Proposed Roller oilfield development, offshore Onslow

West Australian Petroleum Pty Ltd

Summary and recommendations of the Environmental Protection Authority

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Summary and recommendations

West Australian Petroleum Pty Ltd proposes to develop the Roller oilfield within permit area TP/3 Part 1, in shallow coastal waters 20km west of Onslow. The development would extend the life of the existing production operation on Thevenard Island, some 26km northeast of the Roller field, by linking in with the processing and storage facilities there which service the nearby Saladin, Cowle and Yammaderry fields. These developments have all been previously assessed by the Environmental Protection Authority. Because this proposal is a significant addition to the existing project the Authority required it to be formally assessed at the level of Consultative Environmental Review.

The proposal seeks environmental approval specifically for the drilling of a minimum of seven development wells from four monopod structures (Roller A, B, C, D), connected by pipelines to a gas separating plant located either adjacent to one of the monopods, or on the existing WAPET lease on Thevenard Island. In operation the project would have eight producing wells (because Roller No 4 has already been drilled) connected to the four monopods and linked to processing facilities on Thevenard Island.

Production from the existing fields is expected to be in decline by the time this project could be commissioned; thus storage of oil and shipping activities will not require any additional facilities.

The construction phase would require about 120 people; approximately 80 for the drilling operations and about 40 for construction and installation of the components of the project. The latter group would be accommodated either on the rig or in temporary facilities in Onslow. Depending on whether the gas separating unit is offshore or on Thevenard Island there may be an extra 18 or five personnel, respectively, for the operating phase.

The project is located in an environmentally sensitive area, with several coral reef and coastal mangrove locations having high conservation values. The shallow waters and intertidal zones support a diverse range of biota which give the area its high conservation, commercial fishing and tourism values. The region is subject to strong winds and currents and lies within the cyclone-affected belt of Australia.

Concerns raised in public submissions centre around the timing of the proposed activities and their potential effects on the amenity of the Mackerel Island resort, the loss of prawn trawling area to exclusion zones around the monopods, the fate of oil spills and their potential impacts on the commercial fishing and recreational resources of the Onslow-Thevenard Island area, the need for a well planned oilspill contingency plan, and the need for an adequate mechanism for compensation of affected parties in the event of a spill. The Environmental Protection Authority also identified the increased risks of spills from the oil transfer pipeline in shallow water (much of which is subject to trawling activities) joining the Roller field to Thevenard Island, as well as the continual and long term domestic liquid waste discharge associated with the 18 personnel on the offshore gas processing unit, if this option were to be chosen. There are only minor impacts envisaged with the emplacement of the pipelines, which are to be buried along part of the route, as blasting is not expected to be required.

WAPET has researched the environmental sensitivities of the area, modelled the likely spread of an oilspill and characterised the properties of Roller crude oil. This type of oil does not evaporate readily but is amenable to dispersants. It is recognised that the production and transport of oil entails higher risks of spills than for exploration. WAPET have proposed to reduce the chance of the pipeline from the Roller field to Thevenard Island being damaged by burying it within the prawn trawling area and covering it with protective concrete blankets elsewhere. They also have a shipping procedures manual which specifies the conditions for use of the Saladin loading facility by tankers. Given that no increase in tanker traffic is expected as a result of this proposal going ahead there is not expected to be an increased risk from shipping spills associated with this development.

Recommendation 1

The Environmental Protection Authority concludes that the proposal to develop the Roller oilfield as described in the Consultative Environmental Review, is environmentally acceptable. In reaching this conclusion, the Authority

identified the main factors requiring detailed consideration as the effects of routine and accidental discharges arising from the drilling and production operations upon the environment and their effects on the dependant trawling and recreation industries.

The Environmental Protection Authority considers that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Authority's recommendations in this report.

Accordingly the Environmental Protection Authority recommends that the proposal could proceed, subject to:

- **the proponent's revised commitments; and**
- **the Authority's recommendations in this report.**

Blasting of the channel for the pipelines is not planned but remains a possibility if unusually hard strata are encountered along the route.

Recommendation 2

The Environmental Protection Authority recommends that any proposal for marine blasting be referred to the Authority for assessment.

WAPET has recognised it will be necessary to treat sewage outfall points so as to minimise the chances of human bacterial infections being passed on to marine mammals from human sewage discharge points, such as the proposed offshore gas separation unit and the existing outfall from Thevenard Island.

