Devil Creek Gas Development Project

Apache Energy Ltd

Report and recommendations
of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Report 1307
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Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
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30/06/08	**Proponent Document Released for Public Comment**	**34**
11/08/08	**Public Comment Period Closed**	**6**
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Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for the Environment on the Devil Creek Gas Development Project (DCGDP) by Apache Energy Ltd.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for the Environment on the outcome of its assessment of a proposal. The report must set out:

- The key environmental factors identified in the course of the assessment; and
- The EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the *Environmental Protection Act 1986.*

Key environmental factors and principles

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

(a) Terrestrial Flora and Vegetation;

(b) Terrestrial Fauna;

(c) Marine Fauna;

(d) Marine Environment; and

(e) Greenhouse Gas Emissions.

There were a number of other factors which were very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle;

(b) The principle of intergenerational equity; and

(c) The principle of conservation of biological diversity and ecological integrity.

Conclusion

The EPA has considered Apache Energy Ltd's proposed DCGDP. The project would require construction of a gas plant and pipelines, and a horizontal directional drilling program to facilitate the shoreline crossing of the supply gas pipeline.

Marine Components – The EPA notes that the predicted loss of Benthic Primary Producer Habitat associated with the proposal is within the threshold established in EPA Guidance Statement No. 29, *Benthic Primary Producer Habitat Protection for*

Western Australia's Marine Environment (EPA, 2004), and considers these losses to be acceptable.

The EPA notes that the proponent has designed the Horizontal Directional Drilling (HDD) program to minimise discharges of cuttings and drilling fluids to the environment by incorporating a delay in the punch out to sea bed to allow the maximum amount of cuttings to be returned to the shore through the drill hole.

The proposed drilling activities are not scheduled to occur during the key humpback whale migration period of late September early October, when cows and calves may rest in the area during their southern migration, and impacts to sea turtles are not expected to occur.

Terrestrial components – The EPA notes that the proposal involves the clearing of up to 98.5 ha of Roebourne Plains Grasslands, a vulnerable vegetation association. Given the relatively small area of clearing and the proposed management actions to prevent disturbance outside the project area, this factor can be managed in an environmentally acceptable manner.

The EPA notes that the proposal is unlikely to have a significant impact on terrestrial fauna and bird species, given that the habitats to be disturbed are widely distributed through the region. Some temporary displacement of fauna may occur, however this is unlikely to present a significant impact.

The EPA considers that management measures to minimise entrapment and mortality of fauna in pipeline trenches are necessary. The EPA has recommended conditions restricting the length of open trench and requiring a fauna clearing person be employed to manage and monitor impacts on fauna.

Operational Impacts – The EPA notes that the greenhouse gas emissions related to the operation of the proposed gas plant are predicted to be up to 125,000 tonnes per annum. The proponent has incorporated measures into the design of the gas plant to reduce emissions of greenhouse gasses as far as practicable. The EPA considers that these levels are acceptable provided that opportunities to reduce emissions are reviewed and implemented where suitable on a regular basis.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is for construction and operation of gas processing plant, gas pipelines and a horizontal directionally drilled shore pipeline crossing.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;

3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4, including the proponent's commitments; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Conditions

Having considered the proponent's commitments and information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Apache Energy Ltd to develop a green field gas project including a gas processing plant is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) Rehabilitation of temporarily disturbed areas;

(b) Management of fauna along pipeline corridors;

(c) Design of lighting associated with near-shore construction activities;

(d) Maintenance of benthic primary producer habitat loss within predicted limits; and

(e) Regular assessment and implementation of opportunities to reduce greenhouse gas emissions;

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for Apache Energy Ltd's proposed Devil Creek Gas Development Project (DCGDP), a green field gas development located 45km southwest of Karratha.

The DCGDP is planned to produce gas from the Reindeer Gas Field, providing an additional domestic gas supply of up to 220 terajoules per day to the Dampier Bunbury Natural Gas Pipeline (DBNGP), and between 80 and 160 kilolitres of salable gas condensate per day.

The DCGDP includes an offshore, unmanned platform, offshore supply pipeline, Horizontally Directionally Drilled (HDD) pipeline shore crossing, onshore supply pipeline, gas plant and accommodation facility, and an onshore sales gas pipeline feeding into the Dampier-Bunbury Natural Gas Pipeline (DBNGP).

The installation of the offshore section of the supply gas pipeline and the Reindeer Platform are not included within the scope of this assessment. These offshore components were the subject of a separate referral to the EPA in December 2007 and a level of assessment of "Not assessed – no advice given" was set. The Commonwealth Department of Environment, Water, Heritage and the Arts determined that the offshore component was not a controlled action, and imposed measures to avoid significant impacts.

A transient workforce accommodation facility to accommodate construction workers has been previously approved by the Department of Environment and Conservation (DEC) and the Shire of Roebourne and is not addressed within this assessment. This facility would be modified to serve as the permanent accommodation facility for the operation of the project. Therefore, clearing associated with the accommodation facility is also not addressed within this assessment.

The DCGDP was referred to the EPA in October 2007, and the level of assessment set as Public Environmental Review (PER) with a public review period of six weeks.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The Conditions and Commitments to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 5 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

2. The proposal

Apache Energy Ltd proposes to develop a green field gas development in order to recover and process the gas reserves from the Reindeer gas field, providing an additional domestic gas supply of up to 220 Terajoules per day to the DBNGP.

The onshore component of the proposal in located approximately 45kms southwest of Karratha on the Pilbara coast, with the shoreline crossing occurring at Forty Mile Beach adjacent to Gnoorea Point. The locations of the major components of the project are shown in Figure 1.

The major components of the project considered in this assessment include:

- Shoreline crossing using HDD – The offshore section of the supply pipeline would be connected with the onshore section via a 1,850m buried pipeline crossing the mainland near Gnoorea Point.

- Construction of an 11km gas supply pipeline and 500m onshore sales gas pipeline. The onshore section of the supply gas pipeline would extend from the HDD entry point to the gas plant.

- Construction of gas plant and ancillary areas – The gas plant would be located on Mardie Station, north of the North West Coastal Highway.

- Operation of gas plant – The gas plant would be a self-contained, manned, stand-alone facility. The plant would consist of two gas processing trains each sized for 100 million standard cubic feet per day (MMSCFD) of sales gas production.

- Accommodation facility – The accommodation facility, housing the gas plant permanent workforce of 20 to 30 persons, would be located on Mardie Station. The facility would provide associated on-site services, including power, potable water treatment, communications, sewage treatment and effluent disposal.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 3 of the *Devil Creek Development Project Public Environmental Review* (Apache Energy Ltd, 2008).

Table 1: Summary of key proposal characteristics

Element	Description
Hydrocarbon Reserve	Approximately 11 billion cubic metres within the Reindeer field, located approximately 85 kilometres northwest of Dampier.
Offshore gas pipeline shore crossing	Horizontally Directionally Drilled
Onshore gas supply pipeline	Approximately 11 kilometres long.
Onshore sales gas pipeline	Approximately 500 metres long.
Area of terrestrial clearing	Not more than 123 hectares (temporary area 32

Element	Description
	hectares, permanent area 91 hectares).
Gas plant	Two gas trains each sized for 100 Million Standard Cubic Feet per day.
Sales gas production	Up to 220 Terajoules per day to be delivered to the Dampier Bunbury Natural Gas Pipeline.
Condensate production	Up to 160 kilolitres per day.
Condensate storage and loadout	Storage tanks with a working volume of approximately 28,000 kilolitres. Condensate loadout facility.

The potential impacts of the proposal initially predicted by the proponent in the PER document (Apache Energy Ltd, 2008) and their proposed management are summarised in Table 3 (Executive Summary) of the proponent's document.

3. Key environmental factors and principles

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors are very relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

(a) Terrestrial Flora and Vegetation;

(b) Terrestrial Fauna;

(c) Marine Fauna and Sea Turtles;

(d) Marine Environment; and

(e) Greenhouse Gas Emissions.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics.

Details on the key environmental factors and their assessment are contained in Sections 3.1 - 3.6. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

