# ROLLER No. 1

## Oil Exploration Permit TP/3 Part 1

## WAPET Pty Ltd

**Report and Recommendations**
**of the**
**Environmental Protection Authority**

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# Contents



## Appendices



## Figures



## Reference


Department of Conservation and Environment, Bulletin 104, 1984;
Procedures for the Protection of the Western Australian
Marine Environment from Oil Spill.

# Summary and recommendations

West Australian Petroleum Pty Ltd (WAPET) seeks to drill an exploratory oil well at a site 6 km offshore from the mouth of the Ashburton River and 20 km west of Onslow. Drilling is expected to begin in December 1989 and will take about 3 weeks to complete.

The proposed site lies within a Special Protection Locality in water about 10 m deep. The Ashburton River delta is regarded as being environmentally sensitive because of the presence of mangrove stands. As well, islands, fringing corals, and seagrass meadows nearby (See fig 2) have high conservation values.

Onslow's interests centre on the tourist, fishing and petroleum industries, and the drill site lies within locally important prawn fishery areas.

Concerns raised about the proposal concentrated on the possible impacts of an oil spill on the fishing and tourist industries, and the ability of the oil spill contingency plan to deal with an emergency.

The effects of routine drilling operations are considered to be minor and manageable, being associated with the impact of drill cuttings on the sea floor, and the discharge of treated domestic wastes. These will be adequately dispersed by currents.

The environmental impacts likely to result from an oil spill could be very serious depending on the size of the spill and the ability of WAPET to control it. While the possibility of a major spill is regarded as being remote, strict contingency measures are recommended for its minimisation.

This assessment concludes that the risks associated with the proposal are acceptable and makes the following recommendations:

### Recommendation 1

**The Environmental Protection Authority concludes that the Roller 1 proposal as described in the proponent's Notice of Intent is environmentally acceptable and recommends that it could proceed, provided that certain practices outlined in the NOI are subject to the Authority's recommendations in this report, and provided that the proponent's environmental commitments (Appendix II) are followed.**

### Recommendation 2

**The Environmental Protection Authority recommends that the proponent include in the Oil Spill Contingency Plan, the capability for containment of oil spillages of up to 20 $m^3$ on or adjacent to the rig. A suitable boom and skimmer device, together with an operator skilled in their deployment, should be installed on the rig prior to the commencement of drilling and shouldremain there permanently until decommissioning.**

### Recommendation 3

**The Environmental Protection Authority recommends that before drilling operations begin WAPET successfully trial run the Oil Spill Contingency Plan up to the point of deployment of resources, in order to ensure that the plan is workable.**

### Recommendation 4

**The Environmental Protection Authority recommends that in order to minimise the likelihood of failure of the well casing, the proponent should, prior to drilling ahead, pressure test each string of casing to the satisfaction of the Director, Petroleum Division, Department of Mines.**

### Recommendation 5

**The Environmental Protection Authority recommends that the proponent ensure that drill cuttings and fluid are disposed of to the satisfaction of the Environmental Protection Authority.**

### Recommendation 6

**The Environmental Protection Authority recommends that before approval is given for drilling the Roller 1 well, the proponent should provide an undertaking to accept responsibility for any adverse environmental impacts which may occur as a consequence of the proposal. The arrangements for meeting this condition should be to the satisfaction of the Minister for Environment after consultation with the Minister for Mines and the Minister for Fisheries.**

### Recommendation 7

**The Environmental Protection Authority recommends that the proponent refer any further drilling or development plans resulting from this exploration drilling proposal to the Environmental Protection Authority for assessment.**

### Recommendation 8

**The Environmental Protection Authority recommends that the proponent be responsible for decommissioning the rig and the well, and rehabilitating the site and its environs to the satisfaction of the Director, Petroleum Division, Department of Mines.**

## Recommendation 9

**The Environmental Protection Authority recommends that no transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent take place until the Minister has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister should be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.**

# 1. Introduction

West Australian Petroleum Pty Ltd (WAPET) seeks to drill an exploratory oil well within Exploration Permit TP/3 Part I at a site 6 kilometres offshore from the mouth of the Ashburton River and 20 kilometres west of Onslow (Figure 1).

Due to the location of the site within a Special Protection Locality (refer Figure 2) as defined in Department of Conservation and Environment Bulletin 104 , the level of assessment was set at Managed Notice of Intent.

The documentation on which the Environmental Protection Authority assessment is based is titled "Roller No. 1 Notice of Intent, Exploration Permit TP/3 Part I", prepared for West Australian Petroleum Pty Ltd by consultants LeProvost, Semeniuk and Chalmer.

# 2. Project Description

The location of the proposed Roller No. 1 site is 21°, 38'. 06.15"S, 114°, 55', 33.56"E. A cantilever jack-up drill rig will be hired. It will be serviced from Port Hedland by two supply vessels.

The planned hole length is 1,250 metres, and it is expected to take about 3 weeks to complete the drilling.

A workforce of up to 82 people will be required on the rig. Crew transfers are effected by helicopter, which is expected to make about six flights a week to Onslow or Barrow Island.

A vessel will attend the rig at all times during drilling. Its main purpose is to deploy the oil spill boom should it be required to contain an oil spill. However, the skimmer which is required for the removal of oil will be kept at Onslow unless required.

# 3. Existing environment and uses

The site lies in shallow shelf waters near the coast, west of Onslow. The climate is sub-tropical, with very hot summers and mild winters. Rainfall is strongly seasonal (from January to July) and much falls as a result of cyclonic or thunderstorm activity, both of which can be expected in the summer months.

At the proposed time of drilling (November-December 1989) brisk afternoon south west to north west sea breezes commonly blow as a consequence of high land temperatures.

Water movements are dominated by wind-modified tidal currents and sub-surface topography. Storm currents generated by cyclones may affect the area, with the flow direction being generally parallel to the bathymetric contours. During summer, with the prevailing south west to north west winds, net littoral drift is eastwards.

The sea bottom in the general vicinity of the drill site is sand over limestone and gently undulating with water depths ranging from less than 5 metres to over 10 metres. Seagrass and algae beds occur in the shallow shoals, and are favoured by turtles and dugongs.

The adjacent coastal system typically comprises intertidal limestone platforms and gently sloping beaches, backed by mobile and/or vegetated dunes, or tidal flats. The intertidal pavements support a wide range of organisms, distributed according to depth of immersion, including algal turf, clams, gastropods and crabs.

The sandy beach habitat hosts various infauna and crustaceans, and is used by foraging birds and turtles, which both nest at the back of the beach.

