ACTIVITY:	Environmental Significance Assessment																		
PROJECT:	Cooper Basin Petroleum Production Operations, Beach Petroleum																		
ASSESSOR:	Belinda Close			**PREDICTABILITY**						**MANAGEABILITY**									
REF	TYPE OF IMPACT	EVENT(S)	POTENTIAL CONSEQUENCES	SIZE	SCOPE	DURATION	FREQUENCY	STAKEHOLDERS	SIGNIFICANCE	AVOIDANCE	PROBABILITY	DURATION	SIZE AND SCOPE	CUMULATIVE EFFECTS	STAKEHOLDERS	SIGNIFICANCE	COMMENTS	**Environmental significance**
	Natural Environment Impacts																	
	Soil Impacts																	
3.4, 5.5		Vegetation clearance due to road and easement construction.	Exposure of soil to wind and water erosion.	H	H	H	H	H	1	No	High	Short				2	Existing roads and tracks utilised and maintained where appropriate. Road construction methods depend on the land system road will pass through (eg. gibber plains rolled). Design and construct road with drainage features (eg. Culverts and offtakes) that minimise erosion and sedimentation. Erosion controls implemented during and after construction. Respread topsoil and stockpiled vegetation.	**LOW**
5.4		Movement of heavy vehicles (eg. Trucks and side boom tractors).	Soil compaction, inversion of soil profile.	H	H	H	H	H	1	No	High	Short				2	Road construction methods for different land systems summarised in Table 4. Areas of compacted soil to be ripped (except on gibber plains and tableland environments)	**LOW**
3.2, 5.3		Disposal of produced formation water.	Contamination of soil with salts and metals naturally occurring, but concentrated in the PFW.	H	H	H	M	H	2	No	Low					1	Disposal is to interceptor pits and then to evaporation ponds/infiltration basins. Ponds to be sited appropriately to minimise potential impact. This includes consideration of relevant environmental factors including location of surface water, potential flooding and location of vegetation. Measures will be taken to reduce the potential impact on these factors through the use of best practice. Interceptor pits lined and skimmed during operation. Do not overfill evaporation ponds. Audit pond sludge and water annually.	**LOW**
3.3, 3.6.2, 5.2, 5.4		Spills associated with flowline failure, equipment leaks, overflow of storage tanks.	Soil contamination.	M	H	M	M	H	2	No	Low					1	Flowline design construction in accordance with Australian standards. Regular inspection of flowlines to be undertaken to ensure they do not come into contact with soil. Monitoring of the performance of cathodic protection devices on buried steel flowlines carried out to ensure that protection levels are adequate. Major flowlines also pigged regularly to remove water and sludge accumulating in low points. Appropriate storage and containment and implementation of storage and handling procedures. All chemicals and fuels (including oil storage tanks and waste sump oil pits) are stored on impervious bunded surfaces. Contaminated soil treated with fertilisers in situ and stockpiled at landfarm for use in land treatment units. Immediate clean up and remediation to minimise contamination. Possibility that Beach may need to establish a land treatment site for soil remediation, which would involve mixing oily soil with existing soil.	**LOW**
3.5, 5.2, 5.6		Spills associated with transport of oil/condensate.	Soil contamination.	M	H	H	M	H	2	No	Med	Short				2	Oil to be transported in accordance with Australian Dangerous Goods code. Training to increase awareness of hazards. Speed restriction in place. Roads and causeways designed to minimise risk of accident. Vehicles maintained and serviced in accordance with manufacturer's specifications. No transportation movements in wet conditions or at night. Beach to establish appropriate emergency spill response procedures, with an annual review of procedures and equipment. Immediate celan-up and remediation to minimise contamination of soil. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events.	**LOW**
5.2		Spills associated with tanker load-out.	Soil contamination.	H	H	H	H	H	1	Yes						1	Tanker load-out to occur in lined areas with appropriate bunding to contain spills. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events.	**LOW**
3.6, 5.7		Spills or leaks assiociated with disposal and treatment of sewage.	Soil contamination.	H	H	H	M	H	2	No	Low					1	Containment of all sewage wastes within concrete lined Envirocycle/septic tank. Fence off contaminated areas. Backfill all pits upon completion of production and processing operation.	**LOW**