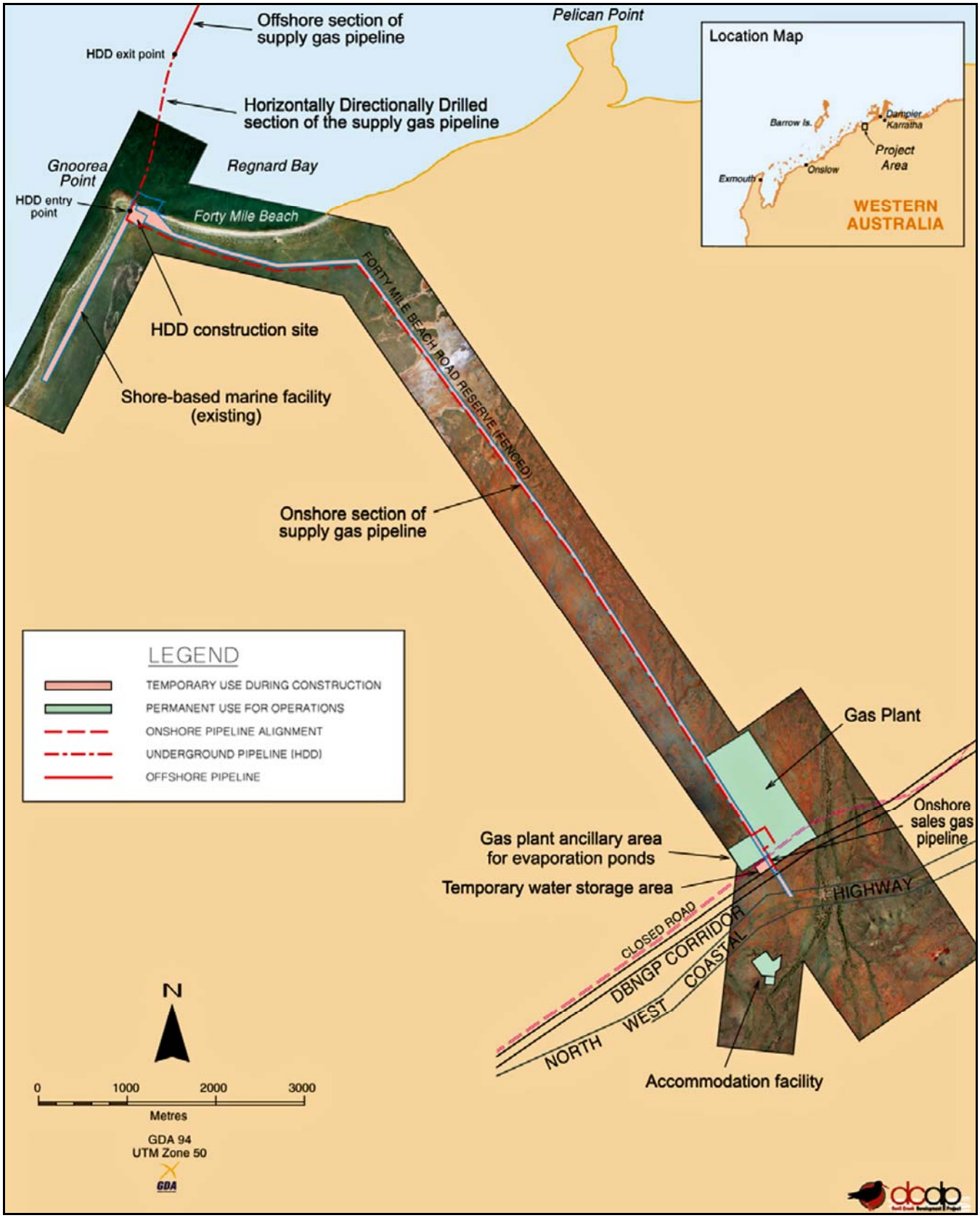

Figure 1: Site location and layout of key components.

The following principles were considered by the EPA in relation to the proposal:

(a) The precautionary principle;

(b) The principle of intergenerational equity; and

(c) The principle of conservation of biological diversity and ecological integrity.

3.1 Terrestrial Flora and Vegetation

Description

The project area is located on the Pilbara Coastline 60km South South-West of Karratha in the Fortescue Botanical district. The area consists mostly of shrubland over hummock or tussock grassland.

The proposal would require clearing of approximately 123 hectares (ha). This includes 91ha of permanent clearing for the gas plant and ancillary area, and 32ha of temporary clearing for construction of the pipeline and HDD operations. Flora and vegetation could be subject to indirect impacts from dust, the spread or introduction of weed species, and accidental disturbance by movement of employees and vehicles outside the clearing area.

Desk top analysis showed that no Declared Rare Flora (DRF) or Threatened Ecological Communities (TECs) are currently listed by DEC for the project area, however, six Priority 3 Species are listed.

There are two vegetation communities in the project area which are considered vulnerable, the Roebourne Plains coastal grassland and Roebourne Plains stony chenopod associations, which are on the Priority Ecological Communities (PECs) list. These are present on the proposed gas plant site and to a lesser extent along the proposed pipeline corridor. Site preparation activities would include the disturbance of up to 98.5ha of Roebourne Plains associations.

Terrestrial vegetation and flora surveys of the project area were undertaken by Astron Environmental Services in May, October, and November 2007. These surveys identified 18 vegetation associations in the project area. As a result of previous disturbance, much of the nearshore area and pipeline route is in poor or degraded condition. The gas plant site is in better condition with greater than 80% of native flora composition intact. Only one of the priority 3 species expected to occur in the area was located during the survey.

No declared weeds were found during the surveys; however five environmental weeds were recorded. Buffel Grass and kapok were dominant on the coastal dunes, coastal sand plain and saline clay plain.

Management actions proposed by Apache to minimise impacts to vegetation include:

- clear marking of the project boundaries to ensure that disturbance does not occur outside the project footprint;
- education of employees during the induction process to ensure that vegetation protection measures are carried out;
- designated access routes for vehicles and personnel;

- dust management measures including watering of unsealed roads, cleared areas and stockpiles, covering loads of dusty materials prior to transport and traffic speed limits;
- weed management and control measures including vehicle and plant washdown procedures, and monitoring of weeds throughout construction in order to manage any new infestations;
- stockpiling of vegetative matter and topsoil for rehabilitation; and
- rehabilitation of temporary clearing areas following the completion of construction.

Submissions

The DEC considered that further assessment of the impacts to the regional distribution of the vulnerable Roebourne Plains vegetation associations is required.

The DEC also recommended that baseline information regarding weed distribution should be provided by the proponent prior to assessment to facilitate the formulation of outcome-based conditions for weed management.

Main Roads Western Australia supported the use of vehicle washdown facilities to prevent spread of weeds along road corridors.

Assessment

The EPA objective for this factor is to ensure that impacts on the abundance, species diversity, geographic distribution and productivity of vegetation communities are avoided as far as practicable.

The area considered for this assessment is the proposed disturbance footprint and adjacent areas of the DCGDP, including the proposed gas processing plant and pipeline construction areas.

The EPA notes that no TEC's or DRF are expected or were identified within the project area. The only priority species found would not be impacted. The EPA notes that the Pilbara region has not been adequately surveyed to map the extent of the Roebourne Plains associations; however these communities are represented relatively widely in the area from Forty Mile Beach to Sherlock Station. The proposal is expected to have a low to moderate impact on the local distribution of the vulnerable Roebourne Plains Associations communities. The EPA considers that the relatively small area of clearing is unlikely to change or impact the conservation status of these species or communities.

The EPA considers that the management strategies outlined are appropriate to minimise and mitigate disturbance to vegetation in the project area as far as practicable.

To ensure that temporarily cleared areas are rehabilitated to an acceptable standard, the EPA has recommended conditions specifying the rehabilitation criteria to be achieved.

The EPA considers that, given the relatively small scale of the proposed clearing and the management actions outlined in the PER, the proposal is unlikely to have a

significant impact on the diversity and distribution of flora and vegetation in the region.

Summary

Having particular regard to:

(a) The proponent's proposed management actions; and
(b) The recommended condition regarding rehabilitation,

the EPA considers that the issue of Flora and Vegetation has been adequately addressed and the proposal can meet the EPA's objectives for this factor.

3.2 Terrestrial Fauna

Description

Potentially 54 species of conservation significance are expected to occur in the project area. Bird species comprise 46 of the significant species, with reptiles and mammals making up the remaining eight. The project area does not have the sort of landscape features that lead to environmental isolation, and speciation of Short Range Endemic (SRE) invertebrates.

The proposal has the potential to impact terrestrial fauna through the loss or fragmentation of habitat, the disturbance of nesting areas and entrapment in trenches and other excavations.

There are six fauna habitat types within the project area, including beach areas, coastal dunes with mixed open shrubland, sandy coastal plains with mixed open shrubland, mosaic grassland, saline inlet and stony low rises. These habitats, which would be directly impacted by clearing for the proposal, are well represented in the region.

Fauna injury or death may result from entrapment in excavations, in particular the trench associated with the onshore section of the supply pipeline. The proponent has proposed measures to remove trapped fauna and to facilitate their escape.

A field survey was conducted during March 2007. The survey consisted of an acoustic survey for bats, spotlighting for nocturnal animals, microhabitat searching for small vertebrates and invertebrates, and opportunistic observations including bird watching. 68 species were observed during the survey. 16 bird species of conservation significance were identified during the survey, however no other significant species were observed.

Management measures have been proposed by the proponent to minimise impacts to fauna arising from the proposal. These have been outlined in the PER and include the following:

- the extent of open trench at any given time would be limited to no more than 2500m;

- daily inspections of all excavations and trenches would be undertaken by a trained fauna handler, and any trapped fauna recorded and removed no later than 3.5 hours after sunrise.
- fauna ladders such as branches would be provided within excavations;
- trenches would inspected by a trained fauna handler half an hour prior to backfilling;
- clearing would occur only within marked project boundaries; and
- site inductions would cover fauna interaction rules.

Submissions

The DEC recommended that to minimise impacts to trapped fauna from the summer heat, trenching should be prohibited from November to March.

Assessment

The EPA's environmental objective for this factor is to ensure that impacts on the abundance, species diversity and geographic distribution of native fauna are avoided as far as practicable.

The EPA notes that the habitats and nesting areas which would be directly impacted are widely represented through the region. Loss of habitat or nesting areas is therefore unlikely to have a significant impact on fauna populations in the area, although some displacement during construction activities may occur.

The EPA notes that the significant fauna in the area is mobile and likely to move away from construction activities. In particular the bird species of conservation significance are highly mobile and unlikely to be impacted.

The EPA notes the DEC's concern regarding fauna entrapment during the heat of the summer months. In line with other projects in the region which involve trenching, the EPA has recommended conditions restricting the length of open trench work to 2500m and requiring management of fauna entrapment.

Summary

Having particular regard to the:

(a) proposed management measures regarding fauna entrapment;

(b) habitat in the disturbance footprint being widely represented; and

(c) recommended conditions,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor .

3.3 Marine Fauna

Description

The project area is within the proposed Regnard Marine Management Area. This region supports a diverse array of marine fauna.

Of the seven species of marine turtle, five have been recorded in the region: the green, hawksbill, loggerhead, flatback and leatherback. The mangroves east and west of Forty Mile Beach and the shallow waters nearshore provide developmental and foraging habitats. Observations of sea turtles confirm that the water off Gnoorea Point is used by adult and juvenile turtles.

Two separate site investigations for evidence of sea turtles using the forty mile beach were undertaken in December 2006 and March 2007. No evidence of nesting or hatching activity was found. Long-term users of the beach have not described any turtle activity at the Gnoorea Point end of the beach, although turtles in the surrounding waters have been seen regularly.

Lighting used to carry out 24 hour operations associated with the HDD drilling program has the potential to disrupt the behavior of sea turtles, particularly nesting females and emerging hatchlings. However, this impact is not likely to occur as the only signs of nesting activity on the beach are at the eastern end of the beach, distant from HDD activities. There may be some short-term disruption to nearshore foraging and migrating turtles.

Noise generated during the construction phase may also disrupt nearshore foraging of sea turtles and cause some short-term displacement in and adjacent to the area. However, they are likely to return to the area once the disturbance has ceased.

