EAGLE BAY RESOURCES NL

STATEMENT OF ENVIRONMENTAL OBJECTIVES (SEO)

DRILLING AND WELL OPERATIONS IN WESTERN PEL182

Rev 2.2, July 2006

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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 Act 2000* (the Act) and Regulations 12 and 13 of the *Petroleum Regulations 2000*.

The intent of this SEO is to outline the environmental objectives that Eagle Bay Resources NL ('EBR'), as operator within those parts of PEL182 impinging on or connected with specific Control Zones of the Coongie Lakes district, is required to achieve during **drilling and well operations**, and the criteria upon which these objectives are to be assessed. Environmental objectives have been developed from the drilling SEOs already in force for other areas, and from the provided in the Environmental Impact Report for drilling and production testing in western PEL182 ("Western Wells EIR").

Production testing for the same area is the subject of a separate SEO

The Petroleum 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.

1.2 Relation to other Cooper Basin SEOs

The SEO is derived from the Santos SEO for drilling and well operations (Santos November 2003), the standard SEO under which most drilling in the South Australian portion of the Cooper Basin is undertaken.In the interest of a stand-alone document, much of the Santos Drilling and Well Operations SEO is repeated *verbatim* in this document, with changes and additions as appropriate to PEL182.

Additions and alterations have been necessary for Eagle Bay Resource's operations in the western part of their licence area, where additional to normal constraints within the Cooper Basin, drilling and associated activities have additional regulatory requirements, under gazetted Special Management Zones associated with the Coongie Lakes National Park and surrounds (Figure 2). Alterations have also been made following public discussion and submission on the publicly circulated draft of the SEO.

1.3 Scope

This SEO applies to EBR's drilling and well operations in the western portion of PEL182, Cooper Basin (Figure 1), and may be extended to their other operations in PEL182 or elsewhere in the Cooper Basin. Operations are described in the Environmental Impact Report (EIR). Those covered by this SEO are:

- well site and access track construction
- drilling
- well completions and workovers
- gas and oil systems on well leases
- well and zonal abandonment
- waterflood or water injection activities
- site and access abandonment and remediation.

The following operations are not covered by this SEO:

- seismic exploration activities
- production and processing operations.