Recommendation 3

The Environmental Protection Authority endorses the proponent's commitment to disinfect and give domestic effluent primary treatment prior to discharge, and recommends that this approach be taken.

The proponent has made a commitment to accept responsibility for possible environmental impacts of a potential oil spill and the EPA endorses this.

Recommendation 4

The Environmental Protection Authority recommends that the proponent accept responsibility for any adverse environmental impacts which may occur as a consequence of the proposal proceeding, and further recommends that the arrangements for this should be to the satisfaction of the Minister for Environment after consultation with the Minister for Mines and the Minister for Fisheries.

The proponent has recently upgraded response capabilities to a spill and has made a commitment to provide equipment onsite with the capability to contain a $20m^3$ spill, which is the upper limit of the most commonly occurring spills.

Recommendation 5

The Environmental Protection Authority endorses the proponent's commitments and recommends that any change to the placement of the oil retrieval equipment should be to the satisfaction of the Authority.

Recognising that recovery of spilt oil is difficult under most wind and wave conditions the Environmental Protection Authority believes that minimisation of the risk of a spill occurring is the best approach.

Recommendation 6

In order to maximise recovery of spilled oil where an environmentally sensitive location is within the zone of influence from an oil spill, the Environmental Protection Authority recommends that refuelling of the rig should only take place during optimal weather conditions, to the satisfaction of the Authority, on advice from the Department of Mines.

Refuelling in conditions where winds, current speeds and wave heights are within safe limits acceptable to the Department of Mines would be regarded as satisfactory.

However, if a spill does occur the proponent's response should be prompt and effective.

Recommendation 7

The Environmental Protection Authority recommends that, prior to the commencement of the first well, the proponent successfully trial runs a simulated Oilspill Contingency Plan up to the point of deployment of resources, to ensure that the plan is workable to the satisfaction of the Authority. The Environmental Protection Authority also recommends that, while drilling is occurring, further simulated Oilspill Contingency drills be run at least once a year, or for each change of drilling rig, whichever is sooner, to maintain a high level of preparedness among all involved personnel.

Recommendation 8

The Environmental Protection Authority recommends that the proponent be responsible for removing the monopods and the facilities on Thevenard Island, and rehabilitating the site and its environs at the end of the project, to the satisfaction of the Authority, on advice from the Department of Mines and the Department of Conservation and Land Management.

1. Introduction

In May 1990 West Australian Petroleum Pty Ltd (WAPET) submitted a proposal to develop the Roller oilfield, offshore about 20km west of the town of Onslow within permit area TP/3 Part 1 (see Figure 1). WAPET is the operator of a joint venture involving:

Chevron Asiatic Ltd	25.7%
Texaco Oil Development Co	25.7%
Ampol Exploration Ltd	12.8%
Shell Development (Australia) Pty Ltd	25.7%
Western Mining Corporation Ltd	10%

The proposal seeks to drill seven new development wells to supplement the three exploration discovery wells (Roller 1, 2 and 4) previously assessed by the Environmental Protection Authority (EPA). These wells would be drilled from four monopod structures (designated Roller 'A', 'B', 'C' and 'D' in Figure 1). WAPET's existing Saladin field and production facilities on nearby Thevenard Island were formally assessed by the Environmental Protection Authority at the level of Environmental Review and Management Programme (ERMP) in 1987.

The Roller field lies in a Special Protection Locality, as outlined in the Department of Conservation and Environment (now EPA) Bulletin 104. This means that the area is regarded as being environmentally sensitive to oilspills. In this case the reason for this is because the waters are shallow and protected and allow the widespread development of coral reefs, seagrass beds and nursery areas for marine life. Several adjacent coastlines are also sensitive because of the occurrence of bird and turtle nesting sites and mangrove-lined river mouths. While the Authority's general position on proposals for exploration in environmentally sensitive areas may be summarised as follows:

- land-based petroleum exploration proposals can usually be made to be environmentally acceptable;
- land-based petroleum exploration proposals in Marine Parks will be assessed for environmental acceptability on their merits;
- marine-based petroleum exploration proposals in Marine Parks are environmentally unacceptable;
- in environmentally sensitive areas, petroleum exploration proposals need to clearly demonstrate the capacity to cope with environmental impacts, especially possible oil spills in terms of credible events, their likely frequency and contingency planning; and
- outside environmentally sensitive areas exploration proposals normally could proceed, subject to standard environmental protection conditions.