A number of whale species have been recorded in the region. In the winter months, breeding humpback whales migrate through the region to the warmer northern waters to calve and suckle their young. This migration peaks in the area in late July or August. During southern migration, which takes place in early spring, whales may be seen resting in Regnard Bay. The peak time for the southern migration of cows and calves through the area is early October.

Dugongs are frequently sighted in Regnard Bay and feed on the sea grasses that grow in the soft sediments between West Intercourse Island and Cape Preston, including Forty Mile Beach and Gnoorea Point.

Marine mammals, particularly cetaceans, are acutely sensitive to noise. Noise generated by the HDD program may interfere with the acoustic perception of marine mammals in the vicinity. Impacts to humpback whales in Regnard Bay would be largely avoided as the activity is scheduled for completion prior to the peak of the southern migration in early spring.

The proponent has outlined a number of management strategies to address impacts to marine fauna arising from the proposal.

- HDD activities would take place outside critical whale migration periods;
- a dedicated marine fauna observer would be employed between 1st November and 31st March, within 1.5km of Forty Mile Beach to identify turtle nesting behaviour as per the EPBC Act referral decision particular matter condition;
- shielding and orientation of lights would be implemented where practicable without compromising safe working operations;

- vessels would be restricted in speed, reducing the risk of collisions with marine fauna. Interaction of vessels with cetaceans would be consistent with *EPBC Regulations 2000;* and
- equipment would be designed to normal petroleum practice, including specifications for noise levels.

Submissions

The DEC considered that the construction phase for HDD drilling should be limited to periods that avoid peak nesting and hatching seasons for marine turtles, or be limited to daylight operations during these times.

Assessment

The EPA's objective for this factor is to maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

The EPA notes that there have been no indications of turtles nesting on the section of Forty Mile Beach adjacent to the HDD site. Therefore it is unlikely that lighting associated with the construction would affect the behavior of nesting and hatching turtles. The EPA notes that a marine fauna observer would be employed to identify any turtle nesting behaviour near the project area.

The EPA notes that lighting for night time construction activities has the potential to impact marine fauna in the area. The EPA notes that the proponent intends to minimise lighting and use shielding to prevent overspill onto the sea. However, to ensure that there is no impact, the EPA has recommended a condition requiring a fauna observer and the suspension of activities if nesting behaviours are observed in the vicinity of the HDD site.

The EPA notes that noise related to construction activities has the potential to cause short term displacement of animals, however they are likely to return to the area once the disturbance has ceased.

The PER indicates that HDD activities are not scheduled to occur during peak times in the southern migration of humpback whales, when cows are likely to be resting in waters adjacent to the project area with their calves. Further, the EPA notes that noise resulting from the drilling operations would be mostly onshore, and is unlikely to impact whale species in the area.

Summary

Having particular regard to the:

(a) proponent's proposed fauna management actions; and

(b) recommended conditions regarding nearshore lighting requirements,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

3.4 Marine Environment

Description

The proposal has the potential to impact on the marine environment by direct or indirect impact to benthic primary producer habitat (BPPH) from drilling activities and associated degradation of water quality and sedimentation.

Water Quality

Potential impacts to water quality associated with the proposal include increase in suspended sediments associated with the HDD program, and discharges from vessels.

Increase in suspended sediments arising from HDD operations represent the highest risk to water quality arising from the proposal. In order to reduce the volume of drilling discharges to the marine environment, a delay in the punch out of the drill hole to the seabed has been incorporated into the engineering design of the HDD program.

The proponent has modelled discharges from three scenarios; the 'planned' scenario including a delay in punch out, a 'contingency' case with a delay in punch out but requiring an extra reaming pass, and a 'no mitigation' case with no delay in punch out.

In general, modelling for all three scenarios indicated that the discharge of cuttings and drilling fluid would generate elevations to the background levels of suspended sediments over a relatively limited area. Concentrations greater than 1 milligram per litre above background were generally limited to less than 1,000m from the HDD exit point. Modelling predicted that plumes would disperse relatively quickly, within hours of the cessation of discharge.

The proponent considered the use of alternative drill fluids to bentonite, such as biodegradable polymers, early in the design phase, but eliminated this option following expert advice that polymers alone were not suitable for use on this project. No project of comparable length has been completed successfully without the use of a bentonite based drilling fluid.

Following installation, the entire HDD section of the pipe would be hydrotested by filling the pipe with seawater or borewater with additives. No hydrotest water would be released into the nearshore environment, but would be stored for appropriate disposal onshore. In the event of a leak in the pipeline, the volume discharged is unlikely to cause impacts. In the event of an unplanned release, impacts would be minimal due to the use of low toxicity chemicals

There is a potential for discharge from vessels to impact water quality in the project area. This includes discharge of domestic waste, contaminated drainage from decks, and accidental diesel spills. Given the proponent's proposed management measures, this is considered to be highly unlikely to occur and is therefore not considered to be a significant risk to the marine environment.

The proponent has proposed management measures to minimise the impacts to water quality arising from the proposal. These are outlined in the PER and include the following:

- planned HDD design including delay prior to punch out to seabed, allowing all cuttings and fluids to be cleared from the hole, so that only drill fluid and cuttings associated with the final 150m are released to the marine environment;
- use of bentonite, a low toxicity drilling fluid;
- vessel wastes and domestic wastes to be bought on shore and disposed of appropriately;
- areas on vessels where hazardous materials (i.e fuels, oils, lubricants) are stores to be bunded and drainage from bunded areas to be directed to a sump;
- scupper plugs to be fitted at deck drainage points;
- contaminated drainage to be diverted to storage;
- no vessel to vessel refueling in nearshore waters;
- apache's bunkering (refueling) management procedures are to be followed by all boat operators;
- oil spill contingency plans to be developed and implemented; and
- no planned discharge of hydrotest water would be made to the nearshore marine environment.

Benthic Primary Producer Habitat
Reduction in the quantity or quality of BPPH has the potential to impact marine fauna food sources, recreational fishing values, commercial fishing resources and the general diversity and health of the marine ecosystem.

Potential impacts to BPPH include direct disturbance at the HDD exit point and through placement of grout bags under the pipeline for support, and indirect impacts associated with increased suspended sediment concentration.

A habitat map was produced from high resolution aerial photography, acoustic remote sensing data, and survey work conducted in October 2007. Detailed marine benthic habitat descriptions and a habitat map were developed. Habitats identified at Gnoorea Point and within Regnard Bay included sea grasses, macroalgae, corals, mangroves and soft sediment habitats.

In accordance with The EPA's Guidance Statement No. 29, *Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment (EPA, 2004),* the proponent has defined a management unit and predicted BPPH loss. The proponent did not include loss of BPPH related to the construction of the approved offshore pipeline component of the project in it's calculations of cumulative loss within the PER, however these figures have now been provided.

The proponent has defined five BPPH categories within the management unit, these being mangrove, bare dominant, macroalgae dominant, seagrass dominant, and coral. For each of the defined habitats the area of BPPH predicted to be lost is less than 2% of its distribution within the management unit. A permanent loss of coral of around 0.25% is expected due to disturbance associated with the exit hole and pipeline,

however sea grasses and macroalgae impacted by increased sedimentation are expected to recover within 5 years.

The proponent's proposed management measures for the minimisation of disturbance to BPPH include:

- use of HDD drilling for shore crossing instead of trenching;
- modifications to the seabed only to occur after HDD exit hole is made to restrict disturbed area;
- planned HDD program with delay prior to punch out to minimise discharges;
- siting of HDD exit point to avoid significant seabed features; and
- prevention measures as outlined above to prevent vessel and hydrotest discharges.

Submissions

The DEC noted that the proponent should be restricted to the BPPH loss predicted in the PER.

Assessment

The area considered for assessment of this factor is the local and regional marine environment around Gnoorea Point in the proposed Regnard Marine Management area.

The EPA's environmental objectives for this factor are to maintain marine ecological integrity and biodiversity and to ensure that the criteria in Guidance Statement No.29 are met.

The EPA's Guidance Statement No. 29 *Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment (EPA, 2004)* is applied to proposals which are expected to cause loss of BPPH. The guidance statement describes categories which can be applied to management units in order to consider loss of BPPH.

The proposed Regnard Marine Management Area is considered to be a Category C management area, with an acceptable cumulative loss threshold of 2%. The EPA notes that the proponent's predictions of loss are less than 2% for all of the benthic primary producer habitats in the management area. The EPA considers that this is in accordance with the requirements with Guidance Statement 29.

The EPA notes that Apache would use HDD for the shore crossing of the supply pipeline, instead of trenching across the shore and intertidal zone. The EPA also notes that the HDD program has been designed to incorporate a delay prior to punch out in order to minimise the amount of discharge to the marine environment.

The EPA considers that the risk to marine water quality from suspended sediments associated with discharge of cuttings and drilling fluid is low given that elevated concentrations are predicted to be short term and transient. The EPA notes that, although the risk to the marine environment from vessel discharges including diesel spills is moderate, such discharges are unlikely to occur given the proposed management measures.

Given that the proposal is in accordance with Guidance Statement 29, and that the impacts to water quality are likely to be localised and short term, the EPA considers that the risk to the marine environment relating to this proposal can be managed to meet the EPA's objectives for this factor. However, in line with the precautionary principle and on advice from the DEC, the EPA has recommended a condition requiring the proponent to limit the loss of BPPH.

Summary

Having particular regard to the:

(a) short term localised nature of impacts associated with suspended sediment concentrations;

(b) proposed management actions relating to discharge from support vessels;

(c) principles of Guidance Statement 29; and

(d) implementation of recommended conditions regarding the monitoring and maintenance of Benthic primary Producer Habitat,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

3.5 Greenhouse Gasses

Description

The gas plant would include two gas processing trains with a production capacity of 100 MMSCFD each. Both trains would be run simultaneously to ensure a consistent production of 100 MMSCFD initially, with a maximum capacity of 200 MMSCFD. Greenhouse gas emissions are calculated at 77,000 tonnes per annum for the 100 MMSCFD case, and 125,000 tonnes per annum for the 200 MMSCFD case.