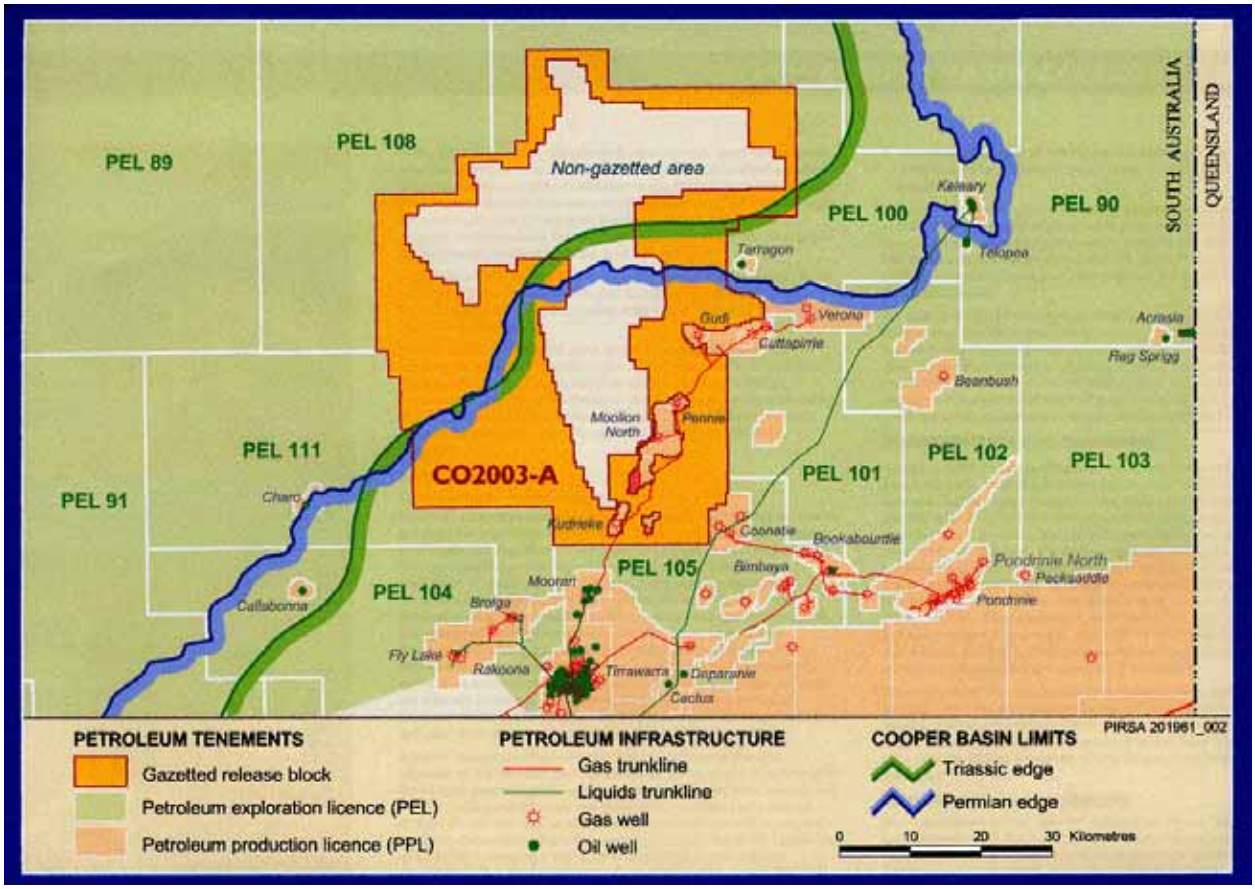

Figure 1. Offer document for CO2003-A, now PEL182, in the Cooper Basin, showing Non-gazetted areas which incorporate Coongie Lakes National Park and zones excluding petroleum activity.