The tidal flats are dominated by mangroves which generate a rich biological assemblage known to be important as a nursery area for prawns which are commercially fished in the Ashburton delta area. The mangroves also provide a feeding area for numerous fish species and migratory wading birds.

The coastal area and islands have been recommended by the Conservation Through Reserves Committee (in 1985) for reservation as nutrient and nursery areas and reserves for the purpose of conservation of flora and fauna, respectively, although these proposals are largely unimplemented to date.

The significant wildlife resources in the area include seabird and turtle nesting sites and dugong, fish and prawn breeding and nursery areas.

The drill site is immediately opposite the river delta, a complex wave and current - modified system which supports mangroves on many of its tidal creeks.

Coral reefs fringe most of the islands in the vicinity of the well site but do not occur along the mainland coastline, because of the high sediment loads entering the sea from the Ashburton River and other creeks.

Apart from its function as a supply base for some of the petroleum installations Onslow's interests centre on the tourist (mainly fishing oriented) and commercial fishing industries. The most significant component of the commercial fishery is the prawn catch, which is concentrated close to the mainland.

Organised tourist facilities include the fishing resort at Thevenard Island.

# 4.Points raised in submissions

Comments were sought from involved government agencies and the fishing industry. These were in turn passed on to WAPET for their response. These questions and responses are included as Appendix 1.

The main concerns centred on:

- possible impacts of an oil spill on the fishing industry and adjacent coastlines, reefs and islands; and
- the ability of the oil spill contingency plan to deal with an emergency.

# 5. Environmental impacts

The impacts associated with offshore drilling fall into two categories: those which relate to normal activities, and others which may arise from abnormal incidents, such as a blowout or a major spill.

## 5.1. Effect of routine drilling operations

Drilling offshore normally requires the disposal of drill cuttings, impregnated with drilling additives, to the sea floor. As the bottom here is sandy the periodic addition of cuttings is not considered to pose a significant impact, as currents in these shallow waters are expected to rapidly disperse them.

The drilling fluid proposed is a low toxicity mixture of seawater and high viscosity muds. It is discharged at the rate of 2 barrels/min (320l) from the holding tanks aboard the rig during periods of strong tidal movements, to allow effective dispersion and dilution.

Domestic wastes are treated in a sewage treatment plant prior to discharge, and are not considered to create a significant impact due to the relatively small quantities involved and the rapid dispersion via tidal currents.

## 5.2. Possible causes of an oil spill

There are 3 potential sources of oil spillage:

1. **Diesel fuel spills during refuelling of the rig.**

   Refuelling is expected to occur 2-3 times during the 3 week period of drill operations. Fuel transfer operations are supposed to be constantly monitored and any rupture of hoses should result in prompt shutdown of pumps. WAPET claims the maximum loss would be 1600 litres, provided shutdown of the pumps is immediate if a leak is detected.

2. **During flow testing of the well.**

   The equipment is designed to shutdown rapidly at several points both downhole and above surface if abnormal pressures are encountered. The amount of oil spilt is thus restricted to that within the isolated section. WAPET claims that the maximum possible volume of oil that might be spilt is $8m^3$ or 8 000 litres.

3. **A blow-out.**

   Although in Australian oilfields this is less likely than some other areas of the world (due to lower formation gas pressures) the consequences of a flow of up to $636m^3$/day for anything up to 6 months (WAPET's worst case scenario figures) would be catastrophic to the region.

A spillage risk assessment has been calculated by the Commonwealth Department of Transport (1983) which indicated a figure for offshore drilling rigs of a spill rate (size unspecified) of one for every 455 wells drilled.

Later official information shows that there have been no (reported) oil spills associated with the total of 798 offshore wells drilled in Australia to 30th June 1987, of which 266 were off Western Australia.

## 5.3. Chances of an oil spill impacting sensitive areas

Figure 1 shows the calculated extent of an oil spill after 24 hours and 48 hours. The diagram is conservative in that it does not take into account the mitigating effects of evaporation and weathering of the slick. It is generally accepted that after 6 hours 80-90% of light Australian crude oil will have evaporated, and after 48 hours only 2.5-5% of the original oil will remain (ie. the other 95-97.5% will have evaporated or weathered to a different, less toxic composition, via photo-oxidation and biodegradation).

WAPET did not assess the impacts of a long-term blow-out in their NOI because:

- they consider the possibility to be extremely remote; and
- should one occur the probability of an uncontrolled flow continuing for more than a few days is remote, since well control and capping procedures have been proven effective.

Analysis by WAPET's consultants of winds and currents leads to the conclusion that there is up to about a 5% probability that a spill could be blown onto the mainland during the summer months, when drilling is scheduled. However, the chances of islands (which include Thevenard, Airlie, Direction, Ashburton, South and Rosily ) in the predicted spill trajectory being impacted are considerably higher (see Figure 1).

# 6. Conclusions and recommendations

In the recent past, and subject to certain conditions, offshore wells have been given approval to proceed within sensitive areas in this region. Specifically, approvals were given for the Rivoli 1 and Cooper 1 holes in Exmouth Gulf and several exploration and production wells on the Saladin Oilfield adjacent to Thevenard Island.

The Environmental Protection Authority considers that this proposal is likewise environmentally acceptable.

### Recommendation 1

**The Environmental Protection Authority concludes that the Roller 1 proposal as described in the proponent's Notice of Intent is environmentally acceptable and recommends that it could proceed, provided that certain practices outlined in the NOI are subject to the Authority's recommendations in this report, and provided that the proponent's environmental commitments (Appendix II) are followed.**

The most common spill, due to fuel handling mishaps or temporary failure of blow-out preventers, can result in relatively minor discharges of 10-20 $m^3$ of oil (10,000-20,000 litres). As these spills are significantly more common than full scale blow-outs during exploratory well drilling operations it is important that contingency plans are able to cater for them. A skimmer should be kept on site whilst drilling is underway, to minimise oil loss beyond booms, as well as sufficient quantities of dispersant in case conditions dictate its use.

### Recommendation 2

**The Environmental Protection Authority recommends that the proponent include in the Oil Spill Contingency Plan, the capability for containment of oil spillages of up to 20 $m^3$ on or adjacent to the rig. A suitable boom and skimmer device, together with an operator skilled in their deployment, should be installed on the rig prior to the commencement of drilling and shoukiremain there permanently until decommissioning.**

Keeping in mind the proximity to fisheries, the environmentally sensitive Ashburton River delta area and nearby islands, it is considered to be vital that any oil spills will be adequately managed. Thus there needs to be confidence in the effectiveness of the Oil Spill Contingency Plan.