Gas within the Reindeer gas field comprises approximately 3.5% CO_2. This is below the threshold of 3.8% CO_2 required for sale via the DBNGP. Therefore, CO_2 would not be released from the gas prior to sales. This means that the offset of reservoir CO_2 required by similar projects in the region would not be required.

The proponent has outlined a number of management measures to reduce or mitigate the production of greenhouse gas. These include the following:

- energy conservation measures in gas plant design;
- process control to minimise flaring;
- regular maintenance on combustion and other energy-intensive equipment;
- fugitive emission controls and thermal destruction of captured VOCs;
- use of dry-gas compressor seals to minimise fugitive emissions;
- metering equipment on all process equipment to quantify atmospheric discharges; and
- corporate participation in Greenhouse Challenge and Energy Reporting program.

Submissions

No submissions were received regarding Greenhouse gasses.

Assessment

The EPA's objectives for greenhouse gas, as set out in Guidance Statement No. 12 "*Guidance Statement for Minimising Greenhouse Gas Emissions"* are to:

- Minimise greenhouse gas emissions in absolute terms and reduce emissions per unit of product to as low as reasonable practicable; and
- Mitigate greenhouse gas emissions, mindful of Commonwealth and State greenhouse gas strategies and programs.

To achieve this, the EPA expects that potential greenhouse gas emissions from proposed projects are adequately addressed in the planning, design and operation of projects, and that:

- Best practicable measures are applied to maximise energy efficiency and minimise emissions;
- Comprehensive analysis is undertaken of unavoidable emissions, to identify and implement appropriate mitigation measures; and
- An on-going programme is implemented to monitor and report emissions, and periodical assessment is undertaken of opportunities to further reduce greenhouse gas emissions over time.

The EPA notes that the proponent has included design factors in the proposal aimed at minimising the emission of greenhouse gas associated with the operation of the project.

The EPA recommends that the proponent ensure that it is aware of its requirements under the federal Carbon Pollution Reduction Scheme, and factors greenhouse gas emissions into its future planning.

Summary

Having particular regard to the:

(a) relevant guidelines and criteria;

(b) proponent's proposed management actions and design features; and

(c) the recommended conditions relating to greenhouse gas emissions,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objectives for this factor.

3.6 Environmental principles

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the *Environmental Protection Act (1986).* Appendix 3 contains a summary of the EPA's consideration of the principles.

4. Conditions

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

4.1 Recommended conditions

Having considered the proponent's commitments and the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if Apache Energy Ltd's proposed DCGDP is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

(a) rehabilitation of temporarily disturbed areas;

(b) management of fauna along pipeline corridors;

(c) design of lighting associated with near-shore construction activities;

(d) maintenance of benthic primary producer habitat loss within predicted limits; and

(e) regular assessment and implementation of opportunities to reduce greenhouse gas emissions.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- Rights in Water and Irrigation Act (1914); and
- Part V EP Act –The EPA recommends that the DEC give consideration during the works approval and licensing process to requiring the flare system to meet best practice, including no continuous flaring and smokeless operation.

5. Other Advice

Portions of the adjacent Mardie and Karratha Stations are to be excluded from the pastoral lease and become conservation reserves in 2015. The proponent and the EPA have taken these proposed reserved areas into consideration during the assessment of the impacts on the conservation values of the vegetation in the project area, with the clear expectation that those areas identified for reservation will be reserved at that time.

6. Conclusions

The EPA has considered Apache Energy Ltd's proposed DCGDP. The project would require construction of a gas plant and pipelines, and a horizontal directional drilling program to facilitate the shoreline crossing of the supply gas pipeline.

Marine Components – The EPA notes that the predicted loss of Benthic Primary Producer Habitat associated with the proposal is within the threshold established in EPA Guidance Statement No. 29, *Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment (EPA, 2004)*, and considers these losses to be acceptable.

The EPA notes that the proponent has designed the Horizontal Directional Drilling program to minimise discharges of cuttings and drilling fluids to the environment by incorporating a delay in the punch out to sea bed to allow the maximum amount of cuttings to be returned to the shore through the drill hole.

The proposed drilling activities are not scheduled to occur during the key humpback whale migration period of late September early October, when cows and calves may rest in the area during their southern migration, and impacts to sea turtles are not expected to occur.

Terrestrial components – The EPA notes that the proposal involves the clearing of up to 98.5 ha of Roebourne Plains Grasslands, a vulnerable vegetation association. Given the relatively small area of clearing and the proposed management actions to prevent disturbance outside the project area, this factor can be managed in an environmentally acceptable manner.

The EPA notes that the proposal is unlikely to have a significant impact on terrestrial fauna and bird species, given that the habitats to be disturbed are widely distributed through the region. Some temporary displacement of fauna may occur, however this is unlikely to present a significant impact.

The EPA considers that management measures to minimise entrapment and mortality of fauna in pipeline trenches are necessary. The EPA has recommended conditions restricting the length of open trench and requiring a fauna clearing person be employed to manage and monitor impacts on fauna.

Operational Impacts – The EPA notes that the greenhouse gas emissions related to the operation of the proposed gas plant are predicted to be up to 125,000 tonnes per annum. The proponent has incorporated measures into the design of the gas plant to reduce emissions of greenhouse gasses as far as practicable. The EPA considers that these levels are acceptable provided that opportunities to reduce emissions are reviewed and implemented where suitable on a regular basis.

The EPA has therefore concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4.

7 Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the proposal being assessed is the Devil creek Gas Development Project.
2. That the Minister considers the report on the key environmental factors and principles as set out in Section 3;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4, and summarised in Section 4; and
4. That the Minister imposes the conditions and procedures recommended in Appendix 4 of this report.

Appendix 1

List of submitters

Organisations:
Department of Industry and Resources
Department of Environment and Conservation
Ngarluma Aboriginal Corporation
Main Roads WA
Dampier Bunbury Pipeline
Department of the Environment, Water, Heritage and the Arts
Department of Health
Department of water

Individuals:
Garry McGlinn
Peter and Leanne Fullerton

Appendix 2

References

Apache (2008) *Devil Creek Development Project Public Environmental Review Document,* Apache Energy Ltd, June 2008.

Apache (2008) *Response to Submissions,* Apache Energy Ltd, September 2008.

APASA (2008) *Quantitative modelling of sediment discharges from Horizontal Directional Drilling.* Report Prepared by Asia-Pacific ASA Ltd for Apache Energy Ltd, May 2008.

Astron (2006) *Turtle Nest Survey at 40 Mile Beach*. Report prepared by Astron Environmental Services for Apache Energy Ltd, December 2006.

Astron (2007) *Reindeer Project Vegetation and Flora Survey* Report prepared by Astron Environmental Services for Apache Energy Ltd, November 2007.

EPA (2000) *Guidance Statement for the Emission of Oxides of Nitrogen from Gas Turbines* Guidance Statement No 15, Environmental Protection Authority, Government of Western Australia, May 2000.

EPA (2002) *Guidance Statement for Minimising Greenhouse Gas Emissions* Guidance Statement No. 12, Environmental Protection Authority, Government of Western Australia, October 2002.

EPA (2004) *Benthic Primary Producer Habitat Protection for Western Australia's Marine Environment* Guidance Statement No. 29, Environmental Protection Authority, Government of Western Australia, June 2004.

Pendoley (2007) *Sea Turtle Site Survey of 40 Mile Beach.* Report prepared by Pendoley Environmental Pty Ltd for Apache Energy Ltd, April 2007.

RPS (2008a) *Apache Devil Creek Development Project: Marine Baseline Studies,* Report prepared by RPS Environment Pty Ltd for Apache Energy Ltd, March 2008.

RPS (2008b) *Apache Devil Creek Development Project: Impacts to Marine Benthic Primary Producers,* Report prepared by RPS Environment Pty Ltd for Apache Energy Ltd, March 2008.

SKM (2008) *Apache Energy Limited – Devil Creek Development Project, Air Quality Assessment,* Report prepared by Sinclair Knight Mertz Pty Ltd for Apache Energy Ltd, February 2008.