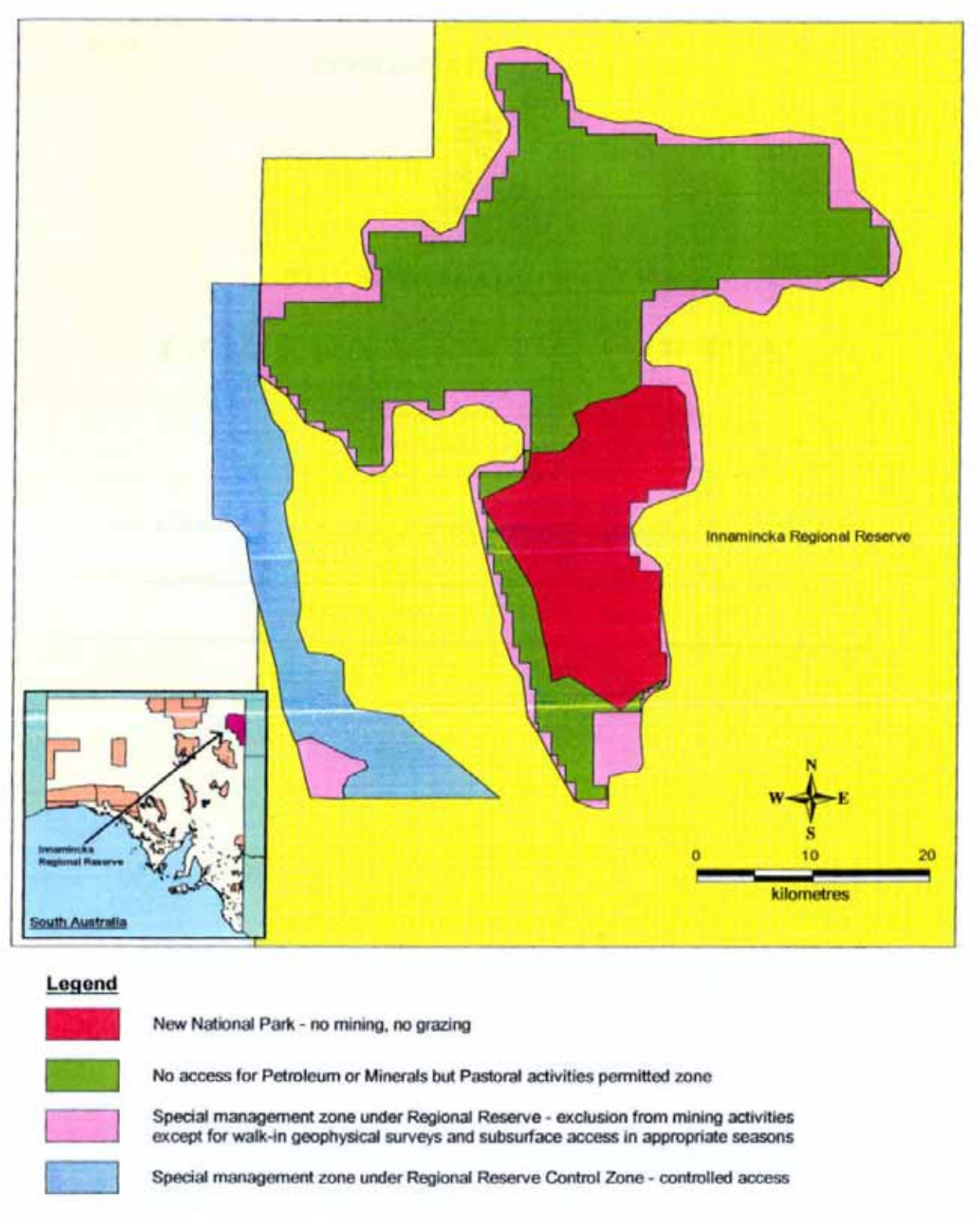

Figure 2. National Park, No-Access buffer zones, and Special Management Zones associated with core Ramsar intermittent wetlands. PEL182 includes the Special Management Zones within its licence area, and surrounds the National Park and the No-access zones.

2. ENVIRONMENTAL OBJECTIVES

2.1 Objectives

The objectives of the Act include:

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

Environmental hazards and risks of drilling and associated activities have been identified in the EBR Western Wells EIR. The purpose of the SEO is to provide the environmental objectives which to which drilling and related activities, including transportation, must conform, and the criteria upon which achievement of those objectives can be assessed, for consideration under Section 101(1) of the Act. A condition of approval of the activity is that Eagle Bay Resources is liable for meeting the environmental objectives and assessment criteria.

The SEO covers objectives which apply regardless of the extent or detail of drilling and associated activities. Accordingly, most Environmental Objectives in this SEO have previously been covered by other SEOs in the Cooper Basin.

Environmental objectives for drilling and well operations are:

1) Minimise the risk to the public and other third parties.

a) Minimise general public and third party risks

b) Minimise fire risk and prevent the spread of any fires to wellheads

2) Minimise disturbance and avoid contamination to soil.

a) Minimise soil impacts

b) Avoid storage and loading facility spills; achieve rapid cleanup and impact minimisation following spills

c) Avoid transportation spills; minimise the likelihood of spread of a transportation spill; minimise impacts of fire from any transportation spill

3) Avoid the introduction or spread of pest plants and animals and implement control measures as necessary.

4) Minimise disturbance to drainage patterns and avoid contamination of surface waters and shallow groundwater resources.

a) Avoid drainage alterations

b) Avoid storage and loading facility spills; achieve rapid cleanup and impact minimisation following spills

c) Avoid other sources of surface and groundwater contamination

5) Avoid disturbance to sites of cultural and heritage significance.

a) Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance

b) Minimise visual impacts

6) Minimise loss of aquifer pressure and avoid aquifer contamination.

a) Minimise formation damage in drilling

b) Prevent cross-connection between aquifers, and between aquifers and reservoirs

7) Minimise disturbance to native vegetation and native fauna.

a) Avoid impacts on high biological value or wilderness value areas

b) Minimise disturbance to vegetation and habitat

c) Avoid disturbance to rare, endangered, vulnerable species

8) Minimise air pollution and greenhouse gas emissions.

9) Maintain and enhance partnerships with the Cooper Basin community.

10) Avoid or minimise disturbance to stakeholders and associated infrastructure.

a) Minimise adverse impact on livestock

b) Avoid contamination of stockwaters with hydrocarbons

c) Minimise adverse impact on Regional Reserve operations

11) Optimise waste reduction and recovery.

12) Remediate and rehabilitate operational areas to agreed standards.

a) Rehabilitate unsuccessful or suspended wellsite and access

b) Undertake long-term planning for rehabilitation for potential producing wellsite

2.2 Assessment Criteria

The criteria for measuring the achievement of these environmental objectives are given in Tables 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 non-indigenous heritage significance", for which one assessment criterion is compliance with the *Aboriginal Heritage Act 1988* and with the CO-98E Native Title agreement.
- 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. 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 2003) are given in Tables 2 to 5, with modifications appropriate to the circumstances of the EBR western wells.

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 (for example, the objective to 'Minimise loss of aquifer pressures and avoid aquifer contamination' may require ongoing monitoring of well bore pressures).

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

4.1 Serious incidents

Section 85(1) of the Act defines "serious incident" to mean:

"an incident arising from activities conducted under a 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."

