

STUART PETROLEUM LIMITED
STATEMENT OF ENVIRONMENTAL
OBJECTIVES
COOPER BASIN PETROLEUM PRODUCTION
OPERATIONS (GIBBER UPLANDS)

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1. INTRODUCTION

1.1 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 2000*.

The SEO has been prepared by Stuart Petroleum Ltd, as the lessee of record and operator in various licence areas within the Cooper and Eromanga Basins in South Australia (Figures 1,2). Stuart Petroleum Ltd is a public Australian Company, currently a wholly-owned subsidiary of Senex Energy Ltd.

This SEO covers the full commercial production of oil, the construction and operation of process, storage and loading facilities, and the transport of oil in upland gibber environments (gibber downs, hills and plains away from floodplain). It complements Stuart Petroleum's SEO for production in lowlands (dunefield, floodplain and sandplain) where the physical environment requires different management approaches to minimise impacts.

In the upland gibber environment, this SEO is intended to replace the current Acrasia Production SEO (Stuart Petroleum, 2003). Acrasia SEO was the first of the Production SEOs under the then new *Petroleum Act 2000* (now the *Petroleum and Geothermal Energy Act 2000*). Subsequent SEOs by other producers, building from this foundation, and the evolution of regulatory approaches to the Act have altered the regulatory environment such that a new SEO rather than an addendum or minor revision is appropriate.

There has been some delay in the development of the SEO beyond the 5-year review life applying to SEOs, stemming from delays in outcomes and acceptance of experimentation and modelling to do with production water disposal issues which are central to minimising the footprint of production in gibber.

The SEO provides the environmental objectives with which production and related activities including transportation, must conform, and the criteria upon which achievement of those objectives can be assessed, for consideration under Section 101 of the Act. A condition of approval of production activities is that Stuart Petroleum Ltd is liable for meeting the environmental objectives and assessment criteria.

Drilling for production wells is covered by the separate Statement of Environmental Objectives for drilling and well operations (Santos November 2009) applied throughout the Cooper Basin in SA.

Environmental objectives have been developed from the existing production and production testing SEOs already in force for Stuart Petroleum's licence areas and other areas, and from the information provided in the Environmental Impact Reports and the various Environmental Risks and Compliance documents listed in Appendix 1. The location of Stuart Petroleum's current production licence areas is given in Figure 1 and Figure 2.

The Petroleum and Geothermal Energy Act broadly defines the environment to include natural, social, cultural and economic aspect. The environmental objectives outlined in the SEO incorporate all of these elements.

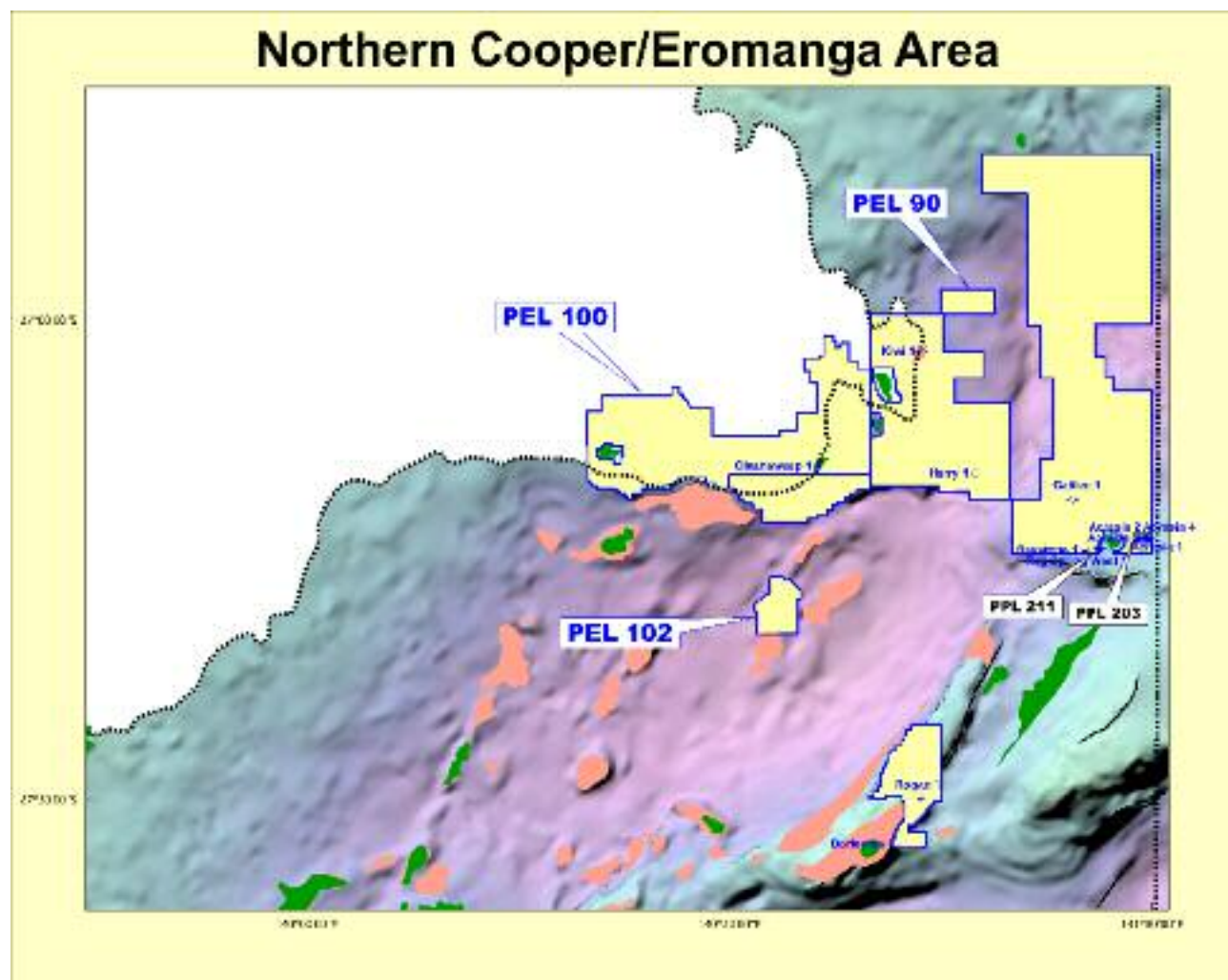


Figure 1. Stuart Petroleum northern licence areas and operations as at October 2010. The southern part of PEL90—containing the Candra Dome and production wells at Acrasia Field and Reg Sprigg west—and PEL102 as well as PPL 211 and PPL203 (Acrasia Field) are on gibber downs and uplands. The remainder of licence areas are in dunefield, sandplain and floodplain, subject to Stuart Petroleum’s Dunefield & Floodplain SEO.

