PFW</td>
<td>produced formation water</td>
</tr>
<tr>
<td>PPE</td>
<td>personal protective equipment</td>
</tr>
<tr>
<td>PPAMP</td>
<td>Pest Plants and Animals Management Plan</td>
</tr>
<tr>
<td>PPL</td>
<td>Petroleum Production Licence</td>
</tr>
<tr>
<td>ROW</td>
<td>right of way</td>
</tr>
<tr>
<td>SACB</td>
<td>South Australia Cooper Basin</td>
</tr>
<tr>
<td>SEB</td>
<td>Significant Environmental Benefit</td>
</tr>
<tr>
<td>SEO</td>
<td>Statement of Environmental Objectives</td>
</tr>
</tbody>
</table>
References


APPENDIX A

Goal Attainment Scaling (GAS) Criteria
### Table A1: GAS Criteria for Assessing the Rehabilitation of Decommissioned Facilities

<table>
<thead>
<tr>
<th>Goal</th>
<th>Goal Exceeded +2</th>
<th>Goal Exceeded +1</th>
<th>Goal Attained 0</th>
<th>Minor Shortfall -1</th>
<th>Significant Shortfall -2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise visual impacts</td>
<td>Access tracks</td>
<td>The track contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable.</td>
<td>The track contours and colour blend with the surroundings and the earthwork disturbance is beginning to blend also.</td>
<td>The track contours blend with the surroundings; but the earthwork disturbance is still prominent (e.g. ripping, rolling or respreading of original material).</td>
<td>The track is prominent because of a scraped surface, windrows along its edges or gully erosion.</td>
</tr>
</tbody>
</table>

| Interdune and floodplains | | | | | |
| The site contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable. | The site contours and colour blend with the surroundings and the earthwork disturbance is beginning to blend also. | The site contours blend with the surroundings; but the earthwork disturbance is still prominent (e.g. ripping, rolling or respreading of original material). | The site surface and edge have been contoured into the surrounding landscape; but the colour of foreign material contrasts with the surroundings. | The site remains as a prominent consolidated surface with a distinct edge. No evidence of rehabilitation works. |

<p>| Dunefields | | | | | |
| The edge and colour of the site blend with the surroundings. The site contours are indistinguishable whether viewed from the top or base of the dune. | The edge and colour of the site blend with the surroundings. The site contours are visible only when viewed from the top of the dune; they cannot be seen from the base. There are no erosion gullies down the face of the dune. | The site contours blend with the surroundings; but the earthwork disturbance is still prominent (e.g. ripping, rolling or respreading of original material). Erosion gullies are present down the face of the dune, but they are not extensive or prominent. | The site has been restored into the natural contour of the dune; but the colour of foreign material contrasts with the surroundings. | Extensive gully erosion down the face of the dune and/or a steep site edge is prominent. |</p>
<table>
<thead>
<tr>
<th>Goal</th>
<th>Goal Exceeded +2</th>
<th>Goal Exceeded +1</th>
<th>Goal Attained 0</th>
<th>Minor Shortfall -1</th>
<th>Significant Shortfall -2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Gibber plain and tableland</td>
<td>Site is indistinguishable from the surrounds.</td>
<td>Site matches adjacent contours and the gibber is uniformly spread with no imported material evident.</td>
<td>Site matches adjacent contours with some imported material still evident within gibber spread.</td>
<td>Site matches adjacent colours, but is visible due to inconsistent spreading of the gibber and some bare areas. Site is poorly formed and predominantly bare due to incomplete spreading or loss of the gibber.</td>
</tr>
<tr>
<td></td>
<td>The revegetation of indigenous species*</td>
<td>Assessment of likely success of rehabilitation</td>
<td>Less than five years since decommissioning*</td>
<td>The revegetation is extensive and mostly consists of annuals and biennials; perennials are beginning to establish which is consistent with the surroundings.</td>
<td>The revegetation is extensive and consists of annuals and biennials; in contrast to the surroundings there are no perennials.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Revegetation with non-indigenous species.</td>
<td>Revegetation is not evident.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No attempt has been made to restore the site.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least five years since decommissioning*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The revegetation type, density and maturity is indistinguishable from the surroundings.</td>
<td></td>
<td>Revegetation has occurred and is mostly consistent with surroundings.</td>
<td>Vegetation is not consistent with surrounds</td>
<td>There is no revegetation.</td>
</tr>
</tbody>
</table>