All development proposals for environmentally sensitive areas need to be referred to the Authority for further assessment because of the potential for greater environmental impacts arising from the long term presence of infrastructure, the processing and transfer of petroleum products and the increased traffic these activities generate.

Because of the scope of the original assessment of the Saladin production facility and the degree of shared infrastructure, the EPA determined that a formal assessment at the level of Consultative Environmental Review (CER) would be required for this proposal.

The proponent was asked to consider the cumulative impacts of the project on the areas likely to be within its zone of influence; to assess the likelihood and potential impacts of an oil spill; and to prepare an effective plan to manage activities at the proposed sites so as to ensure no significant impacts in environmentally sensitive areas.

2. Project description

The Roller oilfield is situated approximately 6km from the mainland, halfway between the mouth of the Ashburton River and Ashburton Island, in shallow waters regarded as being part of an environmentally sensitive ecosystem.

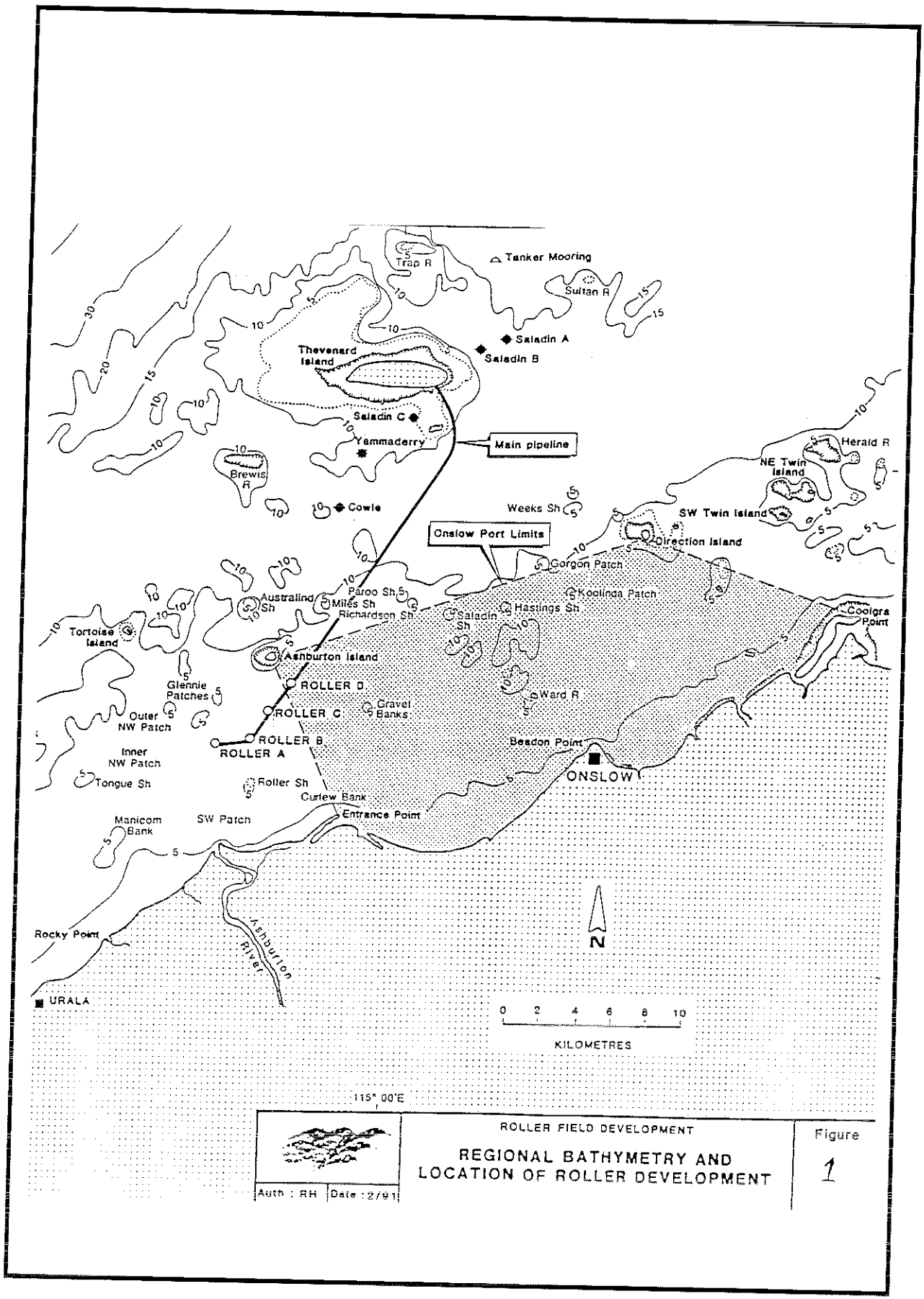

Figure 1. Regional bathymetry and location of Roller development

The construction phase would entail the drilling of seven new development wells from four locations. Coupled with the Roller No 4 well, which was drilled and capped previously, there are expected to be eight producing wells at four separate monopod locations. Two supply boats would be used to service the drill rig, making between one and two round trips a week to transport heavy and bulk supplies from Port Hedland and Dampier. A stand-by vessel would be moored in attendance to the rig at all times during drilling to deploy oilspill equipment in the event it is needed.

During the ensuing operational stages there may be a requirement to drill additional wells from these monopods in order to maintain production rates from the field.

Crude petroleum consists of a mixture of liquid petroleum, gas and water. Its processing requires the separation and handling of these components. WAPET has canvassed two options for the location of the gas separation/compression equipment. Option 1 calls for the unit to be placed within the existing WAPET lease area on Thevenard Island and connected to the Roller 'A' platform by a 26km long 20 inch (51cm) diameter pipeline which would transport the gas, oil and water from the producing wells. Option 2 requires a separate platform, occupied and operated by up to 18 people, to be positioned alongside the Roller 'D' monopod to separate and compress the gas fraction of the produced crude petroleum. The crude oil and water would then be pumped to Thevenard Island for further processing via a 10.75 inch (27cm) diameter connecting pipeline. In both cases most of the compressed gas would be returned to the wells for re-injection to enhance recovery, either via a 6.6 inch (17cm) diameter line from Thevenard Island to the monopods on the field, or via a 4.5 inch (11cm) line from the gas separator module positioned next to Roller 'D'. In the latter case there would be a requirement for a flare on the platform to vent excess gas for safety reasons.