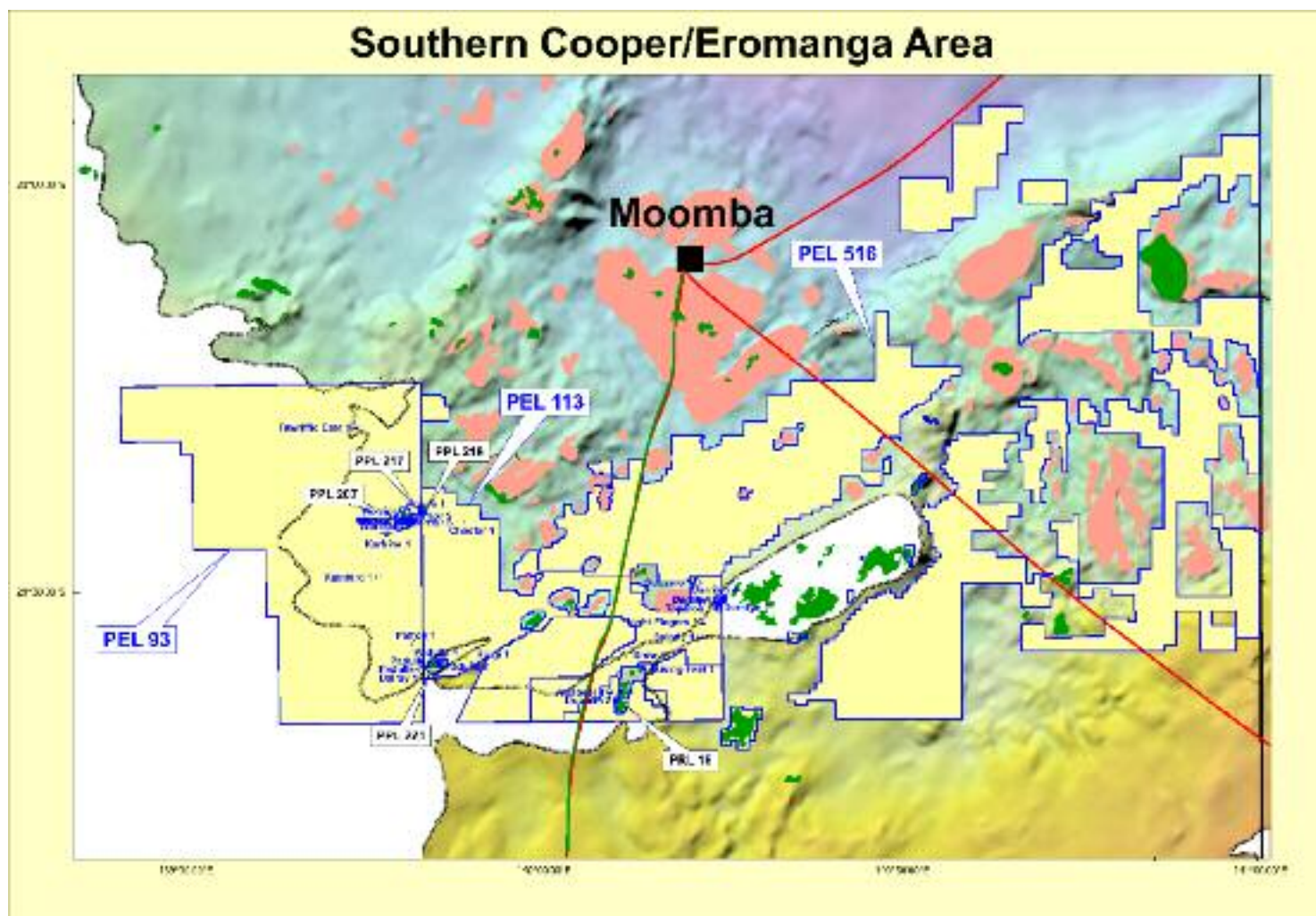


Figure 2. Stuart Petroleum southern licence areas and operations as at October 2010. All southern licence areas are in dunefield, sandplain and floodplain, subject to Stuart Petroleum’s Dunefield & Floodplain SEO.

1.2 Relation to other Cooper Basin SEOs

The current SEO covers objectives which apply regardless of the extent, nature or location of oil production, processing and transportation, and accordingly has elements in common with other full production, extended production testing and initial production testing taking place in the Cooper Basin. Hence this SEO contains objectives and assessment criteria also contained in other existing SEOs.

The SEO has a layout similar to the Stuart Petroleum Limited *Statement Of Environmental Objectives: Cooper Basin Petroleum Production Operations (Dunefield And Floodplain)* (Stuart Petroleum August 2008) but also draws on the following:

- South Australia Cooper Basin Operators SEO: Production and Processing Operations (Santos June 2010)
- Petroleum Production SEO for Acrasia Field (Stuart Petroleum November 2003).
- Extended Production Test SEO for Acrasia Field (Stuart Petroleum February 2003)
- Cooper Basin Petroleum Production Operations SEO (Beach Petroleum November 2003)
- PEL 182 Extended Production Testing SEO (Eagle Bay Resources July 2006)
- Cooper Basin Petroleum Production Operations SEO (Victoria Petroleum 2008)

1.3 Scope

This SEO is intended to cover petroleum production by Stuart Petroleum Ltd as either lessee or operator for the range from Initial Production Testing (IPT), Extended Production Testing (EPT) through to full petroleum production within a Petroleum Production Licence (PPL) area, in the Gibber land systems overlying the Cooper Basin as defined in Marree Soil Conservation Board (1997) (Figure 3):

- Lamamour Land System (gibber downs, hills and undulating plains, 6202 km²)
- Merninie Land System (gibber slopes, mesas, alluvial plains and small floodouts, 2109 km²).

2. ENVIRONMENTAL OBJECTIVES

2.1 Objectives

The objectives of the Act include:

- minimise environmental damage from activities involved in exploration for, or the recovery or commercial utilization of, petroleum and other resources
- minimise environmental damage from activities involved in drilling and well operations.

Environmental objectives in this SEO for petroleum production are:

- 1) Minimise public and third party risks
- 2) Minimise fire risk at facility and prevent the spread of any fires to wellheads
- 3) Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance
- 4) Avoid impacts on high biological value or wilderness value areas, including secondary impact on lower active floodplains.
- 5) Avoid significant drainage alterations and minimise minor alterations
- 6) Minimise soil impacts both of construction and of routine use, and maintain soil integrity
- 7) Minimise disturbance to vegetation and habitat
- 8) Avoid disturbance to rare, endangered, and/or vulnerable species ¹
- 9) Prevent introduction of pest plants and animals
- 10) Avoid storage and loading facility spills
- 11) Undertake rapid cleanup and impact amelioration following spills
- 12) Avoid transportation spills
- 13) Minimise the likelihood of spread of a transportation spill
- 14) Minimise impacts of fire from any transportation spill
- 15) Avoid water quality reduction in surface waters and groundwater
- 16) Minimise visual impacts
- 17) Prevent unintentional cross-connection between aquifers, and between aquifers and reservoirs
- 18) Minimise air pollution and greenhouse gas emissions
- 19) Minimise adverse impact on Regional Reserve operations
- 20) Minimise adverse impact on livestock
- 21) Avoid contamination of stockwaters with hydrocarbons from petroleum production operations
- 22) Minimise waste handling and disposal impact

¹ As defined in the *National Parks and Wildlife Act 1972*

- 23) Remediate and rehabilitate construction impacts, abandoned surface facilities and access or suspended wellsite and access
- 24) Undertake long-term planning for rehabilitation for producing wellsite/wellfields
- 25) Maintain partnerships in community

2.2 Assessment Criteria

The criteria for measuring the achievement of these environmental objectives are given in Table 1. Criteria generally can be split into the following forms:

- 1) *Defined conditions*. Defined conditions apply where the achievement of an objective can be judged through ensuring that those particular conditions are met or carried out. Examples are:
 - Prohibitions of specific actions where the prohibition directly eliminates potential impacts. The best example is the objective "Avoid disturbance to sites of Aboriginal and European heritage significance", for which one assessment criterion is compliance with the *Aboriginal Heritage Act 1988* and with Stuart Petroleum's Native Title agreements.
 - Requirements to undertake actions in accordance with approved procedures or industry-accepted standards. For example, multiple aspects of the construction and operation of production, storage and loading facilities, and the safe transportation of oil are required to meet stated Australian Standards.
 - Requirements to undertake actions or develop procedures to actively limit particular risks or minimise impacts where they do occur.
- 2) *Goal Attainment Scaling (GAS) criteria*. GAS criteria are applied where assessment has to deal with a range of outcomes rather than the relatively straightforward "yes/no" assessment possible in dealing with defined conditions, and where uncertainties of subjective judgement are involved. Examples are visual assessments of minimisation of disturbance to vegetation and soil, where the level of disturbance may range from major to nil, and assessments of the level of success of well site and track rehabilitation.

In this SEO, many of the objectives of most importance can be assessed using Defined Conditions, and Defined Conditions are preferred where possible. However, some aspects including development of access cannot be assessed on a yes/no basis: equivalent GAS scales to those in the basin-wide drilling SEO (Santos November 2009) are given in Tables 2 to 5, with modifications appropriate to the gibber landscapes.

- 3) *Monitoring and/or studies* - In some cases the assessment of the environmental objectives may not be possible in the shorter term and may require longer term monitoring and scientific evaluation. In such cases, the assessment criteria may be in the form of longer-term data and information gathering.

3. AUSTRALIAN STANDARDS

The following Australian Standards are applicable to the proposed operation. Their application also has some bearing on environmental risks and hazards.