### Recommendation 3

**The Environmental Protection Authority recommends that before drilling operations begin WAPET successfully trial run the Oil Spill Contingency Plan up to the point of deployment of resources, in order to ensure that the plan is workable.**

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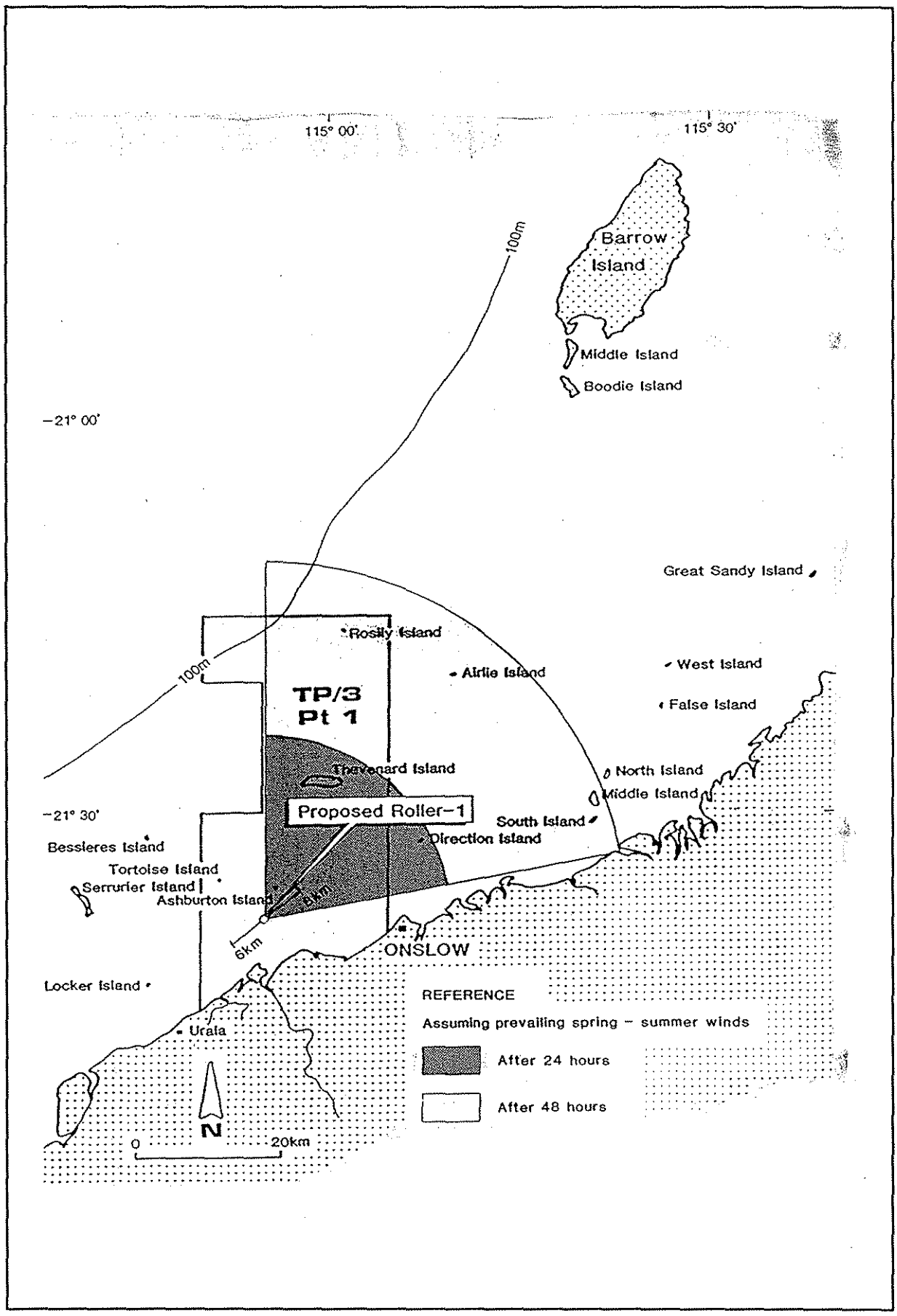