Appendix 3

Summary of identification of key environmental factors and principles

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
BIOPHYSICAL			
Terrestrial Vegetation	Apache Energy proposes to clear approximately 123ha for the entire proposal, including 32ha temporary clearing for construction purposes, and 91ha permanent clearing for location of infrastructure. Other impacts to terrestrial vegetation may include impacts outside the disturbance footprint arising from vehicles or workforce movements outside clearing areas, and the introduction spread of weed species. The project area is located in the Fortescue Botanical District of the Pilbara Region. The project area covers several different vegetation community types, mostly consisting of low shrubland over tussock or mixed grassland. Vegetation within the project area is mostly previously disturbed with significant weed proliferation. Buffel grass is dominant on the pipeline corridor and shore-based areas. The gas plant area is relatively weed-free with areas of patchy	<u>Department of Environment and Conservation</u> • The PER does not provide rigorous evaluation of the significance of impacts on priority ecological communities associated with the Roebourne Plains Cracking Clays • The key issue in relation to the biodiversity impacts of this proposal relates to the potential impacts on a significant plant community and priority ecological communities in the vicinity of the processing plant. • Management of construction related impacts on weed distribution need to be mandated. Information on the baseline distribution of key invasive species should be provided by the proponent. • The proponent should provide further information on the health, size and distribution of the *Eremophila forrestii* populations impacted by the proposal. Location of infrastructure should be reviewed to minimise impacts to this species. <u>Main Roads Western Australia</u> • It is important that weed infestations are not transported along the road corridors, in particular Mesquite. The proposed washdown of vehicles prior to leaving the site is supported.	**Considered to be a key environmental factor.** **See Section 3.1 – Terrestrial Vegetation**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	buffel grass. No DRF are currently listed by CALM within the project area. Six Priority 3 Species are listed; one of these was identified during on-ground surveys. One vegetation association present on the accommodation camp section of the project site is considered to have conservation significance.		
Terrestrial Fauna	There is a risk to terrestrial fauna within the project site from entrapment within trenches and subsequent exposure. The proposal includes two lengths of onshore pipeline which will require trenches to be dug during the construction phase, a 'supply' pipeline from the shore to the gas plant, and a 'sales' pipeline from the gas plant to the DBNGP. The supply pipeline will be 10.9km long, while the length of the sales pipeline is yet to be determined. Terrestrial fauna may also be impacted by permanent or temporary disturbance or removal of habitat related to the	<u>Department of Environment and Conservation</u> • Construction activities should be carried out over periods and according to methods that minimise potential impacts on significant marine and terrestrial fauna. • Onshore pipeline trenching should be limited to between the months of April to October to avoid the heat of the summer months and subsequent impacts of trenching on terrestrial fauna. • The proponent should take into account the recommended critical window for waders/migratory birds in relation to construction activities in habitat areas for these birds and adjust management and mitigation measures accordingly.	**Considered to be a key environmental factor.** **See Section 3.2 – Terrestrial Fauna**.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	proposal. Other impacts to terrestrial fauna may arise relating to attraction to or avoidance of light and noise associated with the proposal, collisions with vehicles and attraction to waste from the accommodation camp or to water storage bunds and evaporation ponds Not including birds, (addressed below) 112 potentially occurring species were identified during the desktop review, including 8 species of conservation significance. Of the potential species, 12 were recorded during the field survey, with no species of conservation significance being found during the field survey.		
Migratory Birds	Key hazards that have the potential to impact shorebirds and seabirds in the project area include attraction and disorientation from artificial light sources, displacement by noise and activity associated with construction, ingestion of waste from vessels, attraction to	<u>Department of Environment and Conservation</u> • The proponent should take into account the recommended critical window for waders/migratory birds in relation to construction activities in habitat areas for these birds and adjust management and mitigation measures accordingly.	**Considered to be a key environmental factor.** **See Section 3.2 – Terrestrial Fauna**.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	food scraps from vessels and toxicity from accidental diesel spills. Indirect impacts may occur due to loss of food sources relating to the loss of BPP habitat and associated species. Loss or disturbance of habitat related to the proposal may also impact seabirds and shorebirds. At least 170 bird species are expected to occur within the project area, of which 46 are considered to have conservation significance. 68 species were recorded during site visits, of which 16 are considered to have conservation significance. Many of the migratory seabirds and shorebirds in the area are covered by international treaties with Japan and China.		
Marine Fauna including Sea Turtles.	There is a potential for significant impacts to Marine Fauna from light, noise and pollution associated with the proposal. Other impacts may include loss	<u>Department of Environment and Conservation</u> • Management of construction related impacts on marine turtles will need to be mandated • The construction phase for HDD drilling should be limited to periods that avoid peak nesting and hatching seasons for marine turtles. This would also limit the effects on migratory birds. • If limitation of construction phase is not possible, there should be a	**Considered to be a key environmental factor.** **See Section 3.3 – Marine Fauna**.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	of food sources due to impact on BPP and collision with vessels used in construction. The nearshore marine area of the project area supports a diverse array of fish species, and is known to be a popular recreational fishing site. The mangroves west and east of the project area are used as developmental and foraging habitat by juvenile and adult green turtles, and it is possible that adult hawksbill turtles would frequent the coral reefs in the area. No evidence of nesting behavior on the beach within the project area has been found to date. A number of species of marine mammals have been sighted in the area, including whales, dolphins, and dugongs. The annual migration path of the humpback whale passes through the region as they migrate north.	proponent commitment or a condition on approval requiring that there be no artificial lighting (12 hour operations) during these times.	
Benthic Primary Producer Habitat	Benthic Primary Producers and their habitats could be impacted by the proposal. The proposal	<u>Department of Environment and Conservation</u> • There is a lack of clarity in relation to predictions of impact on marine benthic habitats to enable the setting of outcome based	**Considered to be a key environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	requires disturbance and modification of the seabed around the HDD exit point and along the offshore section of the pipeline. Discharges associated with the HDD drilling program may cause impacts due to increase in sedimentation. There is also a risk of the release of bentonite and fine cutting particles into the marine environment. There is a risk of impact to BPP's from support vessel discharges, including accidental diesel release, and from the disposal of hydrotest water.	conditions • The proponent should be required to include an analysis of the reduced use of bentonite or avoidance of the use of bentonite in drilling fluids for HDD for shoreline crossing. • The proponent should provide water quality and sediment quality values for HDD assigned to the zones of impact so as to establish suspended sediment concentration limits within each of the impact zones. This level of information will be required to establish outcome based conditions for water quality. • The proponent should provide further information on how the zones of impact, effect and influence were defined and predicted in relation to benthic primary producer habitat tolerance and impact thresholds. • There should be consideration of the need for establishing cumulative loss thresholds for each benthic habitat type as an outcome based condition for this project. This will require a baseline dataset on benthic communities and a monitoring program to be implemented by the proponent to enable the detection of change in these communities. • It is stated that should there be problems during drilling, it may be necessary to change the HDD program. It is not clear what changes may be necessary or how much extra discharge might result.	**See Section 3.4 – Marine Environment.**
Surface water	Potential impacts to surface water in the area include changes to natural drainage patterns, and impacts to water quality. There is also a potential for flooding and storm surge inundation of infrastructure and evaporation ponds Changes in the natural drainage patterns may be caused by	No comments were received in relation to this factor.	The proponent has outlined a number of management strategies aimed at reducing the risk of surface water deterioration, including appropriate storage of fuel, oil, and chemicals, spill response procedures and designated washdown areas. Infrastructure and earthworks have been designed to limit the potential

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	clearing and earthworks associated with the project, and by soil compaction caused by movement of construction vehicles. Deterioration in water quality can arise from spills, leaks and unplanned discharges related to the construction and operation of the project. The nearest waterway to the project site is Devil Creek, an ephemeral creek which discharges into an intermittent wetland or claypan. The gas plant site is at a relatively high point in the landscape, and none of the proposed works at the site traverse any major drainage lines.		for alteration to natural drainage patterns and to prevent damage in the event of flooding or storm surge inundation. Areas to be cleared will be limited as far as is practicable, erosion and sediment control structures will be installed as required. **Factor does not require further EPA evaluation**
Groundwater	Groundwater would be the single source of water for all stages of the project. Abstraction of water has the potential to drawdown aquifer levels and thereby to impact groundwater dependant ecosystems and other groundwater users in the area.	<u>Department of Water</u> • Groundwater extraction and potential environmental impacts are manageable through the *Rights in Water and Irrigation Act 1914* • The proponent is required to develop and carry out a base level monitoring program with defined trigger points and contingency actions to ensure groundwater extraction does not result in adverse impacts to the surrounding environment. • All water supply and management issues associated with the Devil Creek Development Project can be adequately managed through the	Groundwater abstraction rates would be set by the Department of Water prior to commencement of construction, and all abstraction would be undertaken in compliance with agreed DoW license conditions. Monitoring would also be

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	Additionally, there is a risk of impact to groundwater quality arising from leaks or spills of fuels, chemicals or waste material. Groundwater would be obtained from up to four bores within the property. Demand for the construction period is estimated to be approximately 20,000 to 30, 000 kL/month for around 14 months. Ongoing operations demand is expected to be approximately 600 kL/month. Approval for a separate well for supply of the accommodation camp has been submitted to DoW and is not considered to be within the scope of the PER. The groundwater in the project area, although not associated with a declared groundwater resource, is currently being utilised for stock watering. The aquifer in the area is not connected to any potable water sources.	*Rights in Water and Irrigation Act 1914* .	undertaken in compliance with DoW and DEC license conditions, including vegetation monitoring as appropriate. The proponent has outlined a number of management strategies aimed at reducing the risk of groundwater contamination, including appropriate storage of fuel, oil, and chemicals, spill response procedures and designated washdown areas. **Factor does not require further EPA evaluation**
Subterranean Fauna	The clayey alluvial substrates of the project area are considered	No comments were received in relation to this factor.	Given the relatively small volume of groundwater to be abstracted for

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	unlikely to contain large enough pore spaces for Troglofauna. Potential impacts to Stygofauna related to this proposal include loss of habitat through drawdown of aquifer levels, and reduction in groundwater quality. Aquifer drawdown during the construction period is expected to be highly localised in the vicinity of the bore, in the order of 4-5m in the bore and less than 1.2m beyond a 100m radius. A pilot study was conducted to determine the risk to stygofauna from the proposal, including a desktop study and field sampling consisting of 9 samples from 6 bores. This level of sampling was discussed in the ESD and no objection was raised by DEC. A total of 24 stygobitic species were collected from the project area. The stygofauna collected was dominated by ostracods, copepods and amphipods. All the species present are widely distributed within the Pilbara.		construction and operation activities related to this proposal, it is unlikely that any species would be significantly impacted by the proposal. The results of the stygofauna survey indicate that all the species present are represented elsewhere in the region. Therefore, the risk to stygofauna diversity in the region is considered to be negligible. **Factor does not require further EPA evaluation**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
Invertebrate fauna	The project area does not contain the landscape features such as rocky habitats and wetlands commonly associated with SRE species. No invertebrates of conservation significance appear on DEC's threatened fauna list for the area. During terrestrial surveys carried out by AES (2007) micro-habitat searching for SRE invertebrates was carried out targeting locations such as hills, south facing slopes and along watercourses. The searchers looked for live invertebrates, snail shells, scorpion burrows, spider burrows and exoskeleton fragments. No evidence of SRE invertebrates was found.	No comments were received in relation to this factor.	The results of the invertebrate survey indicate that Short Range endemic species are unlikely to occur in the project area. **Factor does not require further EPA evaluation**
POLLUTION			
Air Quality	Air Quality in the DCGDP area and beyond may be impacted by the proposal. The operation of the gas plant would require the emission of combustion products and atmospheric pollutants including	<u>Department of Environment and Conservation</u> • The DEC reviewed the modelling presented in the report and concluded that the modelling is sound and appeared to be free of any significant errors in the model configuration. The model selected is an appropriate model for this task and the modelling results predict that the gas plant does not result in exceedences of relevant air quality criteria for the parameters reported.	The proposed gas plant would be located 45kms from the nearest population centers in Dampier and Karratha, and it is therefore highly unlikely that air emissions from the proposal would impact residential areas. The nearest sensitive receptors to the gas plant would be