AS 1271	Safety Valves for Boilers and Unfired Pressure Vessels
AS 1692	Tanks for Flammable and Combustible Liquids
AS 1940	The Storage and Handling of Flammable and Combustible Liquids
AS 2381	Electrical equipment for Explosive Gas Atmospheres
AS 2430	Classification of Hazardous Areas
AS 2885	Pipelines Gas and Liquid Petroleum – Design and Construction
AS 3000	SAA Wiring Rules
AS 4041	Pressure Pipes
AS 4360	Risk Management
ANSI B31.3	Chemical and Petroleum Refinery Piping

4. INCIDENTS AND INCIDENT DEFINITIONS

In accordance with Section 85(1) of the Act:

Serious incident means an incident arising from activities conducted under the licence in which:

- a) a person is seriously injured or killed; or
- b) an imminent risk to public health or safety arises; or
- c) serious environmental damage occurs or an imminent risk of serious environmental damage arises; or
- 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 incident means an incident (other than a serious incident) arising from activities, conducted under a licence, classified under the regulations as a reportable incident.

In accordance with Regulation 32(1), the following are classified as reportable incidents:

- 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; and
- b) an incident identified as a reportable incident under the relevant statement of environmental objectives.

Expanding on Section 85(1)(e) and Regulation 32(1)(b), the SA Department for Manufacturing, Innovation, Trade, Resources and Energy (DMITRE; formerly PIRSA) has developed the set of incident definitions, given in Table 6 below, for operation (facility and pipeline) activities. These definitions are intended to provide consistency with Licensee reporting and hence are incorporated

into this SEO, as direction on events that must be reported, together with specifics related to subsurface disposal of produced water as applied at Acrasia Field and likely to be needed in similar circumstances elsewhere in gibber landscapes.

5. REFERENCES

- Beach Petroleum Ltd (November 2003) "Statement of Environmental Objectives: Cooper Basin petroleum production operations". Prepared for Beach Petroleum Ltd, Glenside, SA by Ecos Consulting (Aust) Pty Ltd, Wayville, SA.
- Eagle Bay Resources NL (July 2006) "Statement of Environmental Objectives: Extended Production Testing in PEL1182" Eagle Bay Resources NL, West Perth WA, July 2006. Rev 1.1
- Marree Soil Conservation Board (1997) "Marree Soil Conservation Board District Plan" ISBN073084203 7
- Santos (November 2009) "South Australia Cooper Basin Addendum to the Environmental Impact Report: Drilling and Well Operations: Five Year Review of the Statement of Environmental Objectives." Santos Ltd, Adelaide.
- Santos (November 2009) "South Australia Cooper Basin:Statement of Environmental Objectives: Drilling and Well Operations." Santos Ltd, Adelaide.
- Santos (June 2010) "South Australia Cooper Basin Statement of Environmental Objectives: Production and Processing Operations." Santos Ltd, Adelaide.
- Stuart Petroleum Ltd (August 2008) "Statement Of Environmental Objectives: Cooper Basin Petroleum Production Operations (Dunefield And Floodplain)" Stuart Petroleum Ltd, Adelaide, August 2008.
- Stuart Petroleum Ltd (November 2003) "Statement of Environmental Objectives: Petroleum production at Acrasia Field, Cooper Basin". Stuart Petroleum Ltd, Adelaide, November 2003.
- Victoria Petroleum NL (2008) 'Cooper Basin Petroleum Production Operations: Statement of Environmental Objectives' Victoria Petroleum NL, Perth/RPS Ecos Adelaide.