Pursuant to Regulation 12(2) of the Act, the incidents listed below are considered to be those which could arise and, if not properly managed or avoided, cause a serious incident:

- Explosion or fire at the well or loading facility;
- Failure of containment systems at storage and loading facility;
- Spills of oil outside bunded and other defined areas intended to contain spillages within Special Management Zones of Figure 2.
- Transportation accident involving oil spillage;
- Transportation accident resulting in fire;
- Failure of the formation water handling and cleaning system;
- Disturbance to sites of Aboriginal and non-indigenous heritage significance;
- Removal of rare, vulnerable or endangered flora and fauna species.
- Any operation extending into the “No Access” zone and/or National Park (Figure 2)
- New road construction within “Walk-In Zone” of Figure 2

4.2 Reportable incidents

Pursuant to Regulation 12(2) of the Act, the incidents listed below are considered to be reportable incidents under Section 85(1) of the Act.

- Non-compliance with procedures defined or developed to implement environmental objectives
- Spills of oil outside bunded and other defined areas intended to contain spillages in areas other than Special Management Zones of Innamincka Regional Reserve
- Evidence of oil in disposed formation water
- Minor transportation accidents other than those listed under "Serious incidents".
- A complaint from a landowner in regard to production and processing operations.
- Other non-compliance with SEO objectives as indicated by assessment criteria in Table 1
- Any detected unauthorised access to production and processing facilities and associated infrastructure.

5. REFERENCES

Fatchen TJ (March 2006) "Environmental Impact Report: proposed petroleum exploration drilling and production testing by Eagle Bay Resources NL IN Western PEL 182: Michelle 1 (27° 21' 34.4" S, 139° 53' 34.0" E); Jasmine 1 (27° 24' 33.7" S, 139° 53' 46.3" E)" Prepared for Eagle Bay Resources NL by Fatchen Environmental Pty Ltd, Adelaide, March 2006. EBR-05-04. Rev. 1.1.

Eagle Bay Resources NL (July 2006) "Eagle Bay Resources NL Statement of Environmental Objectives: Extended Production Testing in PEL 182" Eagle Bay Resources, West Perth, WA, July 2006. Rev 1.1

Santos (November 2003) "South Australia Cooper Basin Operators Statement of Environmental Objectives: Drilling and Well Operations." Santos Ltd, Adelaide.

Table 1: Environmental objectives and assessment criteria

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
1. Minimise risk to public and third parties				
1a	*Minimise general public and third party risks*	Risks arise through combination and potential conflict of public and rig or oil transport moves on the same road, particularly the Walkers Crossing public access route. Also, well blowouts and industrial safety issues may affect public and other parties	• Maintenance of Walkers Crossing road south of crossing. • Grading of existing Walkers Crossing road north of crossing. • Reconstruction of Walkers Crossing to allow emergency passing. • Low vehicle speed limits set at Walkers Crossing and approaches. Procedural "give-way" rules for rig and oil traffic • Repeated signage on Walkers Crossing road. Local signage on immediate approaches to each well prohibiting entry, warning against trespassing, and warning of truck movements. • At wellsites, regular integrity testing. Firefighting extinguishers for loading areas and pump bunded areas.	• No public or third party incidents • Procedures exist for trucking movements including "stop and scan" and give-way procedures at Walkers Crossing. • Signage present, including speed limits • Logs exist of integrity testing at wellheads • Extinguishers present at loading areas • Installations meet appropriate Australian Standards
1b	*Minimise fire risk and prevent the spread of any fires to wellheads*	Fire risks from the combination of spillage with ignition sources; OH&S considerations, potential loss of resource	• Containment and isolation of fires. • Maintenance of separation distances of facilities to avoid escalating events and to allow manual shutoff/isolation of fuel. • 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)	• An Emergency Response Plan exists for the operation • 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
2. Minimise disturbance and soil contamination				
2a	*Minimise soil impacts*	Access and pad construction including borrow development can lead to expanding soil erosion or alteration impacts, particularly from water erosion and/or ponding, sand drift and dust generation.	• Walkers Crossing road north of Walkers Crossing regraded to reduce current extent of ponding and channelling. • No borrow areas developed for access within the Walk-In zone. • No borrow for access taken from the Controlled Access Zone except at formally notified and approved locations. • Minimise scraped and clayed access and pad areas consonant with engineering and safety requirements • Vehicles normally kept to prepared surfaces • Dune crossings clayed to minimise bogging and track braiding. • Topsoil and plant detritus from cleared areas—pads and borrow--stockpiled for later re-spreading	• There is no unauthorised off-road driving or creation of short cuts • Surface soil and plant dtertitus stockpiles are evident • There is no acceleration in erosion rate due to constructed surfaces.