These criteria are consistent with PIRSA (2009) *Field Guide for the Environmental Assessment of Abandoned Petroleum Wellsites.*

*Note: Assessment will take into account that revegetation is a time- and rainfall-dependent process.*
## Table A2: GAS Criteria for Assessing Borrow Pit Construction, Management and Rehabilitation

<table>
<thead>
<tr>
<th>Goals</th>
<th>Goal Exceeded +2</th>
<th>Goal Exceeded +1</th>
<th>Goal Attained 0</th>
<th>Minor Shortfall -1</th>
<th>Significant Shortfall -2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONSTRUCTION</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimise impacts on soil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pit sited and designed to minimise erosion and facilitate rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gibber plain and tableland</td>
<td>Pit located on flat terrain</td>
<td>Pit located on low sloping terrain but constructed with erosion control measures evident (e.g. contour banks or bunds above the batter slope)</td>
<td>Pit located on low sloping terrain and constructed with no erosion control measures evident</td>
<td>Pit located on low sloping terrain and constructed with no erosion control measures evident</td>
<td>Pit located on sloping terrain or: Pit located in any terrain where gibber mantle around pit removed and/or wind rows on tracks</td>
</tr>
<tr>
<td>-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pit located on flat terrain</td>
<td>Pit located on low sloping terrain</td>
<td>Pit located on low sloping terrain</td>
<td>Pit located on high sloping terrain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td></td>
<td>Pit located on low sloping terrain</td>
<td>Pit located on moderate sloping terrain and constructed with no erosion control measures evident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dunefields</td>
<td>Pit located on flat terrain</td>
<td>Pit located on low sloping terrain</td>
<td>Pit located on moderate sloping terrain and constructed with no erosion control measures evident</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Pit located on flat terrain</td>
<td>Pit located on low sloping terrain</td>
<td>Pit located on high sloping terrain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floodplain</td>
<td>Pit located a suitable distance away from any creek channel, waterhole, terrace or levee so as not likely to cause erosion or flow impediment</td>
<td>Pit located within a distance from any creek channel, waterhole, terrace or levee that is potentially likely to cause erosion or flow impediment</td>
<td>Pit located within a distance form any creek channel, waterhole, terrace or levee that is likely cause erosion or flow impediment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>Pit located a suitable distance away from any creek channel, waterhole, terrace or levee so as not likely to cause erosion or flow impediment</td>
<td>Pit located within a distance from any creek channel, waterhole, terrace or levee that is potentially likely to cause erosion or flow impediment</td>
<td>Pit located within a distance form any creek channel, waterhole, terrace or levee that is likely cause erosion or flow impediment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Goal Exceeded</td>
<td>Goal Exceeded</td>
<td>Goal Attained</td>
<td>Minor Shortfall</td>
<td>Significant Shortfall</td>
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<td>----------------------------------------------------------------------</td>
<td>---------------</td>
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<td>---------------</td>
<td>-----------------</td>
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</tr>
<tr>
<td>Minimise impacts on vegetation</td>
<td>+2</td>
<td>+1</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>Perennial vegetation clearance minimised</td>
<td>Pit located in bare (including previously disturbed) area – no clearance required</td>
<td>No trees or shrubs removed</td>
<td>Trees or shrubs removed where clearance could not have been avoided</td>
<td>Medium trees or shrubs (between 15 and 30cm diameter) removed where clearance could have been avoided</td>
<td>Large trees (over 30 cm diameter) removed and/or Trees or shrubs with hollows removed</td>
</tr>
<tr>
<td>Topsoils and seed source retained</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Protect sites of natural, scientific or heritage significance</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Avoid sites</td>
<td>Heritage surveys undertaken, significant sites identified, flagged, recorded and avoided</td>
<td>Heritage surveys undertaken, significant sites avoided</td>
<td>Heritage surveys not undertaken Or; significant sites disturbed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimise visual impacts – public roads (e.g. Strzelecki Tracks, Della Rd, Dillon’s Hwy, Cordillo Rd, Walkers Crossing, 15 Mile Track, Merty – Cameron Cnr, etc.)</td>
<td>Pit not visible from public road</td>
<td>Pit not clearly visible from public road due to some screening by vegetation or other landform</td>
<td>Pit more than 50m from public road</td>
<td>Pit less than 50m from public road</td>
<td>Pit less than 20m from public road</td>
</tr>
<tr>
<td>Goals</td>
<td>Goal Exceeded</td>
<td>Goal Exceeded</td>
<td>Goal Attained</td>
<td>Minor Shortfall</td>
<td>Significant Shortfall</td>
</tr>
<tr>
<td>-------</td>
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<td>---------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
</tbody>
</table>