Table 1: Environmental objectives and assessment criteria

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>1 <i>Minimise public and third party risks</i></p>	<p>Production and processing risks arise where third parties can detect and access facilities, including flowlines, wells and production sites. All current Stuart Petroleum production sites are distant from public access routes, but there is no means for “hiding” the good-quality oil haul roads leading to them.</p> <p>Transportation risks arise through combination and potential conflict of public and rig or oil transport moves on the same road. There are additional hazards at the “choke points” represented by the one-lane Cooper Ck causeway at Innamincka and the wider causeway at Strzelecki Crossing.</p> <p>Facility failures and industrial safety issues may affect third parties.</p>	<ul style="list-style-type: none"> • Signage on haul road/public road intersections prohibiting entry, warning against trespassing, and warning of danger associated with petroleum activity and truck movements. • Local signage on approaches to production facilities prohibiting entry, warning against trespassing, and warning of truck movements. • Procedural “give-way” rules for rig and oil traffic at major stream crossing “choke points” (currently, Innamincka Causeway and Strzelecki Crossing). • At wellsites, regular integrity testing. Firefighting extinguishers for loading areas and pump banded areas. • Communication with DENR regional officers where third party access issues arise in Regional Reserves. 	<ul style="list-style-type: none"> • No public or third party incidents. • Procedures exist for trucking movements including give-way procedures at Innamincka Causeway. • Signage present, including speed limits. • Logs exist of integrity testing at wellheads. • Extinguishers present at loading areas. • Installations meet appropriate Australian Standards.
<p>2 <i>Minimise fire risk at facilities and prevent the spread of any fires to wellheads</i></p>	<p>Fire risks from the combination of spillage with ignition sources; OH&S considerations, potential loss of resource.</p>	<ul style="list-style-type: none"> • Containment and isolation of fires. • Maintenance of separation distances of facilities to avoid escalating events and to allow manual shutoff/isolation of fuel. • Manned attendance during road tanker filling/loading. • Bunding for containment. • First attack extinguishers present. • Emergency response plan in place. Fire inductions and procedures. • Gas flare in cleared area with appropriate flare shield. • Minimisation of ignition potential through earthing facility and tanker in accordance with AS3000. • Tank fires, or fires where first attack failed, allowed to burn out (approval will be sought under AS1940) 	<ul style="list-style-type: none"> • No wellhead fires. • An Emergency Response Plan exists for the operation of each production facility. • Minimum separation distances observed. • Extinguishers present. • Bunding, earthing meet appropriate Australian Standards.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
3 <i>Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance</i>	Intrusion or physical site damage to areas of Aboriginal and non-indigenous heritage significance can result from access and pad construction, vehicle and people movement.	<ul style="list-style-type: none"> • Facility, camps and structure sites, access, flowline, borrow and water disposal areas inspected; any areas elsewhere requiring remediation also inspected. • Inspections by or in association with signatories to indigenous heritage agreements for the licence area. • Heritage report forms completed and lodged for any sites or artifacts identified. • Survey records kept and available for audit. • Consultation with Heritage Branch where non-indigenous heritage issues arise. 	<ul style="list-style-type: none"> • Proposed facility sites, wellsites, access and ancillary areas have been surveyed and any sites of Aboriginal and non-indigenous heritage identified. • Any identified cultural and heritage sites have been avoided or otherwise appropriately cleared and managed.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>4 <i>Avoid impacts on high biological value or wilderness value areas; minimise secondary impacts on lower active floodplains</i></p>	<p>Direct physical impact on high biological or wilderness value areas including off-road movement; fires started at pad; oil contamination; fires originating from oil spillages extending into high value areas; alterations resulting from process water disposal.</p> <p>Biophysical “High value” areas are formally defined by the Special Management Zones (SMZ) associated with Coongie Lakes in Innamincka Regional Reserve. The current Ramsar wetland boundary is an administrative convenience, covering as it does extensive non-wetland areas: revision of this boundary to reflect the actual disposition of wetlands will define a “high value” area within which the SMZ highlight the most important areas. The SMZ and proposed Ramsar boundary revision lie outside gibber land systems, but within a catchment including those land systems.</p> <p>The riparian fringe and stream courses of major creeks in gibber, such as Patchawarra Creek, may possess high biological conservation values depending on their action as corridors, as linearly extensive but small aggregate area habitat and vegetation contrasting with adjoining gibber.</p>	<ul style="list-style-type: none"> • Facility locations evaluated in environmental risk assessment for biological and wilderness values. • Extended production testing and permanent production facilities including storage loading and water disposal located outside any Reserve Special Management . • Main oil haulage roads constructed outside any Reserve Special Management Zones. • Diversion or holding facilities for produced water to avoid impact on defined drainage connecting to Ramsar floodplains. • Facility design and transport operations and procedures to prevent spills; procedures in place to minimise spill risks in wet conditions; procedures to limit the spread of fires associated with spills, and fire safety included in inductions; limitation of movement to appropriately prepared access; minimised borrow use; prohibition of public access on dedicated haul road. • Haul roads and facilities out of visitor sight as much as possible to maintain some wilderness attributes. 	<ul style="list-style-type: none"> • Facility locations assessed for biological and wilderness value and assessment documented in site-specific information. • Flooding risk indicated in site-specific documentation. • Extended and permanent production facilities located out of frequently flowing waterways. • Spills, fires as assessed under other objectives. • No unauthorised off-road movement evident. • Generally, any remaining impacts on high biological/wilderness value areas demonstrated to be unavoidable.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>5 <i>Avoid significant drainage alterations and minimise minor alterations</i></p>	<p>Greatest risks are associated with access and facility construction, including flowlines, crossing gibber creek channels, and impeding, blocking or redirecting water flows.</p> <p>Blocking or redirection of channels can have major repercussions on downstream habitat..</p> <p>Redirection of overland flow, which then results in local channelling, can in turn result in accelerated and potentially irreversible gully erosion.</p> <p>Track construction and wellsite selection should aim to minimise impacts by avoiding sensitive areas where possible and by appropriate construction methods.</p>	<ul style="list-style-type: none"> • Extended testing and permanent production facilities, including storage loading and water disposal, located out of secondary or major drainage channels. • Facilities and flowlines constructed to avoid water re-direction involving large water volumes. • Diversions, through or around facilities, of minor channels, gutters or overland flow designed to minimise local channelling and other downslope flow alterations. • Production roading constructed to allow passage of local inundation. • Active stream crossings by production roading engineered to permit flows (eg by culverting, crossings at grade, sacrificial formation). 	<ul style="list-style-type: none"> • Flooding risk indicated in site-specific documentation. • Extended and permanent production facilities located above frequently flowing channels and their terraces. • Facility including flowlines and access located and constructed to minimise changes to pre-existing water flow paths. • 0, +1 or +2 GAS criteria are attained for drainage-related objectives as listed in Tables 2 and 3, during facility, flowline and access site selection, construction and rehabilitation. • No overt downstream changes consequent on placement of facilities.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
<p>6 <i>Minimise soil impacts both of construction and of routine use: maintain soil integrity</i></p>	<p>Access, hardstand, pad construction including borrow development, and clearing or trenching for flowlines, can lead to expanding soil erosion or alteration impacts, particularly from water erosion and/or ponding, dust generation, and accelerated erosion on slopes following removal of gibber pavements.</p> <p>Road formations need construction which allows for safety of vehicle movement, minimises risk of transportation spills, and limits accelerated erosion risks and widening of rights of way by vehicles attempting to avoid dust or each other. Simple rolled gibber tracks are unable to cope with more than occasional light loads.</p> <p>Limited off-road driving without lasting damage is generally possible on most gibber surfaces in dry conditions. Continued off-road driving, or driving in wet conditions, leads to rutting, dust nuisance, and potential water ponding and locally redirected runoff with consequent gully erosion. Hence off-road driving needs curtailing. Some off-road driving will always be necessary: roads/tracks should not be built for one-off or rare uses.</p>	<ul style="list-style-type: none"> • New construction subject to route selection, heritage and environmental planning, clearances and procedures. • Minimise clayed access and pad areas consonant with engineering and safety requirements. • Formation and pad construction by laying clay formation over uncut gibber pavement on all but level sites. • Provision on access roads for cross-drainage of overland flow. • Permanent access widened and straightened as required for large-volume haulage and safety. • Redundant access rehabilitated either by active works (older, cut tracks) or by permitting formation to slump and wash away leaving original gibber surface (newer tracks laid without disturbing gibber pavements). • Vehicles normally kept to prepared surfaces. • Borrow taken from level or near-level areas. The use of clay formation over uncut gibber, while it protects the underlying gibber from accelerated erosion, also results in the loss of formation after heavy rain. Accordingly provision must be made for continued input of borrow. 	<ul style="list-style-type: none"> • 0, +1 or +2 GAS criteria are attained for soil impact aspects given in Tables 2-5. • Local erosion rates are not obviously accelerated above those of surrounding land. • No unauthorised off-road driving or creation of shortcuts. • No downslope or upslope erosion associated with borrow pits. • Natural drainage line flows are not impeded by road crossings or other construction. • Provision exists to allow overland flow without creating channelling issues.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
7 <i>Minimise disturbance to vegetation and habitat</i>	Physical damage to soils, vegetation and habitat generally through access and facility construction, including flowlines; fires at facilities or in transit resulting in wildfire; spillages and spread of spilled oil; alterations brought about by disposal of process water.	<ul style="list-style-type: none"> • Environmental impact of alternate routes and placement considered during planning phase. • Location and development of facilities, new access, and borrow sources subject to environmental inspection and evaluation as part of the route selection process. • Assessment records are kept and are available for auditing. • Minimised route distances for new or upgraded access. • No clearing of Category 1 trees, minimised removal of tall shrubs or small trees >1.5m both on access and at facility. Flagging of trees/groves for avoidance where appropriate. • Borrow pits, trenches and similar designed and constructed as far as practicable to minimise fauna entrapment. • Borrow pits constructed and/or restored to minimise water run-in, primarily for erosion control reasons, but also to void temporary ponding (short-term in most gibber areas). • Separate stockpiling of surface soil and debris from unavoidable site cuts (sumps, pits) for use in rehabilitation not necessarily at the immediate site. • Sumps, pondages, facilities fenced as appropriate to minimise access by larger wildlife and feral stock, other grazers. • Inductions emphasising minimisation of damage to vegetation; controls on movement of vehicles and people off prepared sites; fire procedures in place. • Procedures in place to limit and rehabilitate spill damage (see "Avoid spills" below). 	<ul style="list-style-type: none"> • There is an environmental and heritage assessment performed for new facility construction. • 0, +1 or +2 GAS criteria are attained for vegetation-related objectives as listed in Tables 2 to 5, during facility and access track site selection, construction and rehabilitation. • 0, +1 or +2 GAS criteria are attained for vegetation-related objectives as listed in Tables 2 to 5, during borrow pit site selection, and restoration. • No unauthorised off-road driving or creation of short cuts, or other unauthorised activities outside access and work areas.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
8 <i>Avoid disturbance to rare, endangered and/or vulnerable species</i>	<p>Physical removal of rare, endangered, vulnerable species through construction, oil contamination.</p> <p>Animal species of significance particularly birds may be present intermittently using the faunal corridors of major creeks (eg Patchawarra Creek, Dripie Creek).</p> <p>Higher probability of plant species of significance also being along major creeks.</p>	<ul style="list-style-type: none"> Proposed facilities, flowlines, new access and borrow areas assessed for rare, vulnerable and endangered species before construction. New access and facilities out of riparian fringes of larger creeks. Inductions emphasising minimisation of damage to vegetation and habitat; controls on movement of vehicles and people off prepared sites; fire procedures in place. 	<ul style="list-style-type: none"> Sites with rare, vulnerable and endangered flora and fauna present or potentially present have been identified. Identified sites have either been avoided or subject to formal impact minimisation design.
9 <i>Prevent introduction of pest plants and animals</i>	<p>Activity associated with facility and access construction, particularly movement of vehicles and equipment, is a potential source of weed or disease introduction and spread. The most effective prevention technique is to ensure that vehicles and equipment are cleaned prior to entry and movement off construction sites and easements is minimised.</p> <p>Borrow sourcing can result in spread of weeds also. Borrow sources should be in areas free of weed species.</p>	<ul style="list-style-type: none"> Requirement for contractor/other vehicles to be clean prior to entering area. Control measures implemented for new imports as necessary. Securing of food wastes to avoid encouraging feral animals. Borrow areas, including pre-existing, checked for presence of pest species. Routine checks for appearance of pest species. 	<ul style="list-style-type: none"> No borrow pits developed or used in areas of observed weed infestation. No new weeds or feral animals introduced to operational areas or along associated access. Presence of weed species consistent with or less than adjacent land.

Table 1: Environmental objectives and assessment criteria (cont...)