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
2b	*Avoid storage and loading facility spills; rapid cleanup and impact minimisation following spills*	Spills can arise from vehicle and plant refuelling, drilling operations, oil and fuel storage, pumping, loading facilities. There is a risk of pollution if spills are allowed to escape into the surrounding environment.	• Within the Controlled Access Zone at Michelle 1, all storage, loading and refuel out of the Christmas Creek floodplain. • Refuel areas HDPE/clay floored and locally bunded. Sump(s) bunded. "Speed hump" bunds on edge of clay pad. • Minor spillages on pads to be left to evaporate and bio-remediate. Where contamination is major, contaminated soil disposed in sump with drilling muds at end of drilling. • High containment integrity systems using steel piping and complying with AS4041 *Pressure Piping.* • Piping pressure tested to the highest forecast operating pressures. • Filling systems, storage tank operation and tanker procedures in accordance with AS1940 *The Storage and Handling of Flammable and Combustible Liquids* • Procedures developed and in place to minimise overflow and loading spill risks, and integrity management. Attendance at equipment at all times during road tanker filling. Active management of storage tank filling.	• No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them. • No release of production fluid onto Christmas Creek or Cooper Creek floodplain, floodouts or channels. • Levels of hydrocarbon continually decreasing in the case of *in situ* remediation of spills. • Remediation to accepted Soil Health Index levels (dependent on completion of SHI studies, PIRSA/Santos)

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
2c	*Avoid transportation spills; minimise the likelihood of spread of a transportation spill; minimise impacts of fire from any transportation spill*	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. The key risk minimisation is also a practical one: simply not to move during periods of high hazard. Fires from transportation accidents have less pollution issues but potentially major impact if conditions are appropriate for spread of wildfire.	• Procedures in place for safe movement of hydrocarbon/chemical transport • Full trains only to move in daylight hours • No movement on wet roads or in wet conditions • No "wet wheel" fording of flowing watercourses other than sealed floodways with depth markers. Fording depth limit as set by regulatory authorities. • Reconstruction of Walkers Crossing to safe standard, with vehicle speed limits and procedural “give-way” rules for rig and oil traffic • Maintenance of Walkers Crossing road south of crossing. Grading of existing Walkers Crossing road north of Walkers Crossing to provide temporary reasonable road surface. • Dune crossings designed to minimise risk of collision and of rollovers. • contaminated soil on dune, sandplain or floodplain outside Control Zones either landfarmed in place, or in extreme cases removed for pit disposal. • contaminated soil on floodplain within Control Zones either be landfarmed in place with local bunding to prevent local runon/runoff, or in lower floodplain levels removed for pit disposal off the floodplain. • contaminated soil from spillage at a watercourse or floodway crossing removed • Spill contingency and emergency response plans in place. • Conformance with Dangerous Substances Act 1979 and Environment Protection Act 1993 • Actual transportation fires permitted to burn out. Earthmoving equipment brought in if necessary to contain secondary fires.	• No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them. • No release of production fluid onto Christmas Creek or Cooper Creek floodplain, floodouts or channels. • Levels of hydrocarbon continually decreasing in the case of *in situ* remediation of spills. • Remediation to accepted Soil Health Index levels (dependent on completion of SHI studies, PIRSA/Santos)

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
3. Avoid introduction of pest species				
3	*Avoid the introduction or spread of pest plants and animals and implement control measures as necessary*	Activity associated with lease and access track 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. However, given the proximity to Coopers Creek channels, most naturalised aliens of the region can be expected to be present.	• Requirement for contractor/other vehicles to be clean prior to entering. but • Control measures implemented for new imports as necessary • Securing of food wastes to avoid encouraging feral animals	• No new weeds or feral animals introduced to operational areas • Weeds and feral animals which are present are consistent with surrounding areas
4. Minimise disturbance to drainage patterns and avoid contamination of surface and shallow groundwaters				
4a	*Avoid drainage alterations*	Greatest risks are associated with access and pad construction crossing floodplain and channels, and either impeding, blocking or redirecting water flows. Blocking or redirection of channels can have major repercussions on downstream habitat. Even minor changes to microtopography on floodouts may result in major redirection of water films and consequent redistribution of vegetation and habitat. Track construction and wellsite selection should aim to minimise impacts by avoiding sensitive areas where possible and by appropriate construction methods.	• Wellsites distant from channels and off floodplain where possible within Controlled access Zone • Pads constructed to avoid any significant water re-direction. • Walkers Crossing reconstructed so as not to impede low flows. Crossings of other channels at grade, or with low road formation and piping to permit low or local flows. • Walkers Crossing road within Control Zones: road maintained by grading and watering only.	• Wellsites and access tracks are located and constructed to maintain pre-existing water flows except for extreme flood protection requirements. Specifically, water flow into the claypan at Michelle in a 100- to 150-year flood may be prevented by a bund while operations are present, and an equivalent bund may be used to prevent outflow of potentially contaminated water due to a major rainfall event. These exceptions do not fundamentally alter or redirect normal flow channels. • 0, +1 or +2 GAS criteria are attained for drainage-related objectives as listed in Tables 2 and 3, during well lease and access track site selection, construction and rehabilitation.
4b	*Avoid storage and loading facility spills; rapid cleanup and impact minimisation following spills*	See under 2, above for both drilling and production		• No production or process fluid, or fuel or chemical spills or leaks outside areas designed to contain them. • No release of production fluid onto Christmas Creek or Cooper Creek floodplain, floodouts or channels.