4.2, 5.2		Flooding of surrounding floodplain and/or watercourses.	Soil contamination.	M	M	M	H	H	2	No	Low					1	Of particular concern if flood levels are high enough to overflow bunded areas. Flood is likely to occur within the lifetime of facilities such as Sellicks that lie within the 10 year flood boundary of Cooper Creek. Severity of consequences are minimised by shutting down and cleaning up facilities in advance of Cooper Creek flooding, which can be predicted several months in advance (see Table 13 for details).	**LOW**

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	Ground and Surface Water Impacts																	
5.4, 5.5		Construction earthworks, Introduction of fill material	Disturbance of natural drainage patterns, siltation of watercourses.	H	M	H	H	H	2	No	Low					1	Restore natural contours to minimise impacts to natural drainage patterns.	**LOW**
5.4		Disposal of hydrotest water.	Contamination of surface water and/or groundwater.	M	M	H	H	H	2	No	Low					1	Use of biocides and chemicals in hydrostatic test water is required in some circumstances to prevent internal corrosion of the flowline. Hydrostatic test water may be disposed into existing lined evaporation ponds (PFW facilities) or to specifically constructed pits sited to prevent contamination of surface or near surface water. Test water free of additives may be disposed of to land adjacent to the construction zone.	**LOW**
3.2, 5.3		Disposal of produced formation water.	Contamination of near surface aquifers by any residual hydrocarbons, process chemicals, naturally occurring metals concentrated in the PFW.	H	M	H	H	H	2	No	Low					1	Disposal is to interceptor pits and then to evaporation ponds/infiltration basins. Ponds to be sited appropriately to minimuse potential impacts. This includes consideration of relevant environmental factors including location of surface water, potential flooding and location of vegetation. Measures will be taken to reduce the potential impact on these factors through the use of best practice. Interceptor pits lined and skimmed during operation. Do not overfill evaporation ponds, audit pond sludge and water annually. **Depth of potential aquifers to be supplied by Beach.**	**LOW**
3.3, 5.2, 5.4		Spills associated with flowline failure, equipment leaks, overflow of storage tanks.	Contamination of surface water and/or groundwater.	M	M	M	M	H	2	No	Low					1	All flowlines designed, constructed and operated in accordance with relevant standards. Approopriate emergency spill response procedures in place. Immediate clean up and remediation to minimise contamination.	**LOW**
3.5, 5.2, 5.6		Spills into creek during transport of oil/condensate.	Contamination of groundwater and/or surface water.	M	M	H	M	H	2	No	Low					1	Access roads may cross Cooper and Strzelecki Creeks therefore install signs at creek crossings. Oil to be transported in accordance with Australian Dangerous Goods code. Training to increase awareness of hazards. Speed restrictions in place. Roads and causeways designed to minimise risk of accident. Vehicles maintained and serviced in accordance with manufacturer's specifications. No transportation movements in wet conditions or at night. Beach to establish appropriate emergency spill resonse procedures, with an annual review of procedures and equipment. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events. Immediate clean-up and remediation to minimise contamination to water.	**LOW**
4.2, 5.2		Flooding of surrounding floodplain and/or watercourses.	Contamination of surface water and/or groundwater.	M	M	M	M	H	2	No	Low					1	This is of particular concern if flood levels are high enough to overflow bunded areas. Flood is likely to occur within the lifetime of facilities such as Sellicks that lie within the 10 year flood boundary of Cooper Creek. Severity of consequences are minimised by shutting down and cleaning up facilities in advance of Cooper Creek flooding, which can be predicted several months in advance.	**LOW**
3.6.2, 5.7		Construction of land treatment site for soil remediation.	Contamination of groundwater and/or surface water.	H	M	H	H	H	2	No	Low					1	Possibility that Beach may need to establish a land treatment site for soil remediateion, which would involve mixing oily soil with existing soil, and transporting remediated soil (as determined using soil health index method developed by Santos) by truck to appropriate disposal locations. Land treatment site to be constructed in a suitable, stable area, distant from watercourses or floodplain areas.	**LOW**
	Vegetation Impacts																	