**MANAGEMENT**

**Minimise water retention in pit**

| Minimal or no water retention in pit footprint | No evidence of water retention | - | Minor retention - pit retains water for less than 1 month following rainfall event or drawdown of floodwaters (as a guide - max. water depth up to 0.2 metres) Or; Water retention in pit consistent with surrounding land | Pit retains water for up to 3 months following rainfall event or drawdown of floodwaters (as a guide - max. water depth < 1 metre)* And; Water retention in pit inconsistent with surrounding land | Pit holds water for more than 3 months following rainfall event or drawdown of floodwaters (as a guide - max water depth > 1.0 metre)* And; Water retention in pit inconsistent with surrounding land |

**Minimise impacts on soil**

**Minimise soil erosion**

<table>
<thead>
<tr>
<th>Gibber plain and tableland</th>
<th>Gibber layer in situ (apart from pit base and sides)</th>
<th>-</th>
<th>Gibber layer in situ Run-off controlled (e.g. contour banks or bunds above the batter slope) Localised minor erosion (typically pit sides)*</th>
<th>Gibber layer disturbed or removed in areas Run-off uncontrolled Minor gullying around pit and/or access tracks*</th>
<th>Widespread disturbance of gibber layer Run-off uncontrolled Moderate to severe gullying around pit and/or access tracks*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pit footprint soil surfaces stable</td>
<td>No accelerated erosion on pit footprint</td>
<td>-</td>
<td>Run-off controlled (e.g. contour banks or bunds above the batter slope) Localised minor erosion (typically pit sides)*</td>
<td>Areas of pit footprint unstable with some uncontrolled runoff Moderate erosion*</td>
<td>Uncontrolled run-off Large areas of pit footprint unstable Active severe erosion*</td>
</tr>
</tbody>
</table>

**Other land units**

| Soil surfaces stable | - | Run-off controlled (e.g. contour banks or bunds above the batter slope) Minor erosion of pit sides or up-slope from pit* | Areas of pit footprint unstable with some uncontrolled runoff Moderate erosion* | Uncontrolled run-off Large areas of pit footprint unstable Active severe erosion* |
### South Australia Cooper Basin

#### Production and Processing Operations

#### 2016 Statement of Environmental Objectives

<table>
<thead>
<tr>
<th>Goals</th>
<th>Goal Exceeded</th>
<th>Goal Exceeded</th>
<th>Goal Attained</th>
<th>Minor Shortfall</th>
<th>Significant Shortfall</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+2</td>
<td>+1</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
</tbody>
</table>

#### Minimise impacts on vegetation

<table>
<thead>
<tr>
<th></th>
<th>No weed** infestations on pit footprint</th>
<th>-</th>
<th>Presence of weeds** on pit footprint consistent with pre-disturbance conditions and adjacent land</th>
<th>Weeds** present on pit footprint which is inconsistent with pre-disturbance conditions and adjacent land</th>
<th>Declared weeds*** present on pit footprint which is inconsistent with pre-disturbance conditions and adjacent land</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No weeds** on pit footprint</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### REHABILITATION