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
4c	*Avoid other sources of surface and groundwater contamination*	Hydrocarbon contamination due to formation water or brines disposal to groundwater with hydrocarbons present	• Production water, either formation water or drilling brines, returned to existing drilling sumps for disposal. No water will be released to evaporative disposal beyond bunded areas for purposes of initial production.	• No formation water or brines released beyond actual drilling pads
5. Avoid disturbance to sites of cultural and heritage significance				
5a	*Avoid disturbance to sites of Aboriginal and non-indigenous heritage significance*	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.	• Wellsites, camps, access and borrow 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 artefacts identified • Survey records kept and available for audit	• Proposed wellsites, access and ancillary areas have been surveyed and any sites of Aboriginal and non-Aboriginal heritage identified. • Any identified cultural and heritage sites have been avoided or otherwise appropriately cleared and managed
5b	*Minimise visual impacts*	Visual impacts arise through obtrusive access and pad 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.	• Small-footprint rig used • Pads and their loop roads arranged with irregular outlines, split into camp area and drill pad. • Use local borrow on access to reduce colour contrasts. • Active rehabilitation of drill pads and borrow areas in the event of abandonment.	• Visual impacts considered in site planning and development

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
6. Minimise loss of aquifer pressures and avoid aquifer contamination				
6a	*Minimise formation damage in drilling*	These objectives seek to protect water quality and water pressure of aquifers that may potentially be useful as water supplies, and to maintain pressure in sands that might host petroleum accumulations elsewhere. There are also contamination issues: contamination of higher-quality groundwater with lower-quality waters (salinity, trace elements) or with hydrocarbons	<u>Drilling & Completion Activities</u> • A competent cement bond between aquifer and hydrocarbon reservoirs is demonstrated. • For cases where isolation of these formations is not established, a risk assessment incorporating the use of pressure / permeability / salinity data is undertaken in consultation with DLWBC & AAWCMB to determine if lack of cement or poor bond will cause or has caused damaging crossflow which needs to be remediated. <u>Producing, Injection and, Inactive Wells</u> • Monitoring programs implemented to assess condition of casing and cross-flow behind casing. • The condition of the primary casing barrier is adequate. • For cases where crossflow is detected, a risk assessment is undertaken in consultation with to determine if lack of cement or poor bond will or has caused damaging crossflow which needs to be remediated. <u>Well Abandonment Activities</u> • Isolation barriers are set in place to ensure that crossflow, contamination or pressure reduction will not occur.	<u>Drilling & Completion Activities</u> • There is no uncontrolled flow to surface (=no blow out). • Sufficient barriers exist in casing annulus to prevent crossflow between separate aquifers or hydrocarbon reservoirs. • Relevant government approval obtained for abandonment of any radioactive tool left downhole. <u>Producing, Injection, Inactive and Abandoned Wells</u> • No cross-flow behind casing between aquifers, and between aquifers and hydrocarbon reservoirs unless approved by DWLBC.
6b	*Prevent cross-connection between aquifers, and between aquifers and reservoirs*			

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
7. Minimise disturbance to native vegetation and fauna				
7a	*Avoid impacts on high biological value or wilderness value areas*	Direct physical impact on high biological or wilderness value areas; fires started at pad; oil contamination; fires originating from oil spillages extending into high value areas. High value areas are effectively defined by the Special Management Zones and the fact that the intermittent wetlands nearby are the core of the Ramsar wetland areas.	Use existing road through Walk-In Zone and Controlled Access Zone, with grading rather than reconstruction. No borrow development within either Zone, other than out of floodplain in Controlled access Zone. Total prohibition on oil and rig movement through Walkers Crossing when water is over the road formation at the Crossing.	• No new road construction or borrow sourcing in Walk-In Zone. • No movement through Walkers Crossing when water is over the road surface.
7b	*Minimise disturbance to vegetation and habitat*	Physical damage to soils, vegetation and habitat generally through access and pad construction or upgrade; fires at well or in transit resulting in wildfire; spillages and spread of spilled oil	Use of existing access (Walkers Crossing road) and road construction in Controlled Access Zone limited to temporary grading/watering but not new formation or route building. Minimised route distances and easement widths for new access. No clearing of Category 1 trees, minimise removal of tall shrubs or trees >1.5m. Flagging of trees/groves for avoidance where appropriate. Stockpiling of surface soil and debris from site levelling and cuts (sumps, pits) for later use in rehabilitation. Alternate routes and placement considered during planning phase to minimise environmental impacts Borrow pits, sumps, are designed and constructed as far as practicable to minimise fauna entrapment. Sumps and mud pits are fenced as appropriate to minimise wildlife access Assessment records are kept and are available for auditing. Borrow pits are restored to minimise water holding capacity, where agreements are not in place with stakeholders Inductions emphasising minimisation of damage to vegetation; controls on movement of vehicles and people off prepared sites; fire procedures in place.	• 0, +1 or +2 GAS criteria are attained for vegetation-related objectives as listed in Tables 2 to 5, during well lease 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.