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	carbon dioxide, nitrogen oxides, particulate matter and sulphur oxides. The combustion of fuel during the construction phase of the project would also result in air emissions but these would be transient in nature. Dust would also be generated during the construction phase from activities including vegetation clearing and earthworks. Recreational users of the nearby forty mile beach area and residents of the proposed DCGDP accommodation facility may be impacted by emissions associated with the construction and operation phases of the proposal. These emissions have the potential to impact health and amenity in the area. There is also a risk of impacts to vegetation.	• Modelling predicts that emissions from normal operations of the gas plant would not exceed relevant air quality standards.	the proposed accommodation facility located near to the gas plant, and the camping area near Gnoorea Point which is located 10km from the proposed gas plant site. The proponent's air quality assessment (SKM 2008) indicated that the highest predicted concentration of air pollutants at either of the identified sensitive receptors, including during upset conditions, are small compared to the relevant air quality criteria, including NEPM (Ambient air Quality). The proponent's modelling of atmospheric emissions has been reviewed and found to be satisfactory by the DEC, and that the results indicate that the proposed gas plant does not result in exceedences of relevant air quality criteria for the parameters reported. Given the distance of the proposal from the nearest residential centers, atmospheric pollution related to the proposal is unlikely to have a significant impact.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			Factor does not require further EPA evaluation
Greenhouse gasses	The operation of the gas plant would contribute 77,000 to 125,000 tonnes of Greenhouse gas per annum, equating to about 0.01% to 0.02% of Australia's total greenhouse gas emissions. The emission of greenhouse gasses has the potential to contribute to climate change on a global scale.	No comments were received in relation to this factor.	**Considered to be a key environmental factor.** **See Section 3.5 – Greenhouse Gas**
Waste Management	Sewage and greywater would be produced during all phases of the DCGDP when construction and operations workforce are present. The proposed accommodation camp would include a licensed wastewater treatment plant. Portable facilities would be provided to manage sewage produced at each of the construction sites, and their contents disposed of at an approved facility. Hazardous wastes generated during the construction phase of	<u>Department of Health</u> • It should be noted that, in addition to being licensed by the DEC, DOH approval is required prior to any works for the installation/construction of a wastewater treatment plant and effluent disposal area. • Concern has been raised about the disposal of effluent during and after heavy rainfall due to the potential for water pooling and mosquito breeding. Irrigation should not occur under these circumstances if long term pooling may occur.	Waste management related to the construction and operation phases of the DCGDP would involve avoidance of waste generation in the first instance where practicable, and efforts would be made to reuse and recycle where possible. The PER provides details of appropriate waste storage and disposal practices, including bunding of storage areas, segregation of hazardous materials and treatment of waste products where feasible.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	the proposal would include solvents, paints, oils and used filters, batteries, drilling wastes and packaging. Hazardous wastes generated during the operation of the gas plant as a by-product of gas processing would include: • scale from pig cleaning consisting of sulphates and carbonates; • mercury impregnated carbon; • molecular sieve material consisting of silicate materials; and • Washdown effluent contaminated with oils, greases and detergents from cleaning down of plant and equipment. These wastes would be managed in accordance with a waste management plan including systems for tracking waste from source to destination.		Volumes of waste material would be recorded and reported on a monthly basis and disposed to an appropriate disposal site in accordance with relevant regulatory requirements. **Factor does not require further EPA evaluation**
Marine Water Quality	There is potential for discharge of pollutants to the marine environment from two sources	<u>Department of Environment and Conservation</u> • The HDD program is scheduled continue through the cyclone season. Machinery, cuttings and drilling fluid will be located on low-lying	**Considered to be a key environmental factor.**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	during the construction phase of the project. Drilling Fluids and cuttings would be released during the HDD operations, and there is a risk of discharges and drainage from the HDD support vessels. Apache intends to use bentonite as a lubricant for the HDD program. Discharges from support vehicles may include sewage, greywater, food scraps and deck drainage contaminated with oils, greases and contaminants. There is also a risk of diesel or oil spills from support vessels.	land close to the coast. No information has been provided regarding actions to prevent discharge to the marine environment in the event of a cyclone or associated storm surge. • It is stated that should there be problems during drilling, it may be necessary to change the HDD program. It is not clear what changes may be necessary or how much extra discharge might result. • The proponent should be required to include an analysis of the reduced use of bentonite or avoidance of the use of bentonite in drilling fluids for HDD for shoreline crossing.	**See Section 3.4 – Marine Environment**
SOCIAL SURROUNDINGS			
Indigenous Heritage	The proposal has the potential to impact Indigenous heritage by clearing and earthwork activities within significant sites, or through accidental disturbance by vehicle and personnel movements outside designated areas. The project area lies within two registered and overlapping Native title claims. A total of	<u>Ngarluma Aboriginal Corporation</u> • Ngarluma Aboriginal Corporation, and the Ngarluma people it represents, has not been consulted on environmental management and protection matters. This and other matters need to be set out in a written agreement between NAC and Apache (NAC)	Apache has consulted with relevant Indigenous groups regarding Indigenous heritage sites as required by the Department of Indigenous Affairs. The proponent has outlined measures for the management of Indigenous sites in the PER. These measures include the following: • Signage and fencing around significant areas

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	five recorded Aboriginal heritage sites lie partially within or in close proximity to DCGDP areas. Field survey work conducted by the proponent in 2006 and 2007 verified these sites and identified others. Some sites containing scatters of artefacts would be unavoidably disturbed or destroyed. Apache asserts that consultation with senior aboriginal persons indicate that these sites are of low to moderate importance to both Aboriginal groups. Their significance arises from association with the groups' ancestors and the sites do not appear to have ritual or ceremonial significance.		• An aboriginal Heritage Management Plan will be updated and submitted to the DIA for review and comment, and implemented following approval by the DIA. **Factor does not require further EPA evaluation**
Visual Amenity	Impacts to visual amenity associated with the DCGDP include: • the presence of construction equipment for the HDD shore crossing site, onshore pipeline and gas plant construction; and • The presence of the gas plant infrastructure	No comments were received in relation to this factor.	The overall visual impact of the gas plant and accommodation facility is considered to be low. Proposed management strategies to further lower the visual impact of the proposal include landscaping the perimeter of the gas plant and accommodation facility.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	• The presence of the accommodation facility. As the impacts from construction activities will be transient only the visual impact from permanent infrastructure has been assessed. Apache has assessed the visual impact of the project from five viewpoints, four of which a situated along the North West Coastal highway, with the final viewpoint from Gnoorea Point looking towards the gas plant. Visual impact was assessed using digital imaging and photomontages. Impact was assessed based on a number of relevant criteria detailed on pp 169 of the PER the visual impact of the proposal was considered to be negligible from four of the viewpoints, with only the accommodation camp viewed from the North West Coastal Highway causing a moderate visual impact.		**Factor does not require further EPA evaluation**
Public health and safety	There are no existing, permanent settlements in the vicinity of the project area. The only sensitive	No comments were received in relation to this factor.	Potential impacts to health related to air emissions are not considered to be a key environmental issue,

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	receptors in the area would consist of recreational users at Gnoorea Point 10km north west of the plant boundary, and the accommodation facility for the permanent workforce at the gas plant. Potential impacts to the health of employees at the accommodation facility include emissions to the atmosphere from plant operations, dust and noise from construction activities, and contamination of drinking water supply (groundwater)		due to the distance of sensitive receptors from the gas plant area. Management of dust, noise and waste have been addressed previously in this table. **Factor does not require further EPA evaluation**
Recreation	Forty Mile beach and Gnoorea Point are popular recreational areas for locals and tourists. Activities associated with the construction of the DCGDP and the operation of the gas plant have the potential to impact recreational values in the area. Key Impacts to recreational values include noise, dust, visual impact, access restrictions to land and marine areas, and elevated levels of suspended solid concentrations in the	<u>Department of Environment and Conservation</u> • The proponent should address the management issues and potential risks associated with recreational activities of the workforce. • DEC considers that it might be appropriate for the proponent to provide a commitment to assist the department in relation to management of recreational activities in the vicinity of the project, for the life of the project.	Impacts to recreational activities at Gnoorea Point are likely to be temporary and localised. Some temporary restriction of access to areas around the HDD drilling activities would be required, however this would not restrict access to the boat ramp. The community would be advised of any disruptions beforehand. This has been discussed with the Shire of Roebourne. Management of dust, noise and

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	marine environment. Visitors to forty mile beach will be impacted by noise from the HDD activities for a period of 3-4 months. Operational noise from the Gas Plant is not expected to impact visitors to the beach due to the 10km distance between the two locations. Impacts to visual amenity are discussed elsewhere in this table. Permanent impacts to visual amenity are predicted to be low. There would be some temporary access restrictions to recreational areas in the vicinity of the HDD construction site and in the marine areas surrounding the HDD exit point. Public access to the boat ramp at Gnoorea point would not be restricted. The community would be advised of any temporary disruptions. Increases in suspended solids have the potential to impact recreational fishing and diving in the shallow Regnard Bay. The impacts would be temporary and localised.		visual impacts are discussed elsewhere in this table. Impacts to water quality are considered to be a Key Environmental Issue and have been addressed in Section 3.4 – Marine Ecosystems. **Factor does not require further EPA evaluation**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
DBNGP Safety	The proposed gas plant would be located within the easement of the Dampier Bunbury Natural Gas Pipeline.	<u>Department of Industry and Resources</u> • DoIR advises that Apache should endeavor to further consult and resolve with the owners and operators of the DBNG Pipeline (DBP), and demonstrate that the risk associated with the DBNGP concurrent operation is within the acceptable levels consistent with AS2885. (DoIR) <u>Dampier Bunbury Pipeline</u> • It is incumbent on the relevant authorities to ensure that the new facility is designed and constructed in a way that does not compromise existing facilities • Apache must be obliged to carry out a risk assessment in accordance with AS2885 as part of their development approvals process. • To the extent that it is necessary for DBP or its representatives to assist Apache in quantifying the risk posed to or by the DBNGP, the full cost of doing so must be borne by Apache. • DBP strongly objects to the proposed DCGDP site and suggests that all hazardous facilities be relocated beyond the required setback distance or alternatively mitigations measures be incorporated to eliminate any risk posed to the DBNGP.	The owners and operators of the Dampier Bunbury Natural Gas Pipeline and the proponent would be required to comply with the conditions of AS2885. Compliance with AS 2885 is managed by the Department of Industry and Resources Petroleum Safety Branch and is not within the scope of this report. **Factor does not require further EPA evaluation**
Noise	A number of construction activities are likely to generate noise including: • Clearing and earthworks; • HDD drilling operations; • Generators and pumps; • Civil engineering works; and • Metal grinding. Noise is also likely to be	<u>Department of Environment and Conservation</u> • DEC recommends that the proponent make a commitment that the noise emissions from the plant will comply with the noise regulations at the proposed accommodation camp. • The DEC recommends that the proponent, working together with the shire, exclude those beach areas from recreational use during the construction phase where the construction noise level is high.	Noise Impacts related to the construction of the DCGDP are expected to be temporary and localised. Visitors and users of the Forty mile beach camp site would be affected by noise from the HDD drilling operations. Fauna in the area may be disturbed by noise associated with