Figure 1: Location diagram

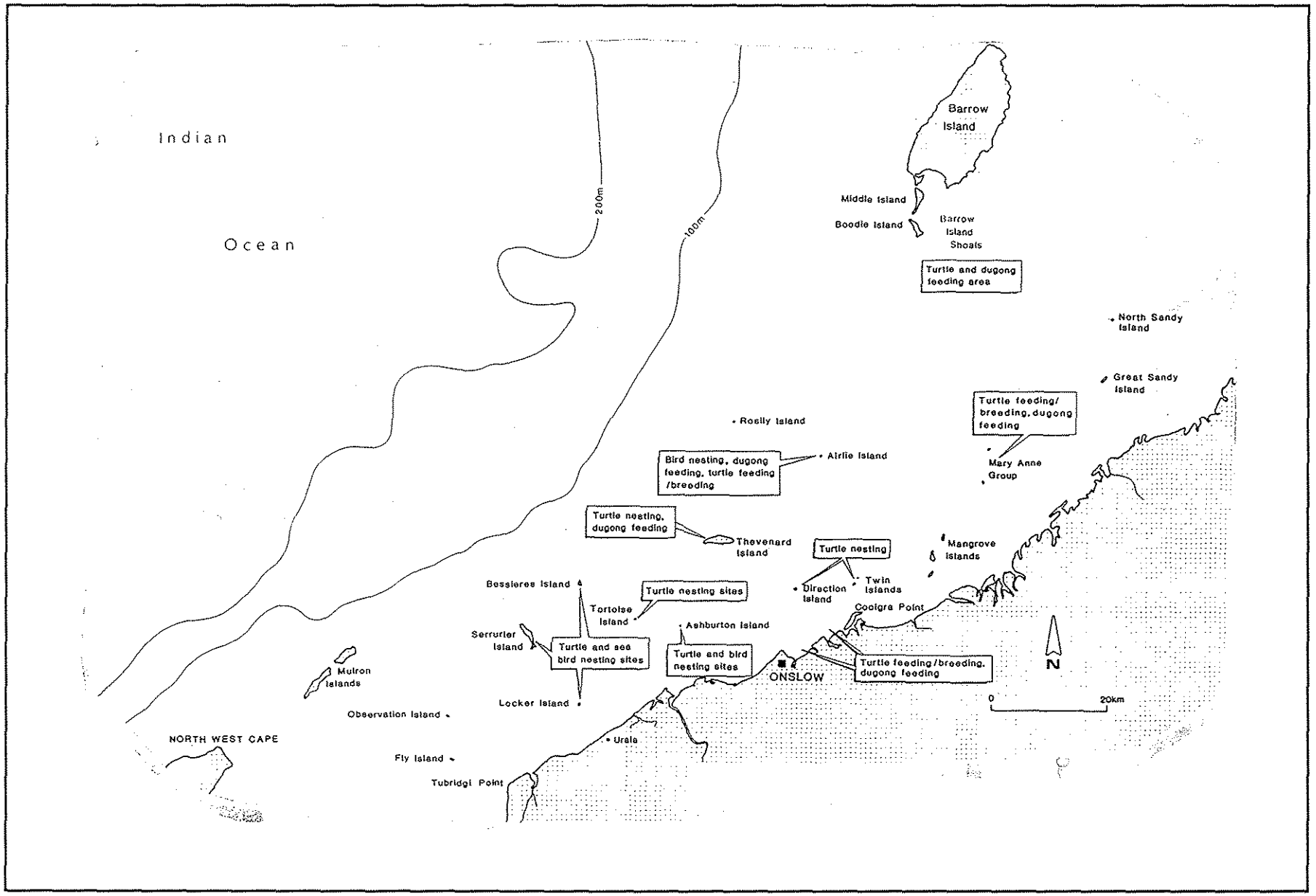


Figure 2: Environmentally significant areas

# Appendix 1

# Summary of submissions and proponent's responses

## 1. Timing of proposals

Q.

**The statement that the drilling is to be conducted at a time which will minimise interference with the prawn fishery seems to be in conflict with data on page 29 which indicate that the spawning season for brown tiger prawns and banana prawns is coincident with the time of drilling. In fact, maximum damage could be done to the mangrove nursery habitats of the prawns by drilling during summer if a spill occurred.**

A.

The statement relates to the prawn fishermen who reduce fishing efforts during September/October and cease fishing in November/December. The timing of the proposal is synchronous with the end of the fishing season.

Damage to the mangrove nursery habitats would occur at any time of year that oil came into contact with the mangroves. The chances of a spill reaching the mangroves are greater during the winter than during the summer because of prevailing wind patterns and because lower temperatures may reduce weathering rates of the oil.

If a spill occurred during the summer it would need the combined effect of neap tides and strong northerlies to drive the spill into the mangroves. As the juvenile prawns concentrate in the mangroves in summer a spill in the mangrove nursery habitats would cause the most damage. Immigration of prawn stock from surrounding areas would ensure that the prawn fishery would recover.

Q.

**The fishing industry should be required to comment on the impact to their operations and expert opinion sought.**

A.

Opinion on the potential impacts of an oil spill on the local prawn fishery was provided by LSC through the NOI. Since there have been no studies conducted to date on the impacts of local oils on local fisheries, finding an expert in this area is not easy. Opinion based on experience with petroleum operations in the Gulf of Mexico indicates that the local fisheries there were not adversely affected by the presence of the oil companies (Geyer, 1980).

Q.

**What a short-term effect of an oil spill on the prawn fishery actually means (p. 30, p. 31) has not been specified and has not been related to the potential long-term economic effects which might arise from resultant loss of income.**

A.

The effects of an oil spill on the prawn fishery were discussed in Section 4.4.7.2 of the NOI.

## 2. Cyclone response

Q.

**What does "circulated out under controlled conditions" mean on page 35? Also, that the "rig selected will be capable of withstanding cyclonic wind and wave action" but there is no indication of the design level, ie what return period?**

A.

The routine procedure when drilling through the deepest plug on re-entry of the well is to close one of the blow out preventers on the drill pipe and circulate drilling fluid down the drill pipe, back up the annular space between the drill pipe and the well bore and at the surface, through a choke into the drilling fluid tanks. This allows complete control of the rate of flow of the drilling fluid. Any hydrocarbons are easily detected and collected separately on the surface.

We propose drilling the well using either the Jack-up "Maersk Valiant" or its sister rig, the "Maersk Voyager". These rigs are designed to survive cyclones.

The rig's insurance agent, Noble Denton, have approved use of the rigs on the location during cyclone season.

## 3. Drilling impacts compared with natural events

Q.

**It is argued that drilling-induced turbidity levels would not be detectable against background levels from a cyclone or from the Ashburton River in flood. At this time of year when drilling is to take place the events of a cyclone or flood are unlikely. The argument used in the NOI is invalid, particularly as it is not coupled to Sechi depth observations.**

**Tidally transported turbidity and comprising sediments suspended from wave and wind action, would be significantly less than that resulting from cyclones or floods.**

A.

According to meteorologists at the Bureau of Meteorology, the cyclone season occurs between October and April (pers. comm. Information Officer, Bureau of Meteorology). Therefore the comment regarding the unlikely occurrence of a cyclone and/or flooding of the Ashburton taking place during the time of drilling (September to December) is wrong. We remind EPA of TC "Ilona", December 1988.

The discussion concerning the turbidity associated with drilling fluids versus the turbidity arising from natural sources (spring tidal flow, cyclones and flood river flow) was intended to show that at certain times large areas of the region under assessment may be subjected to high levels of naturally derived suspended solids and thus the effects of drilling fluids on the region would be indistinguishable from the effects of natural turbidity.

The enclosed photographs show the extent of offshore turbidity associated with the flow of the Ashburton River during neap tides and under the influence of light winds from the west.

## 4. Drilling mud and fluids

Q.

**On Page 5 and in Table 3 no indication of the toxicity of the drilling fluid components has been given nor of the expected dilution levels at successive distances from the drill site during discharge periods.**

A.

The drilling fluid to be used while drilling Roller No. 1 is of the same type used to drill Saladin 1 and 2, Glennie 1, Trap Reef 1 and Yammaderry 1, all in the Saladin area. A drilling fluid of similar toxicity was used to drill Bundegi No. 1 in Exmouth Gulf in 1978. The drilling fluid used for all these wells have been approved by both the Environmental Protection Authority and the Department of Mines. WAPET has supplied ample documentation of the toxicology of these fluids to the respective departments in the past.

Section 2.3.2 states that the main discharge of drilling fluid occurs when the rig's mud storage tank approaches capacity. This discharge is infrequent. These charges will be confined to periods of strong tidal movements to allow dispersion. These fluids will be discharged at low rates.

Q.

**What is chrome lignosulphonate (table 3, page 46) and what is its toxicity?**

A.