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
7c	*Avoid disturbance to rare, endangered, vulnerable species*	Physical removal of rare, endangered, vulnerable species through access and pad construction, oil contamination	• Proposed wellsites, access and borrow areas assessed for rare, vulnerable and endangered species before construction	• Sites with rare, vulnerable and endangered flora and fauna present or potentially present have been identified and avoided. • No known loss of rare, vulnerable or endangered species.
8. Minimise air pollution and greenhouse gas emissions				
		Atmospheric emissions occur as a result of standard practices undertaken during drilling and well operations: Combustion by-products, particulates, flared or vented hydrocarbon release.	• Conduct well testing in accordance with appropriate industry accepted standards. • Appropriate emergency response procedures are in place for the case of a gas leak. • Blowdown carried out in accordance with industry accepted standards / good production practice.	• Compliance with EPA requirements.
9. Maintain/enhance partnerships in community				
		Liaison with local Cooper Basin community and information to other stakeholders		• Affected parties notified and consulted on proposed activities. • Public scrutiny, consultation and participation in EIR and SEO process • No unresolved reasonable complaints from the community.

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

	Environmental objective	Comment	Means for achieving objectives	Assessment Criteria
10. Avoid or minimise disturbance to stakeholders and associated infrastructure				
10a 10b	*Minimise adverse impact on livestock* *Avoid contamination of stockwaters with hydrocarbons*	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	• Stakeholders notified prior to survey and construction, and prior to operations generally • No formation water or brines released beyond actual drilling pad. • Gates or cattle grids are installed to a standard, consistent with pastoral infrastructure in fences where crossings are required for access. • All gates left in the condition in which they were found (ie. open/closed). • Potential sources of contamination are fenced as appropriate to prevent stock access. • System is in place for logging landholder complaints to ensure that issues are addressed as appropriate. • Requirements of the Cattle Care and Organic Beef accreditation programs are complied with.	• No unresolved reasonable complaints from the community. • Other criteria as for Objective 4 above
10c	*Minimise adverse impact on Regional Reserve operations*	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	• Liaison with Park management maintained. • Proposals to reduce public risk also minimise impact on visitors (see Public Risk, 1 above).	• No unresolved reasonable complaints
11. Optimise waste reduction and recovery				
	Minimise waste handling and disposal impact	Creation of wastes: sewerage, litter, overflow and spillage; and their disposal while drilling	• Sewage using self-contained temporary tankage and disposed at Moomba. • Wastes on site confined by bins/skips. Disposal eventually to EPA-licensed waste disposal facility at Moomba: • Minor non-toxic wastes, muds disposed in drill sump. • Litter cleanup during and post-drilling.	• With the exception of drilling fluids, drill cuttings and other fluids disposed during well clean-up, and sewage wastes, all wastes to be disposed of at an EPA licensed facility in accordance with EPA Licence conditions. • No evidence of litter on sites post-drilling • No evidence of litter at borrow pits.

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

	Environmental objective	Comment	Means for achieving objectives	• Assessment Criteria
12. Remediate and rehabilitate operational areas				
	Rehabilitate unsuccessful or suspended wellsite, access and borrow	Wellsite and access permanently left in place if "dry" with visual impact, changed soil surfaces, colour contrasts	Cleanup, sump filled, facilities removed. Ripping of pad, followed by respread of stockpiled surface soil and reshaping of slopes to approximate original profile. *Jasmine 1 rig access:* Light ripping of access on dune crossings and re-spreading of sand cover and any windrows: smoothing of any windrows and light scarifying of access on clay interdunes. Any pipes/culverting removed and channels/gutters re-established. Borrow areas with slopes smoothed to avoid gullying. *Walkers Crossing road:* road left for public use, as prior to exploration	• 0, +1 or +2 GAS criteria are attained all objectives as listed in Tables 2, 3 and 5, for well lease and access rehabilitation.
	Undertake long-term planning for rehabilitation for potential producing wellsite	In the event of a successful well and initial production test, rehabilitation will not be undertaken as development toward at least an extended production test would be needed.	• Development of rehabilitation plans included in production management	• Rehabilitation plan provided to regulator