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
10	Avoid storage and loading facility spills;	Facility spills from oil flowlines, storage, pumping, loading facilities can arise through physical disruption, overpressure, corrosion. Chemical transport and storage spills present a further risk.	<ul style="list-style-type: none"> All production facilities and flowlines designed and constructed to relevant Australian standards. 	<ul style="list-style-type: none"> No production, process or hydrotest fluid, or fuel or chemical spills or leaks outside areas designed to contain them.
11	Undertake rapid cleanup and impact minimisation following spills	Spills can arise from vehicle and plant refuelling.	<ul style="list-style-type: none"> Flowlines to follow oil well access roads where a well is distant from production facility, to avoid development of multiple parallel corridors and allow ease of inspection, except where safety requires separation of flowline and roading. No flowlines alongside regular public access routes. Flowlines laid and supported above ground where saline or sodic soils present a serious corrosion risk. Allowance for corrosion and subject to regular maintenance. Regular inspections. Vehicle movement directed away from unprotected pipes. Signs and barriers at production facilities to avoid vehicles damaging pipework. Operational procedures for special vehicle use within facilities or when need arises to cross flowlines elsewhere. High containment integrity systems complying with AS4041 <i>Pressure Piping</i>. Piping pressure tested to the highest forecast production operating pressures and conditions. Flowlines complying with AS2885. Hydro-testing without added chemicals; bleeds collected and hydrotest water disposed through produced water disposal system. Tanks with bunds sufficiently large to provide for catastrophic tank failure. Pumps and manifold separately banded against local failure. Flowlines hard-piped to pump and loading point (threaded or hammer union connections). Loading point with clay pad. Flexible hose with cutoffs for train loading; any minor spillages at loading point to be left to evaporate and bio-remediate. Landfarming in place or pit disposal of seriously contaminated soils. 	<ul style="list-style-type: none"> No release of production fluid onto active floodplain, floodouts or channels. Facilities conform to Australian Standards. Compliance with the <i>Environment Protection Act 1993</i>. Levels of hydrocarbon continually decreasing in the case of <i>in situ</i> remediation of spills.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
(cont...)	(cont...)	(cont...)	
10 11	<p><i>Avoid storage and loading facility spills;</i></p> <p><i>Undertake rapid cleanup and impact minimisation following spills</i></p>	<p>Facility spills from oil flowlines, storage, pumping, loading facilities can arise through physical disruption, overpressure, corrosion. Chemical transport and storage spills present a further risk.</p> <p>Spills can arise from vehicle and plant refuelling.</p>	<p>Procedures in place for minimising overflow and loading spill risks, integrity management and recording of spills. Attendance at equipment at all times during road tanker filling. Filling systems, storage tank operation and tanker procedures in accordance with AS1940 <i>The Storage and Handling of Flammable and Combustible Liquids</i>.</p> <p>Secondary fuel supplies, refuel areas and chemical storage HDPE/clay floored or equivalent and locally banded.</p>
12 13 14	<p><i>Avoid transportation spills</i></p> <p><i>Minimise the likelihood of spread of a transportation spill</i></p> <p><i>Minimise impacts of fire from any transportation spill</i></p>	<p>There is a severe risk of pollution and impact on soils, vegetation and fauna, where spills occur in periods or locations where oil can be easily spread, particularly wet areas and flowing watercourses. The same conditions conducive to high pollution risk are also conducive to road crashes, rollovers, boggings and similar accidents.</p> <p>The key risk minimisation is also a practical one: simply not to move during periods of high hazard.</p> <p>Fires from transportation accidents have less pollution issues but potentially major impact if conditions are appropriate for spread of wildfire.</p>	<p>Procedures in place for safe movement of hydrocarbon/chemical transport.</p> <p>No movement on wet roads or in wet conditions.</p> <p>No "wet wheel" fording of flowing watercourses other than sealed floodways with depth markers. Fording depth limit as set by regulatory authorities.</p> <p>Reconstruction of rig roads as needed to safe haul road standard, with vehicle speed limits and procedural "give-way" rules for rig and oil traffic.</p> <p>Contaminated soil on gibber fenced, monitored and allowed to remediate naturally. Landfarming should not be attempted on gibber surfaces where permanent erosion risks apply. In extreme cases, removal for pit disposal accompanied by replacement of gibber cover from other sources.</p> <p>Contaminated soil from spillage at a watercourse or floodway crossing removed.</p> <p>Spill contingency and emergency response plans in place.</p> <p>Conformance with Dangerous Substances Act 1979 and Environment Protection Act 1993.</p> <p>Actual transportation fires permitted to burn out. Earthmoving equipment brought in if necessary to contain secondary fires.</p>
			<p>No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them.</p> <p>No release of production fluid onto active floodplain, floodouts or channels.</p> <p>Levels of hydrocarbon continually decreasing in the case of <i>in situ</i> remediation of spills.</p> <p>Remediation to accepted Soil Health Index levels.</p> <p>Procedures exist for safe movement of oil haulage and are adhered to.</p>

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
15 <i>Avoid water quality reduction in surface waters and groundwater</i>	Pollution of surface or groundwaters can result from spills already discussed and from: <ol style="list-style-type: none"> 1) Surface (evaporative) disposal of formation water with hydrocarbons present polluting surface waters 2) Subsurface disposal, affecting active (water-bearing) aquifers. 3) Subsurface disposed water breaking out into surface creeks 4) Overflow of infiltration pits or interceptor ponds 	<ul style="list-style-type: none"> • All preceding spill avoidance measures. • Produced water with visible oil (>30ppm hydrocarbons) retained in containment areas. Produced water separated from oil and cleaned through minimum of <ul style="list-style-type: none"> --Initial separation in dewatering tank --clarification in purpose-built lined interceptor pond with takeoff via a breaker siphon or equivalent to a purpose-built guard pond --further residence in guard pond --disposal to appropriately prepared infiltration points for subsurface disposal or evaporation sites where topography permits. --produced water for infiltrative disposal to have <30ppm hydrocarbons • Subsurface disposal into dry sediment with minimal risk of connection to existing water-bearing aquifers and minimal risk of connection to stock groundwater sources. • Where a large level (near-zero slope) area is available, disposal by evaporation in a prepared evaporation basin may be possible. • Fencing of evaporation area dependent on discussion with local land managers. • Monitoring of groundwater disposal mounds while disposal is in operation. • Water input rates to infiltration pits kept well below pits' infiltration & evaporation capacity. Interceptor ponds managed and maintained within design capabilities 	<ul style="list-style-type: none"> • No production or processing fluid spills or leaks outside areas designed to contain them. • No produced water released from containment areas with visible oil present (>30 mg/L). • No produced water disposed subsurface with hydrocarbon content >30mg/L • Water quality monitoring procedures in place • Water quality monitoring records exist • No produced water released into flowing stream channels or waterholes. • Interceptor pondages are protected from external flooding. • No breakout of infiltrated water in surrounding creeks • Groundwater disposal mounds modelled and monitored.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
16 <i>Minimise visual impacts</i>	Visual impacts arise through obtrusive access and facility development and/or visible long-term persistence of pad and access. Regular outlines, obtrusive man-made landforms and colour contrasts between borrow and surface soil increase impacts.	<ul style="list-style-type: none"> Siting of production facilities to minimise visibility from public access where feasible. 	<ul style="list-style-type: none"> Visual impacts considered in site planning and development. 0, +1 or +2 GAS criteria are attained for visual impact related objectives as listed in Tables 3, 4 or 5.
17 <i>Prevent unintentional cross-connection between aquifers, and between aquifers and reservoirs</i>	This objective is to protect water quality and water pressure of aquifers that are potential water supplies, and to maintain pressure in sands that might host petroleum accumulations elsewhere.	<p>At producing wells:</p> <ul style="list-style-type: none"> Monitoring programs implemented to assess condition of casing and cross-flow behind casing. Risk assessment for remediation if crossflow detected. 	<ul style="list-style-type: none"> No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by DFW.
18 <i>Minimise air pollution and greenhouse gas emissions</i>	Combustion by-products, particulates, flared or vented hydrocarbon release; generation, pump engines, other power sources.	<ul style="list-style-type: none"> Production operations in accord with appropriate industry and legislative standards. Maintenance of motorised equipment. Exploration of alternative power sources with regard to emissions as well as fuel efficiency. 	<ul style="list-style-type: none"> Compliance with regulatory legislative requirements.
19 <i>Minimise adverse impact on Regional Reserve operations</i>	Interference with reserve management; interference with visitors associated with operations and vehicle movements. Some impact on visitor use inevitable due to increased vehicular movement on major Park access.	<ul style="list-style-type: none"> Liaison with Park management maintained. Proposals to reduce public risk also minimise impact on visitors (see Public Risk, 1 above). 	<ul style="list-style-type: none"> No unresolved reasonable complaints.