Chrome lignosulphonate is an organic chemical used almost universally in water-based drilling fluids to aid dispersion of colloidal particles of clay and other minerals. It plays an essential part in maintaining the required properties for the drilling fluid, especially the viscosity. It is added in small quantities to the drilling fluid and has little effect on its toxicity.

Its use in higher concentrations than proposed is accepted by the USA EPA in all areas of the USA. As it is a surface active chemical whose function is to attach to colloidal particles, the majority of it may be permanently bound to clay particles.

## 5. Wind rose data

Q.

**The data used for the oil spill contingency plan does not distinguish between wind direction changes from morning to afternoon. Other data (Bureau of Meteorology Report 1972) shows most winds are from the west-north-west sector at 1500 hours in November-January. Under these conditions a spill is much more likely to impact the mainland coastline around Onslow.**

**The Steedman oil spill trajectory analysis is mainly based on wind data from Thevenard Island, located about 25 km offshore. An offshore wind-recording site is likely to be beyond the strongest influence of the land-sea breeze system. Thus the site chosen may underestimate the strength of on-off shore breezes. The Bureau of Meteorology wind data from Onslow at 1500 hours during January indicates that north-west and west winds are dominant. Winds of >5 m/s (~ 15%) and > 10 m/s (~ 7%) from the north-west are recorded at these times.**

**The Roller site is approximately 5 km offshore. Assuming an oil drift of 3% of the wind speed it would take approximately 8-10 hours for an oil slick to reach the shore under 10 knot winds from the north-west, and 4-5 hours under the influence of a 20 knot north-westerly wind.**

**From the report and the comments above areas can be identified which would have significant probabilities of being impacted if an oil spill were to occur.**

A.

Wind speed and direction data has been recorded on Thevenard Island for the months November to January at 10 minute intervals.

These data have been analysed by Steedman Science and Engineering and they advise that the 0900 and 1500 hour data clearly indicate that the Thevenard Island data display the influence of land-sea breeze system. Whereas south and south-westerly winds predominate at 0900 hours westerly winds dominate at 1500 hours. This is consistent with the published Bureau of Meteorology surface wind analysis for Onslow Post Office. Furthermore, the strength of the sea breeze is similar at the two locations.

A comparison of the 1500 hours values for January, making due allowance for the conversion of m $s^{-1}$ shows that Onslow 5% of westerly winds exceeds speeds of 30 km $hour^{-1}$, while 3% of winds at Thevenard Island exceed 30 km $hr^{-1}$.

The data used for the oil spill contingency plan does therefore distinguish between wind direction changes from morning to afternoon.

Assuming an oil drift of 3% of the wind speed, travel time from the Roller site to the coast is approximately 8-10 hours for 10 kt (18.5 km $hr^{-1}$) and 4-5 hours under the influence of a 20 kt (37 km $hr^{-1}$) north-westerly wind.

During summer the latter winds only occur on 1-2 days per month and it is highly unlikely that the duration of such winds will be the 5 hours required to reach the coast. Similarly, with the cyclic nature of the sea-breeze pattern, 10 kt north-westerly winds of the 8-10 hour required duration are unlikely.

The 0900 hr and 1500 hr Bureau of Meteorology data do not accurately represent the complete 24 hour wind pattern offshore of Onslow. Use of only the

1500 hr winds will totally misrepresent the cyclic nature of the sea-breeze system and severely overestimate the onshore currents.

## 6. Monitoring programme

Q.

**There is insufficient detail in the NOI. The monitoring report should state how the proposed activities assist with baseline information and how they would be used to minimise oil spill impacts or to quantify impacts after an oil spill.**

A.

The information to be collected will minimise oil spill impacts by providing more reliable understanding of both:

i) the character of the environment and location of sensitive resources in the region; and

ii) the likely trajectory path of any oil spill based on real data.

Both pieces of information will be useful in planning how to best combat a spill.

## 7. Probability of the occurence of an oil spill

Q.

**The possibility of an oil spill and the effect it would have on the Onslow coastline. In particular, the Ashburton River, inland creeks and mangroves and prawn spawning. More studies should be done by WAPET on the likely effect of an oil spill on the Onslow coastline.**

A.

We believe these points were adequately covered in the NOI as follows:

i) probability of an oil spill, see page 22 Section 4.4.3 of the NOI; and

ii) effect on Onslow coastline and resources, see pages 23-31, Sections 4.4.4, 4.4.5, 4.4.6 and 4.4.7.

More specific information regarding oils and their impacts on local native species is not available and thus it is not possible to be more specific than the NOI.

We would, however, point out that much of the Onslow coastline is comprised of sand barrier islands and beach habitat. These habitats are not only the least ecologically productive, but they are also the most amenable to clean-up activities of all the habitats in the region.

Q.

**In the event of an oil spill the ability of WAPET to contain more that a minor spill. Company should be required to provide more equipment, ie booms, as part of a contingency plan to contain the spill and protect environmentally sensitive areas of the coastline.**

A.

WAPET will have the capacity to cope with all minor spills and for the first 24 hours of a major spill. This is stated on page 35 of the NOI.

The document describes the response capabilities and resources available if the spill is beyond the company's control.

Q.

**Volume spilt in a rig refuelling spill has been underestimated. As the drilling floor is to be jacked up 20-30m the volume of the fuel level will more likely be about 7 $m^3$ than 0.17 $m^3$.**

A.

The maximum volume that could be spilt during refueling operation is 1600 litres (or 1.6 $m^3$).

Q.

**The statement of page 23 is misleading and is contradicted by an account of an oil spill (page 27) from the Harriet "A" platform. Numerous other "small" spills have occurred, including a 2000 litre spill north of Dampier within the last few months.**

A.

The statement on page 23 is valid. There have been no reported oil spills from offshore exploration or development wells drilled in Australia. The Harriet "A" spill was from a production facility, not from drilling. The 2000 litre spill north of Dampier was from a ship and not connected at all with drilling an exploration well.

Oil spills resulting from a blowout of an offshore exploration well are very rare occurrences.

Many wells have been drilled in the area to penetrate the rock formations which will be encountered in the Roller No 1 well, most of which have been drilled by WAPET. The considerable drilling knowledge gained from these dramatically reduces the uncertainty factor which often contributes to the potential for blowout conditions to exist. The Department of Mines and WAPET rigourously enforce stringent requirements for procedures, training of personnel, and drills in well control to minimise the potential for a blowout. The drilling operations are carried out using specialised, high-pressure rated blowout prevention equipment which is tested weekly to ensure its performance.