**Minimise water retention in pit**

<table>
<thead>
<tr>
<th>Predictive</th>
<th>Minimal or no water retention in pit footprint</th>
<th>-</th>
<th>Measures to minimise water retention implemented (e.g. upslope runoff diverted by contour banks or bunds, rip base, etc.)</th>
<th>-</th>
<th>No measures to minimise water retention evident</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimal or no water retention in pit footprint</td>
<td>-</td>
<td>Minor retention - pit retains water for less than 1 month following rainfall event or drawdown of floodwaters (as a guide - max. water depth up to 0.2 metres) Or; Water retention in pit consistent with surrounding land</td>
<td>Pit retains water for up to 3 months following rainfall event or drawdown of floodwaters (as a guide - max. water depth &lt; 1 metre)* And; Water retention in pit inconsistent with surrounding land</td>
<td>Pit holds water for more than 3 months following rainfall event or drawdown of floodwaters (as a guide - max. water depth &gt; 1.0 metre)* And; Water retention in pit inconsistent with surrounding land</td>
</tr>
<tr>
<td>Ongoing</td>
<td>No evidence of water retention</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Minimal or no water retention in pit footprint</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Minimise impacts on soil

<table>
<thead>
<tr>
<th>Predictive</th>
<th>Minimal soil erosion</th>
<th>-</th>
<th>Measures to minimise erosion implemented (e.g. upslope runoff diverted by contour banks or bunds)</th>
<th>-</th>
<th>No measures to minimise erosion evident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ongoing</td>
<td>Soil surfaces stable</td>
<td>-</td>
<td>Minor erosion of pit sides or upslope from pit*</td>
<td>Moderate erosion*</td>
<td>Active severe erosion*</td>
</tr>
<tr>
<td>Minimise soil erosion</td>
<td>No accelerated erosion</td>
<td>-</td>
<td>Areas of pit footprint unstable with some uncontrolled runoff</td>
<td>Large areas of pit footprint unstable; uncontrolled run-off</td>
<td></td>
</tr>
<tr>
<td>Goals</td>
<td>Goal Exceeded</td>
<td>Goal Exceeded</td>
<td>Goal Attained</td>
<td>Minor Shortfall</td>
<td>Significant Shortfall</td>
</tr>
<tr>
<td>-------</td>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
<td>----------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>+2</td>
<td>+1</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
<td></td>
</tr>
</tbody>
</table>

**Minimise impacts on vegetation**

- **Pit footprint revegetated with indigenous species (subject to time and preceding climatic conditions)**
  - Vegetation community re-established with species and cover typical for land unit
- **Pit footprint revegetated with perennial species mix and cover levels typical for land unit**
- **Pit footprint revegetated with species mix similar to surrounding area, some bare patches still present**
- **Revegetation confined to base of pit, pit sides bare, species mix differs from surrounding area, annual species dominate**
- **No revegetation evident**

- **No weed** on pit footprint
  - No weeds** on pit footprint
- **Presence of weeds** on pit footprint consistent with pre-disturbance conditions and adjacent land
- **Weeds** present on pit footprint which is inconsistent with pre-disturbance conditions and adjacent land
- **Declared weeds** present on pit footprint which is inconsistent with pre-disturbance conditions and adjacent land

**Minimise visual impacts**

- **Borrow pit effectively contoured and ripped**
  - Pit contours indistinguishable from surrounding landscape
  - Access tracks ripped
- **Pit contours blend in with surrounding landscape, although still evident**
- **Pit sides battered and ripped along contours but pit still highly visible**
  - Topsoil and vegetative material re-spread over disturbed area
- **Pit sides battered but not ripped**
  - No re-contouring of pit has occurred – pit sides very steep
  - Topsoil and vegetative material not re-spread

**Site to be left in a clean and tidy condition**

- **Litter and other foreign materials removed**
  - -
- **No litter and other foreign materials on pit footprint or surrounds**
- **Scattered litter and/or other foreign materials on pit footprint or surrounds**
- **Litter and/or other foreign materials common on pit footprint or surrounds**


**Weeds are defined in these tables as any invasive plant that threatens native vegetation in the local area or any species recognised as invasive in South Australia.**

***Declared weeds are defined in these tables as any exotic plant species that are currently declared under the *Natural Resources Management Act 2004*.**
Note: In a case where the landholder requests a borrow pit for pastoral watering purposes, pursuant to section 111(2)(b) of the Petroleum and Geothermal Energy Act 2000, the following may be applied to facilitate transfer of ownership and liability of the borrow pit to the landholder—