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
20 <i>Minimise adverse impact on livestock</i> 21 <i>Avoid contamination of stockwaters with hydrocarbons from petroleum production operations</i>	Problems can arise from interference with normal pastoral operation, direct interference to stock, pollution of stock water by spills, or formation water or brines disposal with hydrocarbons present polluting stock water.	<ul style="list-style-type: none"> • Stock proof fencing around facility and water disposal. • Timber fenceposts and flowline support sleepers may be creosoted but not CCA-treated, to comply with “green beef” certification requirements. • No oil released outside containment areas. • Production water cleaned to no visible hydrocarbons (<30ppm) before disposal to evaporation and cleaned to <30ppm before disposal to infiltration. Disposal away from channels and stockwaters; subsurface disposal not into active (waterbearing) aquifers and not into formations allowing connection to stockwaters. 	<ul style="list-style-type: none"> • Facility and water disposal are fenced. • No production or processing fluid spills or leaks outside areas designed to contain them. • No produced water released from containment areas with visible oil present (>30 mg/L) • No produced water disposed subsurface with hydrocarbon content >30mg/L • No CCA-treated fencing or flowline supports. • No production-sourced hydrocarbons in local stockwaters.
22 <i>Minimise waste handling and disposal impact</i>	Creation of wastes: sewerage, litter, overflow and spillage.	<ul style="list-style-type: none"> • Wastes disposed in accordance with EPA licensing, with waste hierarchy model separation applied for manned production facilities. • Production camps’ and service buildings’ sewerage disposed via permanent septic tank system. • Wastes on site confined by bins/skips with segregation of recyclables. Disposal at regular intervals to waste transfer station and/or EPA-licensed waste disposal facility, currently at Moomba • Chemicals and fuel oils purchased in bulk; adequate storage and tankage provided at facilities. • Litter cleanup and ongoing management. 	<ul style="list-style-type: none"> • No Environment Protection Act infringements. • No spills or leaks from sewage disposal system. • No litter remaining on or around sites. • Attainment of GAS criteria for “Site left in clean, tidy and safe condition after final clean-up” objective during well site restoration (Table 3). • Attainment of GAS criteria for “Site left in clean, tidy and safe condition” objective during borrow pit restoration (Table 5).

Table 1: Environmental objectives and assessment criteria (cont...)

Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
23 <i>Remediate and rehabilitate construction impacts, abandoned surface facilities and access or suspended wellsite and access</i>	Construction will result in some impact which can be rehabilitated post-construction, even though the facility is operating. Also, wells will cease production and flowlines and access become redundant.	<ul style="list-style-type: none"> • Wellsite cleanups as for unsuccessful drilling outcomes. • Removal of flowlines. • Removal of redundant camp and facilities, including sewerage system for disposal at EPA facility. • Rehabilitation of redundant access if no further petroleum exploration likely; interim disguising of access entry points pending final rehabilitation. 	<ul style="list-style-type: none"> • 0, +1 or +2 GAS criteria are attained for all objectives listed in Tables 2 to 5, during facility and access track site selection, construction and rehabilitation. • 0, +1 or +2 GAS criteria are attained for all objectives as listed in Tables 2 to 5, during borrow pit site selection, and restoration.
24 <i>Undertake long-term planning for rehabilitation for potential producing wellsite/wellfields</i>	Isolated small producing fields may cease to warrant production, and will require cleanup. Major centres (equivalent to Santos satellites) may remain viable through discovery of other fields reachable by flowline.	<ul style="list-style-type: none"> • Development of rehabilitation plans included in production management. 	<ul style="list-style-type: none"> • Planning completed and rehabilitation objectives developed prior to facility abandonment.
25 <i>Maintain partnerships in community</i>	Liaison with local Cooper Basin community and information to other stakeholders.		<ul style="list-style-type: none"> • Affected parties notified and consulted on proposed activities. • EIR and SEO process in place. • Liaison for wildfire management with Reserve and pastoral management • No unresolved reasonable complaints.

Table 2: GAS criteria for assessing facility location and construction

	Reduce disturbance to drainage patterns	Minimise impacts on soil	Minimise impact on vegetation
	<i>No obstruction of water flows</i>	<i>Access and facility construction</i>	<i>Minimise perennial vegetation clearance</i>
-2	Water flows in major channels permanently obstructed as a result of earthworks (other than containment bunding to prevent polluted runoff) or other facility development.	New road, facility or right of way construction and/or borrow sourcing in any Reserve Special Management Zone prohibiting construction. Major accelerated erosion associated with road, facility, right of way and/or borrow pits. Removal of gibber mantle on slopes >2% (>1°) other than small, purpose-engineered pits (temporary drill sumps, cellars, infiltration pits).	Trees of priority 1 removed in area where could have been avoided.
-1	Major water pathways diverted for flow maintenance, but minor channels and/or water pathways permanently obstructed as a result of earthworks (other than containment bunding to prevent polluted runoff) or other facility development.	Borrow materials taken from outside approved areas. Minor accelerated wind or water erosion associated with road, facility, right of way or borrow pits. Removal of gibber mantle on slopes 1%-2% other than purpose-engineered pits (temporary drill sumps, cellars, infiltration pits).	Vegetation of priority 2 or 3 removed in area where could have been avoided.
0	No major water pathways obstructed or diverted, minor channels or other water pathways are diverted around facilities if required (other than containment bunding to prevent polluted runoff); some local disruption of active overland water flow remains.	No accelerated erosion associated with road, facility or right of way, minor water erosion on operating pits. Removal of gibber mantle on slopes <1% out of water pathways for facilities, borrow pits.	Trees and vegetation removed in area where unavoidable
1	No major water pathways obstructed or diverted, minor channels or other water pathways are diverted around facility if required; some local disruption of overland water flow	No accelerated erosion on any of road, facility, right of way or pits. Gibber mantle fully intact.	No trees removed, only vegetation of priority 4 cleared.
2	No obstruction to any water flow pathway; no local disruption of overland water flow.	No erosion evident on or immediately adjoining roads, facility, right of way or pits. Gibber mantle fully intact.	No trees or vegetation removed.

Table 3: GAS criteria for assessing well and other facility site restoration

	Minimise residual impacts on drainage	Minimise visual impact of abandoned well and facility sites, flowlines and access tracks		
		<i>Flowlines</i>	<i>Pads</i>	<i>Access tracks assessed from the main track (rolled or clay formation access)</i>
-2	Site or access permanently blocks drainage	Flowline remains on surface, access track or ROW remains a consolidated surface.	The site remains as a prominent deep consolidated surface with a distinct edge.	The track remains prominent because of a consolidated surface which will not slump or disperse with repeated rainfall and the presence of distinct windrows..
-1	Site or access permanently impedes and/or diverts drainage	Flowline and ancillary equipment (sleepers, fittings) removed but access/ROW remains a consolidated surface.	The site edge has been spread into the surrounding landscape and pad surface consolidation has been broken, but excess clay has not been removed and surface has not been shaped or stone armour replaced.	The track surface remains prominent because of excess clay formation, but has been prepared (e.g. by shallow tyning or partial lifting of clay) to assist natural slumping. Windrows have been levelled and/or spread.
0	Site or access has minor drainage influence or redirection	Flowline removed, access/ROW treated but the earthwork disturbance (eg. partial lifting, spreading or light shallow tyning of original material) is still prominent. Roads built by direct claying over untreated gibber will slump and disperse over time and this should be allowed for.	Excess clay has been lifted without disturbing underlying gibber; clay surface has been contoured to match similar areas in surrounds; stone and gibber have been spread on pad surface; there is still colour contrast with surrounds and the presence of pad material is still prominent.	The track surface is naturally broken and dispersing into surrounds though parts remain prominent, and can reasonably be expected to disappear with time. Colour contrasts may still be present.
+1	Site or access has no apparent influence on drainage	Flowline removed. Track/ROW contours and colour blend with the surroundings and the earthwork disturbance is beginning to blend also.	The earthwork disturbance is beginning to blend into the surroundings.	The track formation has largely dispersed into surrounds. Colour contrasts may still be present.
+2	Site or access cannot affect drainage regardless of construction—may apply for facilities on crests of gibber downs]	No evidence of flowline. Track/ROW 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 indistinguishable from the surroundings.	The track formation has dispersed and colours are largely indistinguishable from surrounds.