We consider therefore that the conclusion that the probability of a major spill resulting from a blowout being extremely low is valid.

## 8. Potential oil spill effects

Q.

**The introduction states that the "major environmental concern associated with the proposal is the potential for marine pollution on a large scale as the result of blowout during drilling . . ." and that the period of blowout could**

**be anything from an hour to six months (Section 4.4.2.3). Given these statements it is of concern that there is no discussion in the contingency plan which covers the event of a spill lasting up to six months. The effects of a blowout lasting for more than a few days would undoubtedly be very significant, yet the environmental consequences have not been discussed. There is an unsubstantiated assumption that any spill will be of short duration.**

A.

The NOI did not access the impacts of a long term blowout because:

i) the safeguards that are in place during exploration drilling programmes as explained previously make the possibility of a blowout extremely remote; and

ii) should a blowout occur the probability of an uncontrolled oil flow continuing for more than a few days is remote since well control and capping procedures have been proven effective.

iii) since so few exploratory drilling blowouts have occurred worldwide there is little information on the effects of an uncontrolled blowout of a light oil on tropical marine ecosystems and it is therefore difficult to predict the potential impacts after more than a few days. However studies have shown that, with the possible exception of mangroves, the impacts of light oils in tropical marine environments cause significantly less long term impact on the sensitive resources than either light or heavy oil in temperate marine environments.

iv) the greatest possibility of an oil spill occurring during the drilling of Roller No 1 is from spillages during refuelling of the platform. The duration of this type of spill will therefore be controlled by the vigilance of the personnel overseeing the refuelling operation and the volume of the refuelling line. We feel it is not unreasonable to assume that this type of spill would be small and of short duration.

The contingency plan does not address long term oil spills because:

i) response actions to any spill will initially be the same and will only vary in the amount of equipment mobilised and the number of personnel involved; and

ii) control and clean up of a spill of that size would be taken over by the State Combat Committee.

Q.

**The NOI repeatedly states that damage from drilling or a spill is less than or equal to that experienced on a regular basis during cyclones or flood discharges. This ignores the fact that these communities have evolved with cyclones, and have developed strategies to survive them.**

**An oil spill causes very different kinds of damage, which may in fact couple with cyclonic events to cause some real devastation.**

**For example, oiled mangroves hit by a cyclone several months later may be removed or significantly damaged. This could cause erosional damage and major sediment relocation.**

A.

The NOI stated that the turbidity (and not damage) associated with drilling fluids is minor compared to turbidity caused by natural events and prawn trawling.

There are many examples throughout the northwest of natural events such as cyclones and flood discharges having caused localised and extensive mortality of marine resources. Penn and Caputi (1986) have identified the occurrence of cyclones as a major factor affecting the number of prawns recruited into the commercial fishery. LSC personnel have recorded the occurrence of coral mortality over an extensive area (ie Dampier to Exmouth) as a result of Cyclones Ilona and Orson in 1988/89. In addition, substantial coral mortality has been observed as a result of bleaching not only in the northwest but internationally as well.

Increased water temperatures have been proposed as a possible cause for this bleaching. Locally, bleaching has been recorded in corals located in shallow waters spanning the region between the Kimberleys and the Abrolhos Islands.

Ningaloo Reef is currently subject to the coral eating molluscs Drupella which are responsible for extensive coral mortality, and in 1989 a large percentage of Coral Bay biota died of asphixiation during the annual coral spawning event.

LSC personnel have also observed cyclones causing substantial beach erosion which has exposed or removed turtle nests while offshore limestone pavements are swept bare of algae and associated fauna.

There are numerous locations along the Western Australian coastline where mangroves have been lost as a result of erosion caused by strong winds and high tides or smothering by the migration of sand dunes.

These are all natural processes that occur along the tropical coast of Western Australia.

Given the regional extent of these natural disturbances the comparative effects of an oil spill are likely to be highly localised and of relatively minor significance to the regional populations of the species affected.

Q.

**As a blowout may last up to six months we must assume that areas west of the Roller No 1 are potentially at risk. This would compromise the vast conservation values and economic resources of the Exmouth Gulf and the Yannrie coastal plain. No discussion to this possibility has been given in the NOI.**

A.

The chance of a blowout occurring is highly unlikely, and the chance of a six-month spill is even more remote. Should a spill occur it is not certain that:

i) the spill would be carried into Exmouth Gulf;

ii) the resources of the Gulf would be impacted; and

iii) the impacts on the resources would be adverse.

The only available information on the impact of a relatively light oil on a tropical environment is from studies of the PEMEX Ixtoc-1 blowout that occurred in 1979. Studies have indicated that the observable impacts were minor (Bedinger and Nulton, 1989).

At the time the NOI was prepared the proposed timing of drilling was spring through summer and therefore any potential blowout would have been carried east because of the strong southwesterly component to prevailing winds.

With the subsequent delay of the drilling programme we acknowledge that a long-term blowout could extend into the winter period when winds are predominantly from the eastern sector. However, during winter the vast majority of winds (53%) come from the east to south sector and would be expected to disperse oil offshore and away from sensitive marine resources located within Exmouth Gulf.

Furthermore, these resources start some 60 km to the southwest (Tent Point) of the prospect site and extend southwards deep into Exmouth Gulf. For oil to reach this area, moderate to strong (18-25 knots) winds from the north would be required over a period of 60 hours which provides ample evaporative and chemical weathering time, thereby substantially reducing the toxicity of the oil. Hence, whilst we acknowledge there is a potential risk to the sensitive marine resources of Exmouth Gulf, in our opinion this risk is slight. We question why the Roller No 1 well is being singled out on this point. There has been a substantial number of wells drilled in this area, all of which had a similar potential to impact Exmouth Gulf under the circumstances postulated.

Q.

**The NOI claims that recovery of oil-devastated seabird populations is "usually within one or two generations". That might not be possible in the case of fairy terns.**

A.

The major source of information on the potential impacts of petroleum on local seabirds is given in the report entitled 'Marine Resources Map of Western Australia, Part 2, The Influence of Oil on Marine Resources and Associated Activities with an emphasis on those found in Western Australia' by H E Jones (1986) who identified two groups of birds at most risk from oil spills and these were:

i) endangered species; and

ii) species which have few breeding areas in Western Australia and whose populations would therefore be susceptible to diminution by localised oil spills in breeding areas.

Fairy terns were not mentioned in either of these risk groups and therefore we would query the reasons for singling out this particular species given that these birds nest above the high tide line.

## 9. Impacts on mariculture

Q.

**Pearl shell tissue is sold for food. Profitability of pearling leases may be damaged by a spill.**

A.