3.3, 3.4, 5.4, 5.5		Road and easement construction.	Vegetation clearance.	H	H	H	H	H	1	No	High	Med	Confined			3	No species of particular conservation significance identified. If such species present, they are associated with common habitat and can be expected to be widespread in the region. Route selected to minimise/avoid vegetation. Use existing easements where possible. Trim vegetation rather than clear where possible. Particular care taken to ensure minimal clearance in Coolibah woodland during easement preparation. Easement is minimised to 8m in any heavily wooded areas. Respread stockpiled vegetation.	**LOW**

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5.4, 5.5		Introduction of fill material during road construction.	Introduction/spread of weeds.	M	M	H	M	H	2	No	Low					1	Undertake vehicle and equipment washdowm before entering Cooper Basin or after operating in areas of known weed infestations. Drive only on access tracks and construction easements. Inspect/monitor for weeds during standard inspections of facilities and infrastructure. Undertake control measures for weed outbreaks. Do not import material from areas of weed/disease infestation.	**LOW**
3.2, 5.3		Disposal of produced formation water.	Contamination of vegetation with salts and metals naturally occurring, but concentrated in the PFW.	M	M	M	H	H	2	No	Low					1	Disposal is to interceptor pits and then to evaporation ponds/infiltration basins. Ponds to be sited appropriately to minimuse potential impacts. This includes consideration of relevant environmental factors including location of surface water, potential flooding and location of vegetation. Measures will be taken to reduce the potential impact on these factors through the use of best practice. Interceptor pits lined and skimmed. Oil in water content reduced in interceptor pond to <30mg for bunded evaporation ponds and <10mg for unbunded evaporation ponds.	**LOW**
5.4		Movement of heavy vehicles (eg. Trucks and side boom tractors) during flowline construction.	Damage to vegetation and habitats.	H	H	H	H	H	1	No	High	Med	Confined			3	Potential impacts of specific earthworks activities on different land systems summarised in Table 16. Flowline routes are planned to avoid areas of high ecological value and sensitivity.	**LOW**
3.3, 5.2, 5.4		Spills associated with flowline failure, equipment leaks, overflow of storage tanks.	Contamination of vegetation.	M	H	M	M	H	2	No	Low					1	Implementation of appropriate chemical and fuel storage and handling procedures (eg. bunding and signage).	**LOW**
3.5, 5.2, 5.6		Spills associated with transport of oil/condensate.	Contamination of vegetation.	M	H	H	M	H	2	No	Med	Short				2	Oil to be transported in accordance with Australian Dangerous Goods code. Training to increase awareness of hazards. Speed restrictions in place. Roads and causeways designed to minimise risk of accident. Vehicles maintained and serviced in accordance with manufacturer's specifications. No transportation movements in wet conditions or at night. Beach to establish appropriate emergency spill resonse procedures, with an annual review of procedures and equipment. Immediate clean-up and remediation to minimise contamination of soil. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events..	**LOW**
5.2		Spills associated with tanker load-out.	Contamination of vegetation.	H	H	H	H	H	1	Yes						1	Tanker load-out to occur in lined areas with appropriate bunding to contain spills. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events.	**LOW**
5.2		Explosion or fire at the production facility.	Burning of vegetation and habitats.	M	M	M	M	H	2	No	Low					1	All production facilities are designed and constructed in accordance with relevant stadnards. Safety, testing, maintenance and inspection procedures implemented. Safe work permits must be obtained to ensure only individuals with proper clearance can conduct works. Safe smoking areas away from equipment or activity. Appropriate fire fighting equipment available at all production facilities. Emergency response procedures for explosion and fire will be established.	**LOW**
4.2, 5.2		Flooding of surrounding floodplain and/or watercourses.	Spread of contamination to vegetation.	M	M	M	H	H	2	No	Low					1	Of particular concern if flood levels are high enough to overflow bunded areas. Floods likely to occur within the lifetime of facilities such as Sellicks that lie within the 10 year flood boundary of Cooper Creek. Severity of consequences are minimised by shutting down and cleaning up facilities in advance of flooding, which can be predicted several months in advance.	**LOW**