Table 3: GAS criteria for assessing well and facility site restoration (Cont...)

	Re-establish natural vegetation on abandoned well, facility, flowline sites and access tracks		Site to be left in a clean and safe condition	
	<i>Less than 5 years since restoration</i>	<i>More than 5 years since restoration</i>	<i>Backfilling and marking</i>	<i>Rubbish removed</i>
-2	The site remains as a consolidated surface.	No revegetation evident.	Incomplete filling of sumps, cellars, ramps	Large items of litter present across site, eg. drums, pieces of casing and cables etc.
-1	The colour of foreign material contrasts with the surroundings.	The revegetation mostly consists of annuals and biennials. In contrast to the surroundings, there are few perennials.	Cellar backfilled but no marker erected.	Small items of litter spread over more than 50% of the site, eg. tin cans, nuts and bolts, rags, small pieces of cable and wood etc.
0	The site surface has slumped or been appropriately restored to facilitate revegetation (eg. Lifting of excess clay, recreation of Gilgai humps, respreading of original material).	The revegetation consists of annuals, biennials and perennials, but there are some bare patches which are inconsistent with the surroundings.	Cellar backfilled and marker erected.	No evidence of litter on site.
+1	The revegetation is extensive and consists of annuals and biennials. In contrast to the surroundings, there are no perennials.	The revegetation, mostly perennials, is consistent with the surroundings, but there is contrast in maturity between them.	n/a	n/a
+2	The revegetation is extensive and mostly consists of annuals and biennials. Perennials which are consistent with the surroundings are beginning to establish.	The revegetation type, density and maturity are indistinguishable from the surroundings.	n/a	n/a

Table 4: GAS criteria for assessing borrow pit siting and construction

	Minimise impacts on vegetation	Protect unknown sites of natural, scientific, or heritage significance	Minimise visual impacts	Minimise erosion risks
	<i>Perennial vegetation clearance minimised</i>	<i>Avoid sites</i>	<i>Site pit appropriately</i>	<i>Accelerated erosion minimised</i>
-2	Trees of priority 1 in Field Guide ² removed in area where could have been avoided.	Sites disturbed.	Borrow pit less than 20m from road.	Pit sited on slope >2% (>1°). No provision for redirecting water flow around pit.
-1	Trees of priority 2 or 3 in Field Guide ¹ removed in area where could have been avoided.		Borrow pit less than 50m from road.	Pit sited on slope up to 2%. No provision for redirecting water flow around pit.
0	Trees and vegetation removed in area where could not have been avoided.	Sites identified, flagged and avoided.	Borrow pit more than 50m from road. Visible from road due to lack of screening vegetation.	Pit sited on slope up to 2% with low bunding to divert overland waterflow around pit.
+1	No trees removed, only vegetation of priority 4 in Field Guide ¹ cleared.		Borrow pit shielded from road by utilising screening vegetation or landform.	Pit sited on level ground at foot of slope or adjoining waterway with low bunding to divert overland waterflow around pit.
+2	No trees or vegetation removed.	Sites identified, flagged and avoided by 100m.	Borrow pit not visible from road.	Pit sited on crest with no possible runoff.

² Field Guide refers to the *Field Guide to the Common Plants of the Cooper Basin – South Australia and Queensland* (SEA Pty Ltd 1997)

Table 5: GAS criteria for assessing borrow pit restoration

	Minimise impact on vegetation	Minimise impact on soil	Minimise visual impacts	Site to be left in a clean and tidy condition
	<i>Acceptable revegetation after rainfall</i>	<i>Minimise erosion</i>	<i>Borrow pit effectively recontoured and protected from erosive run-on</i>	<i>Rubbish removed</i>
-2	No revegetation evident.	Severe erosion evident.	No recontouring of pit has occurred; pit sides are very steep, no run-on prevention..	Litter present on site.
-1	Revegetation localised on the base of the pit but none or very little on the sides of the pit.	Moderate erosion.	Pit sides battered but no run-on prevention at top of batter.	
0	Perennial grasses and shrubs revegetated and type consistent with surroundings. Some bare patches still present. Vegetation cover is uniform over base and sides of pit.	Minor erosion along the sides of the pit.	Pit sides battered and provided with water diversion to prevent water eroding pit sides, but are still highly visible.	No litter present on site.
+1			Pit contours blend well into surrounding landscape, although still evident.	
+2	Vegetation type and density indistinguishable from surrounding landscape.	No erosion anywhere on the pit.	Pit contours indistinguishable from surrounding landscape.	

Borrow pits in gibber will self-rehabilitate due to natural seed transport by local runon or blow-in. The topsoil (largely gibber) scraped and usually stored at the time of pit construction is too valuable a resource to put back into a pit which would respond in any case, and should be used on bared areas such as pads where gibber may be absent or still under clay which cannot be lifted without creating erosion risks.

Table 6: Incident definitions for operation (facility and pipelines) activities.

Serious Incidents	Reportable Incidents
<p>1. A person is seriously injured¹ or killed.</p> <p>2. An imminent risk to public health or safety arises.</p> <p>3. Serious environmental damage occurs or an imminent risk of serious environmental damage arises. For example:</p> <ul style="list-style-type: none"> a) Disturbance to sites of cultural and/or heritage significance without appropriate permits and approvals². 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 and fauna species. 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. d) Any removal of rare, vulnerable or endangered flora and fauna without appropriate permits and approvals³. <p>4. Security of natural gas supply is prejudiced or an imminent risk of prejudice to security of natural gas supply arises⁴.</p> <p>5. An event that compromises the physical integrity of an asset or facility. For example:</p> <ul style="list-style-type: none"> a) Identification of a through-wall defect on a pipeline⁵ or plant component. b) Pipeline rupture. <p>6. Unauthorised activity on a pipeline easement where the pipeline is contacted and repair action is required⁶.</p> <p>7. An uncontrolled gas release resulting in the activation of emergency response and/or evacuation procedures of an area in or adjacent to the gas release, and/or fire or explosion.</p> <p>8. Failure of the produced water handling and cleaning system resulting in the release of uncleaned water (>30ppm hydrocarbons) to surface or subsurface disposal;</p> <ul style="list-style-type: none"> a) Disposal of or contamination by released uncleaned water (more than 30ppm hydrocarbons) into an active (water-bearing) groundwater source b) Break-out of disposed uncleaned water (more than 30ppm hydrocarbons) from groundwater mound into creek system. 	<p>1. An escape of petroleum⁷, processed substance, a chemical or a fuel that affects an area that has not been specifically designed to contain such an escape⁸ (other than a serious incident).</p> <p>2. An event that has the potential to compromise the physical integrity of an asset or facility. For example:</p> <ul style="list-style-type: none"> a) Unauthorised activity on a pipeline easement with equipment that has been identified⁹ as exceeding the pipeline’s penetration resistance, determined in accordance with Australian Standard (AS) 2885. b) Identification⁹ 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). c) Unauthorised activity on a pipeline easement with equipment or vehicles that have been identified⁶ as exceeding allowable stress limits, determined in accordance with AS2885. d) An unapproved¹⁰ excursion outside of critical design or operating conditions/parameters. e) Failure of a critical procedural control in place to reduce a credible threat to low or as low as reasonably practicable (ALARP).¹¹ <p>3. Unauthorised activity on a pipeline easement where the pipeline is contacted but repair action is not required.</p> <p>4. Malfunction or failure of critical plant or equipment that had (or still has) potential to cause a serious incident.</p> <p>5. Failure of the produced water handling and cleaning system resulting in the release of cleaned water (<30ppm hydrocarbons) to surface or subsurface disposal;</p> <ul style="list-style-type: none"> a) Disposal of or contamination by released cleaned water (less than 30ppm hydrocarbons) into an active (water-bearing) groundwater source b) Break-out of disposed cleaned water (less than 30ppm hydrocarbons) from groundwater mound into creek system. <p>6. Transportation accidents</p> <p>7. Other non-compliance with SEO objectives as indicated by assessment criteria in Table 1</p>

Table 6 (cont.): Incident definitions for operation (facility and pipelines) activities.