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	generated from the ongoing operation of the gas plant. Main ongoing noise sources would include: • Sales gas compressors; • Stabiliser compressors; • Gas coolers; • Condensate loading pumps; • Gas turbine driven generators; and • Emergency flares. The nearest sensitive noise receivers for construction activity is the recreational area at Gnoorea Point, while the only receptor for operational would be the proposed accommodation camp.		construction. Displacement would occur temporarily, however this displacement is expected to be short-term. Noise monitoring would be undertaken and noise would be minimised using a combination of management measures including selection of quietest available equipment, use of mufflers and noise absorbing enclosures and walls. Noise impacts relating to the operation of the gas plant is unlikely to affect recreational areas due to the distance between the locations. Modelling indicates that noise received at the accommodation camp can comply with applicable limits. It is likely that fauna will become habituated to operational noise. **Factor does not require further EPA evaluation**
Traffic	The DCGDP would be accessed via the North West Coastal Highway and the Forty Mile Beach Road.	<u>Main Roads Western Australia</u> • The PER briefly discusses impacts on the North West Coastal Highway. MRWA considers that the comments are satisfactory and that the impacts will be acceptable and manageable.	Impacts related to increased traffic are not expected to be significant, and can be satisfactorily managed as detailed in the PER.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	Traffic frequencies on the North West Coastal Highway are relatively light, with historical movements of 20 events per hour averaged over a 24 hour period. Traffic movements on the unsealed Forty Mile Beach Road are limited to recreational users. There would be increased traffic on the NWCH during the construction period. During operations there would be one to two road tankers per day travelling between the gas plant and Kwinana. Bitumen sealed turning roads would be constructed at the intersection of NWCH and Forty Mile Beach Roads There would be increased traffic on a 0.75km section of the Forty Mile Beach Road. This section of the road would be raised and bitumen sealed to safely manage traffic access to the DCGDP.		**Factor does not require further EPA evaluation**
Fisheries	The Pilbara Region supports a range of commercial fisheries. Recreational fishing is also popular in the vicinity of	• Submissions from an Aquarium collecting business operating in the area expressed concern regarding further disturbance to, or reduction in access to the 'coral garden' area at forty mile beach, and request mitigation and/or compensation for any loss of income resulting from	Impacts to the Marine environment are considered to be a key environmental issue and are discussed in Section 3.4 – Marine

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	Gnoorea Point. Activities associated with the DCGDP which may impact local fisheries include impacts to the marine environment such as Seabed disturbance, HDD discharge, Vessel discharge and spills and leaks.	the proposal.	Environment. As the pipeline shoreline crossing will be achieved using HDD, no impact to the 'Coral gardens' is expected, and access to this area would not be restricted. **Factor does not require further EPA evaluation**
Accommodation	A separate village to house employees is proposed.	• A submission from a member of the public raised concerns that the proposed accommodation camp is not in the best interests of residents of Karratha, and that housing employees in Karratha would be preferable.	The DCGDP accommodation facility would provide its own on-site services, including power, potable water treatment, communications, sewage treatment and effluent disposal. Hence, no additional pressure would be placed on the region's existing facilities. Waste material would be disposed of in accordance with regulatory guidelines. Given the relatively small scale of the development, the impact to regional infrastructure and services is expected to be negligible. **Factor does not require further**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
			EPA evaluation
OTHER			
Decommissioning	The DCGDP would be decommissioned at the end of it's operating life or when production from the reservoirs reached the end of its economic life. Specific abandoning and decommissioning requirements would be carried out in line with the decommissioning standards of the day.	No comments were received in relation to this factor.	**Factor does not require further EPA evaluation**

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
1. The precautionary principle *Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.* *In application of this precautionary principle, decisions should be guided by –* *(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and* *(b) an assessment of the risk-weighted consequences of various options.*	Yes	In considering this principle, the EPA notes the following • The proposal has the potential to impact native vegetation, terrestrial and marine fauna. • Studies on the existing environment have been carried out • Vegetation, terrestrial fauna and marine fauna are relevant environmental factors discussed in this report.
2. The principle of intergenerational equity *The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.*	Yes	In considering this principle, the EPA notes the following • The proposal would result in the loss of native vegetation, and has the potential to impact biodiversity. • The proposal would result in the emission of up to 125000tpa of greenhouse gas, which would contribute to climate change. • Greenhouse gas and vegetation are relevant environmental factors discussed in this report.
3. The principle of the conservation of biological diversity and ecological integrity *Conservation of biological diversity and ecological integrity should be a fundamental consideration.*	Yes	In considering this principle, the EPA notes the following • The proposal would result in the clearing of native vegetation and fauna habitat and has the potential to impact biological diversity. • Vegetation and fauna are relevant environmental factors discussed in this report.
	No	

PRINCIPLES		
Principle	**Relevant Yes/No**	**If yes, Consideration**
4. Principles relating to improved valuation, pricing and incentive mechanisms *(1) Environmental factors should be included in the valuation of assets and services.* *(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.* *(3) The users of goods and services should pay prices based on the full life-cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste.* *(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximise benefits and/or minimize costs to develop their own solution and responses to environmental problems.*		
5. The principle of waste minimisation *All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.*	No	

Appendix 4

Recommended Environmental Conditions

RECOMMENDED ENVIRONMENTAL CONDITIONS

Statement No.

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED
(PURSUANT TO THE PROVISIONS OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

DEVIL CREEK DEVELOPMENT PROJECT, GNOOREA POINT,
SHIRE OF ROEBOURNE

Proposal: The construction and operation of a gas processing plant, onshore supply gas pipeline, onshore sales gas pipeline, and horizontal directionally drilled shore crossing.

The proposal is further documented in schedule 1 of this statement.

Proponent: Apache Energy Limited (ABN 39 009 301 964)

Proponent Address: Level 2, 88 Colin Street , WEST PERTH WA 6005

Assessment Number: 1710

Report of the Environmental Protection Authority: Bulletin 1307

The proposal referred to in the above report of the Environmental Protection Authority may be implemented. The implementation of that proposal is subject to the following conditions and procedures:

1 Proposal Implementation

1-1 The proponent shall implement the proposal as assessed by the Environmental Protection Authority and described in schedule 1 of this statement subject to the conditions and procedures of this statement.

2 Proponent Nomination and Contact Details

2-1 The proponent for the time being nominated by the Minister for the Environment under sections 38(6) or 38(7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal.

2-2 The proponent shall notify the Chief Executive Officer (CEO) of the Department of Environment and Conservation of any change of the name and address of the proponent for the serving of notices or other correspondence within 30 days of such change.

3 Time Limit of Authorisation

3-1 The authorisation to implement the proposal provided for in this statement shall lapse and be void within five years after the date of this statement if the proposal to which this statement relates is not substantially commenced.

3-2 The proponent shall provide the CEO of the Department of Environment and Conservation with written evidence which demonstrates that the proposal has substantially commenced on or before the expiration of five years from the date of this statement.

4 Compliance Reporting

4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the Chief Executive Officer of the Department of Environment and Conservation.

4-2 The proponent shall submit to the Chief Executive Officer of the Department of Environment and Conservation, the compliance assessment plan required by condition 4-1 at least 6 months prior to the first compliance report required by condition 4-6. The compliance assessment plan shall indicate:

1 the frequency of compliance reporting;

2 the approach and timing of compliance assessments;

3 the retention of compliance assessments;

4 reporting of potential non-compliances and corrective actions taken;

5 the table of contents of compliance reports; and

6 public availability of compliance reports.

4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by condition 4-1.

4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by condition 4-1 and shall make those reports available when requested by the Chief Executive Officer of the Department of Environment and Conservation.

4-5 The proponent shall advise the Chief Executive Officer of the Department of Environment and Conservation of any potential non-compliance as soon as practicable.

4-6 The proponent shall submit a compliance assessment report annually from the date of issue of this Implementation Statement addressing the previous twelve month period or other period as agreed by the Chief Executive Officer of the Department of Environment and Conservation. The compliance assessment report shall:

1 be endorsed by the proponent's Managing Director or a person, approved in writing by the Department of Environment and Conservation, delegated to sign on the Managing Director's behalf;

2 include a statement as to whether the proponent has complied with the conditions;

3 identify all potential non-compliances and describe corrective and preventative actions taken;

4 be made publicly available in accordance with the approved compliance assessment plan; and

5 indicate any proposed changes to the compliance assessment plan required by condition 4-1.

5 Performance Review and Reporting

5-1 The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the construction phase of the proposal and then at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which address:

1 the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to the management of the major risks and impacts;

2 the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and

3 significant improvements gained in environmental management which could be applied to this and other similar projects.

6 Terrestrial Vegetation

6-1 Within two months following completion of construction of the gas plant and associated pipelines, the proponent shall commence rehabilitation of the temporarily cleared areas of the site in accordance with the following:

1 Re-establishment of vegetation in the rehabilitation area to be comparable with that of the pre-clearing vegetation such that the following criteria are met within three years:

(1) Species diversity is not less than 70 percent of the known original species diversity;

(2) Weed coverage is less than 10 percent of the rehabilitated area.