5.2		Access and activity of personnel outside designated facility area/work areas.	Damage to vegetation and habitats	M	M	M	M	H	2	No	Med	Short				2	Training and induction of all personnel and visitors includes information on restricted areas and activities. Vehicle access restricted to designated roads and areas. Fencing and signage to delineate restricted areas.	**LOW**
	Fauna Impacts																	
5.4, 5.5		Construction activities.	Loss of habitats due to vegetation clearance, injury or death of fauna/stock in construction zone.	H	H	H	H	H	1	No	High	Med	Confined			3	Particular care taken to ensure minimal clearance in Coolibah woodland during easement preparation. Easement is minimised to 8m in any heavily wooded areas. Use existing cleared areas for laydowns and turnarounds, and drive only on access tracks and construction easements.	**LOW**

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3.3, 5.4		Flowline construction.	Impediment of fauna movement.	H	H	H	H	H	1	No	Med	Short				2	Minimise impacts to fauna by leaving trenched areas open for as short a time as possible. Utilise trench plugs and fauna ladders (sticks etc) to facilitate the movement of fauna out of and across trench. Reinstate construction areas including easement as soon as possible.	**LOW**
3.2, 5.3		Disposal of produced formation water.	Ingestion of contaminants by native fauna or stock, contact of birds with residual hydrocarbons and other contaminants in interceptor pits.	M	H	M	H	H	2	No	Low					1	Fence off contaminated water sources and maintain fencing. Oil in water content for open ponds must be <10mg.	**LOW**
3.3, 5.2, 5.4		Spills associated with flowline failure, equipment leaks, overflow of storage tanks.	Access to contaminants by stock/fauna.	M	H	M	M	H	2	No	Low					1	Fencing of contaminated areas if threat is posed to fauna/stock.	**LOW**
3.5, 5.2, 5.6		Spills associated with transport of oil/condensate.	Access to contaminants by stock/fauna.	M	H	H	M	H	2	No	Low					1	Oil to be transported in accordance with Australian Dangerous Goods code. Training to increase awareness of hazards. Speed restrictions in place. Roads and causeways designed to minimise risk of accident. Vehicles maintained and serviced in accordance with manufacturer's specifications. No transportation movements in wet conditions or at night. Beach to establish appropriate emergency spill resonse procedures, with an annual review of procedures and equipment. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events. Beach to establish appropriate emergency spill response procedures, with an annual review of procedures and equipment. Immediate clean-up and remediation to minimise contamination to soil/water. Fencing of contaminated areas if threat is posed to fauna/stock.	**LOW**
5.2		Spills associated with tanker load-out.	Access to contaminants by stock/fauna.	H	H	H	H	H	1	Yes						1	Tanker load-out to occur in lined areas with appropriate bunding to contain spills. Register of spills and leaks to be maintained to implement corrective actions based on analysis of spill events. Fencing of contaminated areas if threat is posed to fauna/stock.	**LOW**
4.2, 5.2		Flooding of surrounding floodplain and/or watercourses.	Spread of contamination to fauna.	M	M	M	H	H	2	No	Low					1	Of particular concern if flood levels are high enough to overflow bunded areas. Floods likely to occur within the lifetime of facilities such as Sellicks that lie within the 10 year flood boundary of Cooper Creek. Severity of consequences are minimised by shutting down and cleaning up facilities in advance of flooding, which can be predicted several months in advance.	**LOW**
5.5		Presence of borrow pits.	Injury or death of stock and wildlife, dispersal of watering points and redistribution of stock/wildlife movements resulting in inadvertant damage to vegetation and habitats.	H	H	H	H	H	1	No	Med	Med	Confined			3	Procedures for operation and restoration of borrow pits are followed. Existing unrestored borrow pits used. Construciton of pits must be a minimum of 75m from existing facilities, including stock yards. Pits not to be established in locations which pose an unacceptable hazard to stock or wildlife. Borrow pits restored as soon as practicle after material extraction, and to a standard consistent with the surrounding land use. Topsoil replaced on restored pits, and pit reprofiled to prevent erosion.	**LOW**
	Sensitive Area Impacts																	