Notes to Table 6

¹ Includes an immediately notifiable work-related injury pursuant to Division 6.6 of the *Occupational Health, Safety and Welfare Regulations 1995* that results in the issuing of a Prohibition Notice by SafeWork SA.

² Pursuant to *Aboriginal Heritage Act 1988* and *Heritage Places Act 1993*

³ Pursuant to *Native Vegetation Act 1991* (flora) and *National Parks and Wildlife Act 1972* (fauna).

⁴ 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

⁵ 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.

⁶ For the case where a detailed assessment is required to determine this, DMITRE recommends the incident be reported initially and amended at a later date if required.

⁷ In gaseous, liquid or solid state, as per *Petroleum and Geothermal Energy Act* definition.

⁸ 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.

⁹ 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.

¹⁰ "Approval" as per AS2885 definition. Note that there may be situations where excursions are allowable under AS2885.

¹¹ As per the Safety Management System process articulated in AS 2885.1-2007, or similar risk assessment process.

APPENDIX 1

STUART PETROLEUM ENVIRONMENTAL RISK AND COMPLIANCE DOCUMENTS FOR GIBBER LANDSCAPES

Documents already provided in support of notifications or for regulatory overview.

Acrasia PPL and connected wells

Fatchen TJ (September 2010) "Environmental risks and compliance: proposed petroleum development drilling, extended production testing and production by Stuart Petroleum Ltd in PPL 203 at Acrasia 6 (27°13' 51.1" S 140° 58' 55.7" E) " Prepared for Stuart Petroleum Ltd by Fatchen Environmental Pty Ltd, Adelaide, September 2010. STU-10-67 Rev. 1

Fatchen, TJ (July 2010). "Environmental risks and compliance: proposed petroleum development drilling, extended production testing and production by Stuart Petroleum Ltd in PPL 203 at Acrasia 5 (27°13' 59.0" S 140° 59' 35.9" E)" Prepared for Stuart Petroleum Ltd by Fatchen Environmental Pty Ltd Adelaide, July 2010. STU-10-64 Rev. 1.01

Fatchen TJ (June 2005) "Environmental risks and compliance: proposed petroleum development drilling, extended production testing and production by Stuart Petroleum Ltd in PEL 90 - Candra Block at Acrasia 4 (27°13' 57.2" S 140° 59' 54.8" E) " Prepared for Stuart Petroleum Ltd by Fatchen Environmental Pty Ltd Adelaide, June-July 2005 SP-04-17

Fatchen Environmental (July 2009) "File Record: Trial of produced water disposal to surface drainage at Acrasia; Stage 1 narrative and outcomes" Prepared for Stuart Petroleum Ltd by Fatchen Environmental Pty Ltd, Adelaide, July 2009. Revision 1

Fatchen TJ (September 2003) "Environmental Impact Report: Petroleum production by Stuart Petroleum Ltd at Acrasia Field, Cooper Basin, SA." Prepared for Stuart Petroleum Ltd by Fatchen Environmental, Adelaide, September 2003. Revision 2

Fatchen Environmental (September 2002) "Environmental risks and compliance: proposed petroleum exploration drilling by Stuart Petroleum NL at Acrasia 3 (27° 13' 55.20" S 140° 59' 32.61" E)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, September 2002 STU-02-06

Fatchen TJ (July 2002a) "Environmental impact report: proposed extended production test by Stuart Petroleum NL at Acrasia field, Cooper Basin, SA" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd. Adelaide, July 2002 SP-02-04b

Fatchen TJ (July 2002b) "Draft statement of environmental objectives: extended petroleum production test by Stuart Petroleum NL at Acrasia Field, (PEL 90, Cooper Basin)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, July 2002 SP-02-04c

Fatchen TJ (June 2002a) "Environmental Impact Report: proposed petroleum production test by Stuart Petroleum NL at Acrasia 1 (27° 14' 3.94" S 140° 59' 43.21" E)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, June 2002 SP-02-04

- Fatchen TJ (June 2002b) "Draft Statement of Environmental Objectives: Initial Petroleum Production Test by Stuart Petroleum NL at Acrasia 1 (PEL 90, Cooper Basin)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd Adelaide, June 2002 SP-02-04a
- Fatchen Environmental (May 2002) "Environmental impact report: proposed petroleum exploration drilling by Stuart Petroleum NL at Acrasia 2 (27° 13' 58.67" S 140° 59' 3.23" E)" Prepared for Stuart Petroleum NL by Fatchen Environmental Pty Ltd, Adelaide, May 2002, STU-02-04
- Fatchen Environmental (2000) Declaration Of Environmental Factors & Environmental Impact Report: proposed petroleum exploration drilling by Stuart Petroleum NL at Acrasia 1 (27° 14' 3.94" S 140° 59' 43.21" E). Prepared for Stuart Petroleum NL. Fatchen Environmental Pty Ltd, Adelaide, June 2000
- GPA Engineering (August 2003a) "Acrasia design basis document". Report for Stuart Petroleum on Acrasia Permanent Crude Oil Processing Facilities. GPA Engineering, Adelaide.
- GPA Engineering (August 2003b) "Preliminary overview risk assessment". Report for Stuart Petroleum on Acrasia Permanent Crude Oil Processing Facilities. GPA Engineering, Adelaide.
- Stuart Petroleum Ltd (August 2002) "Statement of Environmental Objectives, Acrasia Field (PEL 90, Cooper Basin) Extended Petroleum Production Test". Stuart Petroleum Ltd, Adelaide, July 2002.
- Stuart Petroleum Ltd (November 2003) "Statement of Environmental Objectives: Petroleum production at Acrasia Field, Cooper Basin, SA." Stuart Petroleum Ltd, Level 7, 22 King William Street, Adelaide, South Australia 5000, November 2003)

Acrasia water disposal investigations

- Australian Groundwater Technologies (2009) "Production water disposal study; Acrasia Oilfield, Cooper Basin PPL 203 S.A." Prepared for Stuart Petroleum Ltd by Australian Groundwater Technologies Pty Ltd, Adelaide. ACT Report No. 2009/401a
- Fatchen TJ (November 2008) "Acrasia water disposal: possible infiltration expansion Addendum" Prepared for Stuart Petroleum Ltd by Fatchen Environmental Pty Ltd, Adelaide, November 2008. STU-08-58 Revision 1.1
- Fatchen TJ (September 2008) "Acrasia water disposal: possible infiltration expansion." Prepared for Stuart Petroleum Ltd by Fatchen Environmental, Adelaide, 2008 . Revision 1.1
- Fatchen TJ (April 2007) "Proposed disposal of produced water at Acrasia Production Facility" Prepared for Stuart Petroleum Ltd by Fatchen Environmental, Adelaide, April 2007. Revision 6.
- Stuart Petroleum Ltd (November 2007) "Trial of produced water disposal to surface drainage at Acrasia". Stuart Petroleum Ltd, Level 7, 22 King William Street, Adelaide SA in association with Fatchen Environmental Pty Ltd. Revision 5, November 2007.

Other gibber area exploration wells

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Rev	Date closed	About	Who
0.0	27 May 10	Initial draft including revised tabulations, diagrams	FE
0.1	28 May 10	“Draft” applied to all SEO references; forwarded to Stuart Petroleum for feedback	FE
1.0	28 Oct 10	Current PEL/PPL maps incorporated, general editing, updated list of Environmental Risks and Compliance Documents (ERCs)	FE
1.1	27 Jan 11	Incorporated DMITRE (then- PIRSA) risk definitions and legislative corrections	FE
2.0	20 Feb 11	Revisions to incident definitions, hydrotesting provision, water quality	FE/STU
2.1	8 April 11	Corrections to hydrocarbon concentration, legal names	FE/STU
2.2B	26 May 11	Incident definitions consolidated and groundwater breakout addressed	FE/STU
2.3	7 June 11	Groundwater monitoring revised to match proposed monitoring actions	FE/STU
2.4	24 June 11	Hydrotest risks added	FE/STU
3.0	2 Dec 11	Responses incorporated and regulatory changes included: non-draft version	FE/STU