Should a spill occur the oil floating on the sea surface will not come into contact with the pearl shells since they are located on the seafloor. Furthermore, research has shown that molluscs which are impacted by petroleum hydrocarbons:

i) will survive an oil spill; and

ii) have the ability to depurate (expel) petroleum hydrocarbons and thus they will flush hydrocarbon contaminants from their bodies once they are subjected to clean water.

Therefore, whilst the normal operations of pearling leases may be interrupted during a spill, the profitability of the pearling operation is unlikely to be compromised.

## 10. Oil spill contingency plan

Q.

**The source of the data on oil impacts on different habitats is not specified, nor is it stated to what extent these general comments apply to the locations at risk.**

A.

The conclusions regarding the relative sensitivity of resources to whole and dispersed oil were based on referenced information contained in the NOI.

Since specific studies on the impacts of Australian oils on native marine species have not been conducted, we can only give general predictions on the potential impacts of oil on marine resources in

the general vicinity of Roller No 1. These generalisations are based on available local and international literature (see WAPET's Saladin Oilfield ERMP).

The information contained in the Environmental Considerations section is intended to brief, highlighting the sensitive marine resources in the vicinity of the well and their relative sensitivity to dispersed and undispersed oil. More detailed information may be confusing to the on-site person in charge of clean-up operations who is concerned only with what should be protected and how this should be done.

Q.

**The projected Maximum Oil Spill Spread figure looks optimistic.**

A.

This figure is based on oil spill envelope predictions prepared by professional meteorologists and oceanographers at Steedman Science and Engineering. Figure 18 is considered an accurate approximation of the area potentially at risk from an oil spill given that most damage occurs during the initial hours of a spill prior to the onset of weathering of the oil.

Q.

**Why, and on what basis, are seagrass beds given low priority with respect to protection of the marine environment? Specify why sand beaches are low priority for part of the year. How does the priority rating link with the habitat maps provided at the back of the report?**

A.

The priority for protection of resources in the area is based on a study conducted by LSC entitled "The Distribution, Character and Sensitivity to Oil of Shallow Marine Habitats in the Thevenard Island Region".

Seagrass beds are given a low priority for protection relative to more sensitive resources because they are subtidal and therefore have a lower potential for impact by floating oil. Even if seagrass leaves are coated by oil and killed the buried rhizomes will survive and regenerate the following summer. Furthermore, seagrass beds undergo wide natural seasonal fluctuations in biomass, dying off in the winter before undergoing substantial spring and summer growth.

Sandy beaches rate a low priority for protection only during the months that turtles are not nesting on them (June-August).

The maps are provided to identify shallow marine resources in the vicinity of the proposed well that are potentially at risk from an oil spill. These resources have been assigned high or low priority ratings in the action plan.

Q.

**Page 12, Para 4, Last Line - This notification should be rapid. The other appropriate agencies should also be notified verbally as soon as possible.**

A.

The reporting procedure on page 12 of the OSCP is for reporting the spill and what action was taken after the event. It is not the alert procedure for initial notification to Mines and EPA. In the event of a spill the action plan on page 4 of the OSCP will be followed. The notification procedure referenced there is detailed on Figure 10 as the Spill Action Chart.

This figure will be changed such that the Mines Department is notified immediately of any spill more than 0.5 bbls (80 litres).

Q.

**Pages 9 and 19 - Use of dispersants requires approval of the designated authority following the advice of the Environmental Protection Authority. This is the case, especially for spills in sensitive locations such as ESLs and SPLs as defined in DCE Bulletin 104.**

Note that deflection booming to low sensitivity coast for eventual land-based collection and retrieval is an appropriate alternative (provided conditions are suitable) for deflecting oil away from the mangroves.

Information on the appropriate use of dispersants in shore clean-up is given in the CONCAWE manual on shore clean-up. Some of this information could be usefully incorporated into this plan (for example, line 18 on page 6).

A.

WAPET recognises the restrictions on the use of dispersants and this is stated on pages 2, 5, 6, 8, 9 and 19.

WAPET is seeking advance approval from the EPA to use dispersants under certain conditions. It is recognised that under certain wind and tide conditions it would be possible for a slick to impinge on the mangrove community. The ability to respond quickly with dispersants prior to the mangroves being affected will require prior permission of the EPA.

In the above case of wind and tide WAPET will direct its resources to deflecting the oil away from the mangroves to low sensitivity coast. The mangrove community has the highest priority for protection.

The CONCAWE report contains some useful information, some of which is not relevant or is outdated (it was published in 1981). Prior to 1987 there was little published information on oil spills in tropical environments. Since 1987, however, there has been a greater push to conduct field and laboratory studies on the behaviour of oil in tropical marine environments and the impact of the oil on the sensitive tropical resources. Some of the currently suggested clean-up strategies don't agree with the CONCAWE strategies.

Q.

**From marine charts it is probable that the Roller No 1 location is in a depth of about 8 m not 12 m. Numerous shoals surround this area, particularly to the North West. This information is important in relation to the EPA's rule of the thumb - no dispersants in waters less than 8 m.**

A.

The water depth at Roller No 1 is 10.5 m LAT Onslow but in this instance water depth is immaterial. As Roller No 1 is within 8 km of the coastline irrespective of the depth of water dispersant cannot be applied without prior advice of the EPA. This is stated in the EPA bulletin number 104. The WAPET OSCP on page 19 and in Figure 14 acknowledges this.

Q.

**Note: All stores, with the exception of the bulk dispersant stockpile, had been removed from the Karrakatta store and are now in "D" shed at Fremantle Port Authority.**

**Page 13, Section 7.1 - Delete "Capt J Barron" and insert "Capt C Deans Ph: 430 4911 (24 hours)".**

**Page 14 - Delete "Capt J Major" and insert "Mr T Micale Ph: 430 4911 (24 hours)".**

**Page 14 - Remove Mr P Ashton's name from the list at Section 7.2.**

A.

The changes to the equipment location and the telephone list are noted. This information was compiled from the latest editions of the State Counter Disaster Plan and MOSAP. The fact that these documents are presently incorrect indicates a mechanism is required to update communication charts on a more frequent basis. This information must be disseminated throughout the industry.

Q.

**Specify how much dispersant is held at Onslow.**

A.

Onslow will hold 2050 litre (10 x 205 litre drums) of Corexit 9527.

Q.

**Given the short distance from well site to sensitive islands (eg Ashburton Island) there is a need to hold some Corexit on site during drilling if, for example, the boom does not work effectively because of local conditions.**

A.