2 A schedule of the rate of rehabilitation acceptable to the CEO of the Department of Environment and Conservation.

6-2 In liaison with the Department of Environment and Conservation, the proponent shall monitor progressively the performance of rehabilitation against the criteria in condition 6-1 based on annual Spring surveys.

6-3 The proponent shall submit annually a publicly available report of the rehabilitation performance monitoring required by condition 6-2 to the CEO of the Department of Environment and Conservation and shall address in the report the following:

1 The progress made towards meeting the criteria required by condition 6-1 and milestone criteria; and

2 Contingency management measures in the event that the criteria required by condition 6-1 are unlikely to be met.

7 Terrestrial Fauna

7-1 The proponent shall limit the length of open trenches to two and a half kilometres at any time.

7-2 Fauna refuges providing suitable shelter from the sun and predators for trapped fauna are to be placed in the trench at intervals not exceeding 50 metres.

7-3 The proponent shall employ at least two “fauna clearing people” to remove fauna from the trench. The “fauna clearing people” shall be able to demonstrate suitable experience to obtain a fauna handling licence from the Department of Environment and Conservation.

7-4 Inspection and clearing of fauna from trenches by fauna clearing people shall occur twice daily and at least half an hour prior to the backfilling of trenches, with the first daily inspection and clearing to be undertaken no later than 3.5 hours after sunrise, and the second inspection and clearing to be undertaken daily between the hours of 3:00 pm and 6:00 pm.

7-5 In the event of significant rainfall, the proponent shall, following the clearing of fauna from the trench, pump out any pooled water in the open trench (with the exception of groundwater) and discharge it to adjacent vegetated areas in a manner that minimises erosion.

8 Marine Fauna

8-1 The proponent shall prevent lights or light glow adversely affecting turtle behaviour in waters and/or beaches adjacent to the project area.

8-2 The proponent shall employ a dedicated marine fauna observer during all shoreline construction activities between 1 November and 31 March to verify that no turtle nesting behaviour occurs in the vicinity.

8-3 If turtle nesting behaviour is observed in the vicinity of construction activities, the proponent shall:

1. Cease construction work immediately; and

2. Notify the CEO of the Department of Environment and Conservation and determine strategies in liaison with the Department of Environment and Conservation to prevent further impact prior to recommencing construction.

9 Benthic Primary Producer Habitat

9-1 The proponent shall undertake all works to ensure that the loss of Benthic Primary Producer Habitat within the management unit does not exceed 0.5% for any habitat type.

9-2 If monitoring detects a loss of greater than 0.5% in any habitat type, the proponent shall:

1. immediately suspend all construction activities which contributed to the exceedance; and

2. provide a report to the Chief Exectutive Officer of the Department of Environment and Conservation on the measures to be implemented to keep impacts below the limits specified in Guidance Statement 29, prior to recommencing any construction activities that contributed to the exceedance at the site.

10 Greenhouse Gas Abatement

10-1 For the life of the project, the proponent shall include in the annual environmental compliance reports referred to in Condition 4 the following:

1. greenhouse gas emissions resulting from the operation of the project;

2. details of improvements in equipment, technology or procedures investigated by the proponent that would reduce greenhouse gas emissions; and

3. details of improvements in equipment, technology or procedures implemented by the proponent that would reduce greenhouse gas emissions.

11 Decommissioning

11-1 At least six months prior to the anticipated date of closure, or at a time approved by the Chief Executive Officer of the Department of Environment and Conservation, the proponent shall submit a Final Decommissioning Plan designed to ensure that the site is suitable for future land uses, for approval of the Chief Executive Officer of the Department of Environment and Conservation.

The Final Decommissioning Plan shall set out procedures and measures for:

1. removal or, if appropriate, retention of plant and infrastructure agreed in consultation with relevant stakeholders;

2. rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and

3. identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.

11-2 The proponent shall implement the Final Decommissioning Plan required by condition 11-2 until such time as the Minister for Environment determines, on advice of the Chief Executive Officer of the Department of Environment and Conservation, that the proponent's decommissioning responsibilities have been fulfilled.

11-3 The proponent shall make the Final Decommissioning Plan required by condition 11-2 publicly available in a manner approved by the Chief Executive Officer of the Department of Environment and Conservation.

Procedures

1. Where a condition states "on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment and Conservation for the preparation of written notice to the proponent.

2. The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment and Conservation.

3. The Minister for Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment and Conservation over the fulfilment of the requirements of the conditions.

4. The proponent is required to apply for a Works Approval and Licence for this project under the provisions of Part V of the *Environmental Protection Act 1986.*

Schedule 1

The Proposal (Assessment No. 1710)

The proposal is for the construction and operation of a gas development in order to recover and process the gas reserves from the Reindeer gas field, providing an additional domestic gas supply of at least 100 terajoules per day to the Dampier – Bunbury Natural Gas Pipeline.

The onshore component of the proposal in located approximately 45kms southwest of Karratha on the Pilbara coast, with the shoreline crossing occurring at Forty Mile Beach adjacent to Gnoorea Point. The locations of the major components of the project are shown in Figure 1.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1: Summary of key proposal characteristics

Element	Description
Hydrocarbon Reserve	Approximately 11 billion cubic metres within the Reindeer field, located approximately 85 kilometres northwest of Dampier.
Offshore gas pipeline shore crossing	Horizontally Directionally Drilled
Onshore gas supply pipeline	Approximately 11 kilometres long.
Onshore sales gas pipeline	Approximately 500 metres long.
Area of terrestrial clearing	Not more than 123 hectares (temporary area 32 hectares, permanent area 91 hectares).
Gas plant	Two gas trains each sized for 100 Standard Cubic Feet per day.
Sales gas production	Up to 220 Terajoules per day to be delivered to the Dampier Bunbury Natural Gas Pipeline.
Condensate production	Up to 160 kilolitres per day.
Condensate storage and loadout	Storage tanks with a working volume of approximately 28,000 kilolitres. Condensate loadout facility.

Figure 1 – Site location and layout of key components (see figure 1 page 3 above)
Figure 2 – Regional location of the proposal

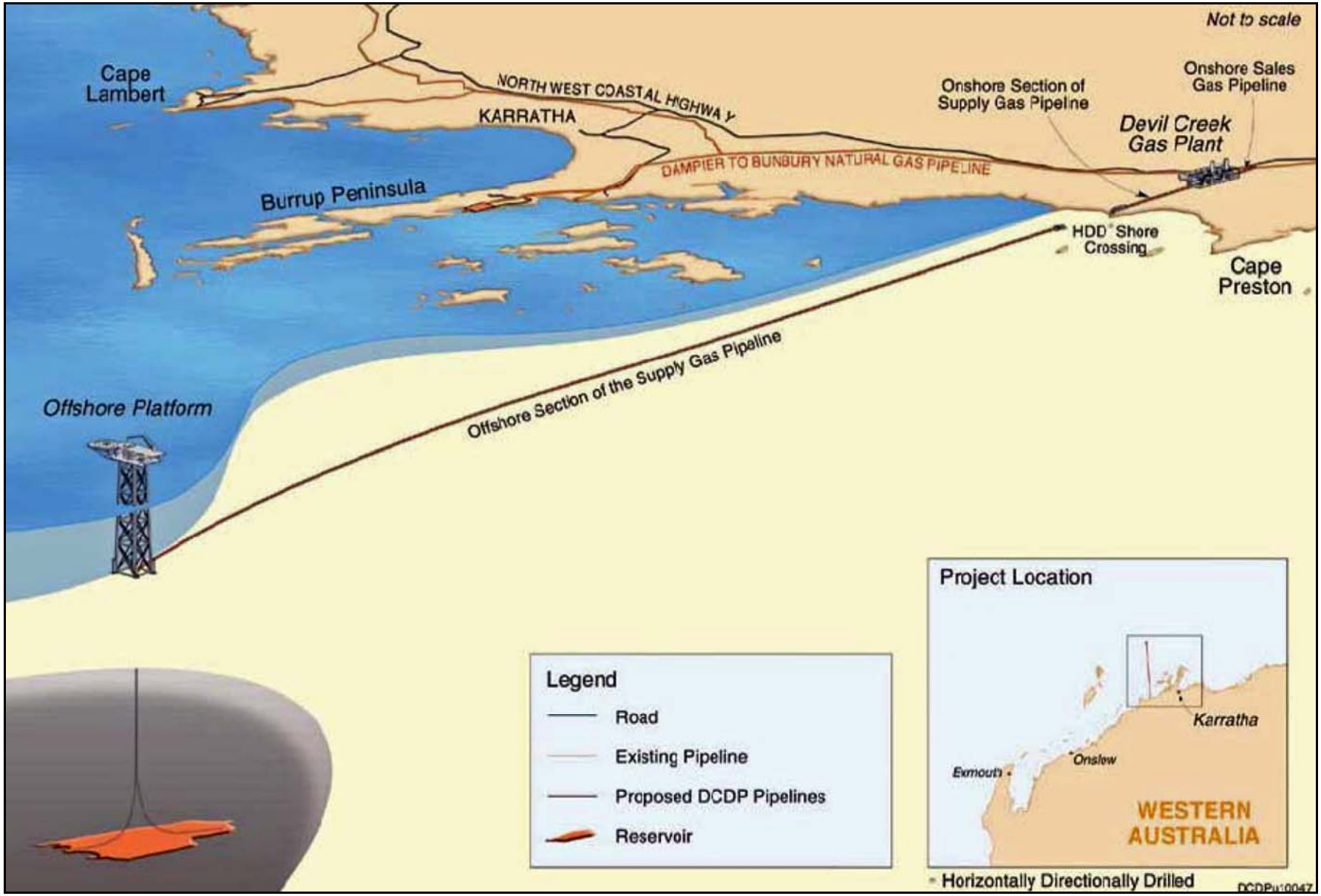

Figure 2: Regional location of the proposal

Appendix 5

Summary of Submissions and
Proponent's Response to Submissions