111—Liability for damage caused by authorised activities

(2) If a licensee provides the Minister with a report, made by an independent expert acceptable to the Minister, containing an assessment of the risk inherent in regulated activities, and of the precautions necessary to eliminate or minimise the risk, the Minister may enter into an agreement with the licensee under which—

(b) the licensee’s liability under this section is limited or excluded.
Table A3: GAS Criteria for Assessing Produced Formation Water Facilities – Field Inspections

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Goal</th>
<th>Goal Exceeded +2</th>
<th>Goal Exceeded +1</th>
<th>Goal Attained 0</th>
<th>Minor Shortfall - 1</th>
<th>Significant Shortfall - 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise impacts to soil and important native flora and fauna</td>
<td>Minimise hydrocarbon discharge into the environment</td>
<td>No phase-separated hydrocarbons visible in either the evaporation, holding or interceptor ponds.</td>
<td>No phase-separated hydrocarbons visible in either the evaporation, holding or interceptor ponds, only some stains on the banks of the interceptor pond.</td>
<td>Phase-separated hydrocarbons visible in interceptor pits only.</td>
<td>Phase-separated hydrocarbons visible on water surface in holding pond(s).</td>
<td>Phase-separated hydrocarbons visible on water surface in freeform or final-stage evaporation pond, which is not lined and fenced.</td>
</tr>
<tr>
<td>Minimise impacts to important native flora from salinisation of soil</td>
<td>No impacts to important native flora from salinisation of soil</td>
<td>No salinisation evident.</td>
<td>Salinisation only evident within operational area.</td>
<td>No salinisation evident outside of pre-disturbed area.</td>
<td>Salinisation and seepage evident outside operational pond area and has adversely impacted native flora and fauna.</td>
<td></td>
</tr>
<tr>
<td>Minimise native vegetation clearance and impacts to fauna and/or fauna habitat</td>
<td>Minimise native vegetation clearance and impacts to fauna and/or fauna habitat removed.</td>
<td>No native flora and/or fauna habitat removed.</td>
<td>Native flora and/or fauna habitat removed in area where could not have been avoided.</td>
<td>Removal of important native vegetation (for example trees of Priority 1 in the Field Guide and/or fauna habitat in area where could have been avoided.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimise impacts to important native vegetation as a result of inundation</td>
<td>Minimise impacts to important native vegetation as a result of inundation.</td>
<td>No observed impacts to important native vegetation as a result of inundation.</td>
<td>No irreversible damage to important native vegetation.</td>
<td>Irreversible damage to important native vegetation.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimise impacts to native fauna and/or livestock</td>
<td>Satellite pond water quality acceptable for consumption by native fauna and/or livestock</td>
<td>No contaminants in satellite pond water.</td>
<td>No unacceptable risk to native flora and fauna and/or livestock as a result of satellite pond water quality</td>
<td>Impact to native flora and fauna and/or livestock as a result of satellite pond water quality</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Field guide refers to the Field Guide to the Common Plants of the Cooper Basin – South Australia and Queensland (Wiltshire and Schmidt 2003)
In the Cooper Basin, ‘important’ vegetation typically includes:

- plants of Priority 1 or 2 species as defined in the Field Guide (which predominantly include tree and larger shrub species that are long lived and/or do not regenerate readily from seed or rootstock).
- vegetation that is restricted in distribution and/or is locally important (e.g. for habitat or for land stability)
- vegetation communities identified as conservation priorities in the South Australian Arid Lands Biodiversity Strategy (DEH 2009).
- vegetation that provides important habitat for rare or threatened fauna

Whether vegetation is ‘important’ at a particular site needs to be considered in the context of the land system and the local and regional environmental setting.

Rare, vulnerable or endangered flora would also fall within the definition of ‘important vegetation’, however additional avoidance requirements are specified under Objective 2 of the SEO (i.e. necessary permits and approvals must be obtained if removal of rare, vulnerable and endangered species is unavoidable.).
Maps of Approved Cooper Creek Water Extraction Points - Innamincka, Kudrieke and Mitchie Crossings
Innamincka surface water extraction point
Mitchie and Kudrieke Crossing surface water extraction points