WAPET will be holding dispersant on site. However the EPA should provide guidelines for dispersant use ahead of time since its use is dependent on being able to contact them within a few hours. By the time the EPA has been contacted and the appropriate people notified and decisions made it could be too late to use dispersants, especially if the oil is headed for the Ashburton delta.

As page 19 of the OSCP detailed, dispersant application should take place between two and eight hours after a spill occurs. If a spill was heading directly for a sensitive area dispersal would be undertaken immediately after the recommended initial two hour weathering period. Both the helicopter dispersant spray unit and vessels carrying dispersant can be mobilised to site within that initial 2 hours' period.

Q.

**The affect of a dispersant on the environment if used in the event of a major spill heading towards the coastline.**

A.

We are not certain what affect dispersants will have on the local native marine species since no research has been conducted to date in Australia on this topic.

A brief assessment of the relative impacts of dispersed versus undispersed oil on sensitive marine resources was presented on page 3, Section 3, of the Oil Spill Contingency Plan and was based on information available from the international literature.

Q.

**In any spill, regardless of size, containment has to be the first priority. How fast can booms etc be mobilised, and would that be rapid enough to contain a spill? Likewise skimmers.**

A.

Booms on site could be mobilised and deployed within an hour. Their effectiveness to contain a spill would depend on weather conditions at the time.

The skimmer would require at least 3-4 hours to mobilise to site from Onslow. Given that initial efforts would be concentrated on deployment of booms to contain any spill, we consider this to be an adequate and practical measure.

Q.

**As Ashburton Island has the most significant likelihood of being impacted by a spill, response times will need to be fast to avoid this occurrence. In this context, why is the Vikoma skimmer not going to be held on site? The time delay in transporting the equipment from Onslow could result in significantly more oil from a spill being lost from within an area by a boom if winds and/or tides are adverse.**

A.

In the event of a spill the first response is to control the source of the spill. The second is to contain the spill and thirdly, to clean up after a spill. The boom is the primary source of containment for a spill. All efforts will be directed at successfully deploying this equipment. The Vikoma skimmer will be held in Onslow as it is not required for immediate containment of the slick.

The skimmer can only be used effectively on contained oil in good weather. If the weather is adverse the skimmer is of limited use especially with the light crude likely if oil is found in the well. The very conditions that hamper the use of the skimmer benefit the management of the slick by increasing natural weathering and dispersal.

Q.

**How many containment booms are available to WAPET if needed, and are there enough of them to either contain a spill effectively, or to protect islands, mangroves etc in the event of oil beaching.**

A.

This information is provided in the document.

Q.

**In rough conditions, how would a spill threatening beaches/mangroves/coral be contained or otherwise handled?**

A.

In rough weather a spill will be left alone to weather and disperse naturally and consideration for chemical dispersant use will only be given if the mangroves in the Ashburton delta are threatened.

Oil that is left alone will weather and disperse rapidly under conditions such as rough sea state and high wind speeds.

Q.

**The possibility of a night oil spill and how this would be handled by the Company.**

A.

The response to night spills is the same as for daylight spills. The lighting provided on the rig and support vessels is extremely effective. Bright floats or floating lights can be placed in the slick to assist in tracking. Frequent weather observations are taken to assist in applying the relevant spill trajectory data.

Q.

**Tractors and bulldozers should not be allowed onto active turtle beaches to rake the sands.**

A.

The oil will not be pushed any further up the beach than the high tide line and therefore if bulldozers and tractors are required to rake the sands there will be no need for this equipment to operate beyond that point. Since turtle nesting takes place beyond the high tide line it is not anticipated that they will be affected. We therefore question the reason for this statement.

Q.

**Clean up of an oil spill onto an active turtle beach should be conducted using hand rakes. Sand/oil bolus should be removed from the beach and disposed of properly on the mainland.**

A.

We have stated in the NOI that raking of the beach is the best clean-up management strategy for spills of Saladin type oil and have further stated that oiled material will be disposed of at the Karratha Seven Mile Industrial disposal site. We question the advisability of only using hand rakes since a tractor towing an agricultural rake would cover much more beach area faster and more frequently than a gang of labourers with rakes. Since speed is an essential ingredient of any oil spill management plan we would have thought that mechanised clean up methods were more appropriate.

Q.

**The contingency plan should stand on it's own, ie independent of the information in the NOI. All relevant data from the NOI dealing with spills (such as trajectory etc) should be included in the plan.**

A.

While we agree that OSC plans for producing oil-field require a significant degree of detail, we do not agree that all the information contained in the NOI should be repeated in an Oil Spill Contingency Plan for an exploratory well within an area that has been previously assessed (ERMP Saladin Field). The Oil Spill Contingency Plan is a working document that must be understandable to the layman and contain the basic information that a person in charge will require when dealing with an oil spill for the first few hours before experts can be contacted to help guide their actions. After that scientific co-ordinators familiar with the marine environment will advise the person in charge.

## 11. Legal responsibility and compensation

Q.

**The responsibilities of WAPET will need to be defined in regard to a clean-up should an oil spill reach the coastline.**

A.

WAPET assumes full responsibility for clean-up of the coastline.

Q.

**As with the recent Rivoli No 1 well in Exmouth Gulf there should be provision for compensation to commercial fishermen in the event of an oil spill. I propose that the insurance agreement should include a clause to this effect which is equivalent to that contained in the Rivoli No 1 agreement and that this should be a prerequisite for drilling to occur.**

A.

WAPET has, on behalf of its joint venture principals, ie CHEVRON, TEXACO, AMPOLEX, SHELL and WMC, already done the following:

1) given an undertaking to the State of Western Australia and the Commonwealth to pay any costs, expenses, claims or liabilities arising from loss of well control, pollution and spillage of oil including expenses of complying with directions with respect to the clean up or other remedy of the affects of the escape of petroleum from any drilling operation carried out by WAPET in Permit area TP/3 Part 1 and WA-24-P Part 1 and in connection with the drilling of Roller No 1 well in particular; and

2) provided evidence of insurance carried by its principals. This is set out in our letter of 16 September 1989 to the Mines Department.

# Appendix 2

# Proponent's commitments

WAPET hereby commit themselves to comply with commitments made in this NOI. Specifically this means that WAPET will:

- comply with all legislative requirements pertaining to this project;
- adopt industry and government standards and guidelines for safe exploration drilling practices;
- implement the environmental management programme documented in the NOI;
- comply with guidelines provided in the oil spill contingency plan; and
- implement the monitoring programme outlined in the environmental management programme.