1.2.1, 4.3		Disturbance to Innamincka Regional Reserve, Strzelecki Regional Reserve.	Loss of conservation value.	H	H	H	H	H	1	Yes	Low	Long	Confined			3	Both these reserves fall within Beach PELs, however the specific sites are located outside these reserves. Any future production operations insede these reserves will require aditional approval. Consultation will be undertaken with DEH, DWLBC and other relevant stakeholders with regards to minimising the identified potential impacts of production operations on the reserve. Following completion of production operations any affected areas of the reserve will be rehabilitated.	**LOW**
	Social Environment																	
	Community Resource Impacts																	
5.4, 5.5		Change in visual appearance of the area due to construction and long-term persistence of facility and access.	Reduction in aesthetic value.	H	H	H	H	H	1	No	High	Long	Confined			3	Where possible conceal line of sight along access tracks to minimise visual impact. Remove waste following construction to minimise visual impact.	**LOW**

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3.4, 3.5, 5.5		Use of public roads.	Degradation of public road through heavy vehicle use.	H	H	H	H	H	1	No	High	Long	Confined			3	Oil transported in dual trailer road tankers. There may be several tankers per day travelling along access and public roads. Currently there ate 10 per week from Sellicks and 1 per week from Aldinga. In the event that damage occurs to public roads as a result of Beach operations, maintenance will be undertaken to restore and maintain the road at an acceptable standard (as a minimum to pre-existing standard)	**LOW**
	Cultural & Heritage Impacts																	
3.3, 4.2, 5.4		Construction earthworks, movement of heavy machinery and vehicles.	Disturbance to sites of cultural significance.	H	H	H	M	H	2	Yes						1	Sellicks- Aboriginal heritage clearances have found that the flood-out area does not contain material of heritage significance, however the sandy rise and low sand dune to the west and north-west is known to be of Aboriginal heritage significance. Access to this area by Beach personnel is restricted. Aldinga- Sand dunes to the north, east and west of the site are currently designated as Aboriginal heritage no-access areas. Christies- An area to the north of the site is designated as a heritage no-access area. Beach to observe procedures and guidelines for the identification, management and protection of cultural heritage sites.	**LOW**
5.2		Access and activity of personnel outside designated facility area/work areas.	Disturbance to sites of cultural significance.	M	H	M	H	H	2	No	Med	Short				2	Training and induction of all personnel and visitors includes information on restricted areas and activities. Vehicle access restricted to designated roads and areas. Fencing and signage to delineate restricted areas.	**LOW**
	Community Health & Safety																	
5.2		Explosion or fire at the production facility.	Personal injury to employees, contractors and possibly the public.	M	M	M	M	H	2	No	Low					1	All production facilities are designed and constructed in accordance with relevant standards. Safety, testing, maintenance and inspection procedures implemented. Safe work permits must be obtained to ensure only individuals with proper clearance can conduct works. Safe smoking areas away from equipment or activity. Appropriate fire fighting equipment available at all production facilities. Emergency response procedures for explosion and fire will be established.	**LOW**
3.6, 5.7		Storage of domestic waste at camps, burning and transport to landfill.	Scavenging by native and pest species, pest outbreaks, odourous emissions.	H	H	H	H	H	1	No	High	Short				2	Minimise generation of waste where practicable. Provide suitable covered bins for the collection and storage of wastes. All waste collected in one area at each camp site. Cover all loads of rubbish leaving camps to ensure no spillage. Reduce, reuse and recycle.	**LOW**
	Economic Environment																	
	Existing Land Use Impacts																	
4.3		Construction and operation activities.	Disturbance of beef cattle pastoral activity.	H	H	H	M	H	2	No	Low					1	Beach holds/operates PELs on several properties that have either obtained, or are in the process of obtaining, certification for NASAA Organic Beef Export. There exists a maximum level of chemicals allowable in soil to permit certification for beef exports. On these properties, any spill sites will be fenced to exclude stock access, and no fertiliser will be added in the site remediation process without permission from the landholder.	**LOW**