Table 2: GAS criteria for assessing well site location and construction

	Reduce disturbance to drainage patterns	**Minimise impacts on soil**	**Minimise impact on vegetation**
	No obstruction of water flows	*Location of roads and borrow*	*Minimise perennial vegetation clearance*
-2	Water flows obstructed as a result of earthworks (other than containment bunding to prevent polluted runoff).	New road construction in Walk-in Zone. Borrow materials taken from Walk-In Zone.	Trees of priority 1 removed in area where could have been avoided.
-1	Minor channels only obstructed during well lease and access track construction (other than containment bunding to prevent polluted runoff).	New road construction in Controlled Access Zone outside approved areas. Borrow materials taken from Controlled Access Zone outside approved areas	Vegetation of priority 2 or 3 removed in area where could have been avoided.
0	No obstruction of water flows, or flows diverted around the well lease if required (other than containment bunding to prevent polluted runoff).	Access and pad borrow	Trees and vegetation removed in area where unavoidable
1	No obstruction of water flows, or flows diverted around the well lease if required, containment bunding		No trees removed, only vegetation of priority 4 cleared.
2	No obstruction of channels of any dimension.		No trees or vegetation removed.

Table 3: GAS criteria for assessing well site restoration

	Minimise residual impacts on drainage	**Minimise visual impact of abandoned well sites and access tracks**		
		Interdune and floodplain well sites	*Well sites on dunes*	*Access tracks assessed from the main track*
-2	Site or access permanently blocks drainage	The site remains as a prominent consolidated surface with a distinct edge.	Extensive gully erosion down the face of the dune and/or a steep site edge is prominent.	The track is prominent because of a scraped surface, windrows along its edges or gully erosion.
-1	Site or access permanently impedes and/or diverts drainage	The site surface and edge have been contoured into the surrounding landscape, but the colour of foreign material contrasts with the surroundings.	The edge of the site has been restored into the natural contour of the dune, but the colour of foreign material contrasts with the surroundings.	The track surface has been contoured into the surrounding landscape, but the colour of foreign material contrasts with the surroundings.
0	Site or access has minor drainage influence or redirection	The site contours and colour blend with the surroundings; but earthwork disturbance (eg ripping or respreading of original material) is still prominent.	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. Erosion gullies are present down the face of the dune but they are not extensive or prominent.	The track contours and colour blend with the surroundings, but the earthwork disturbance (eg. ripping, rolling or respreading of original material) is still prominent.
+1	Site or access has no apparent influence on drainage	The earthwork disturbance is beginning to blend into the surroundings.	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 track contours and colour blend with the surroundings and the earthwork disturbance is beginning to blend also.
+2	[Site or access cannot affect drainage regardless of construction—may apply for dunefield areas]	The site contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable from the surroundings.	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 track contours and colour blend with the surroundings and the earthwork disturbance is indistinguishable.

Table 3: GAS criteria for assessing well site restoration (Cont…)

	Re-establish natural vegetation on abandoned well sites and access tracks		**Site to be left in a safe condition**
	Less than 5 years since restoration	*More than 5 years since restoration*	*Backfilling and marking*
-2	The site remains as a consolidated surface.	No revegetation evident.	Incomplete filling of sumps, cellars, ramps
-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.
0	The site surface has been appropriately restored to facilitate revegetation (eg. ripping or 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.
+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.	
+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 is indistinguishable from the surroundings.	

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**
	Perennial vegetation clearance minimised	*Avoid sites*	*Site pit appropriately*
-2	Trees of priority 1 in Field Guide[1] removed in area where could have been avoided.	Sites disturbed.	Borrow pit less than 20m from road.
-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.
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.
+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.
+2	No trees or vegetation removed.	Sites identified, flagged and avoided by 100m.	Borrow pit not visible from road.

[1] 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**
	Acceptable revegetation after rainfall	*Minimise erosion*	*Borrow pit effectively recontoured and ripped*
-2	No revegetation evident.	Severe erosion evident.	No recontouring of pit has occurred – pit sides are very steep. Topsoil and vegetation not respread.
-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 not ripped.
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 ripped along the contour, but are still highly visible. Topsoil and vegetation respread over disturbed area.
+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. Access ripped.