WAPET has consulted with the affected fishermen to determine which are the prawn trawling areas and, as a result it is proposed that the sections of pipeline(s) between the Roller development and Ashburton Island would be trenched to enable commercial prawning operations to continue.

The workforce (up to 82 people) for the development drilling would be accommodated on the drill rig, while up to 40 other personnel involved with the other offshore facilities would be housed either on the rig or in temporary accommodation in Onslow. During the production stage there would be a requirement for five people more than the present complement on Thevenard Island if Option 1 were to be favoured, or up to 18 personnel to be accommodated on the Option 2 jackup module on a 24 hour rotational basis with Thevenard Island.

No additional storage or tanker transfer facilities would be required on Thevenard Island, and the number of tankers is not expected to increase from the present level of four a month, as petroleum from the Roller field is expected to come on stream at a time when the flow from the Saladin field is declining. At the closure of the field the wells would be plugged and sealed with concrete, and the casings would be cut off 4 metres below the sea floor so as to remove navigational or fishing hazards.

Drilling operations and installation of the monopods are expected to take about six weeks at each wellhead, while the compressor module at Roller 'D' would take a further four weeks to set up. Laying of the various pipelines would take approximately four months. If the proposal is approved, construction is planned to begin in May 1992 with the installation of facilities on Thevenard Island, and be completed in 15 months. The expected production life from the Roller field is about eight years.

3. Existing environment

The Roller field lies in coastal waters of between 5 and 10 metres depth. In these shallows the winds and subsurface topography play an important part in modifying the movement of surface waters, which are primarily driven by twice-daily tides.

The prevailing winds in summer are westerly to south westerly at speeds averaging between 15 and 30 km/h, but their direction can be modified by the influence of local land breezes. In the

winter months winds off the mainland (ie from the south, southeast and east) are most common and may be strong and prolonged. Wind direction measurements recorded at Thevenard Island over a year show that winds from the west, southwest and south southeast occur for 71% of the time. Analysis of the occurrence of cyclones shows that an average of 1.5 cyclones per year give rise to winds above 80 km/h at Onslow. These may be accompanied by strong tidal surges and winds from any direction. (It is company practice to close down drilling operations and plug and shut in wells during a cyclone Red Alert).

There are four tidal current reversals each day. Due to the smaller tidal variation, (about 1.8m), currents tend to be slower in the Onslow region than further eastwards along the Pilbara coast, but there are localised stronger currents in channels, which have management implications for spills in these areas. Increased water turbidity during spring tides is marked in nearshore regions, including the vicinity of the Roller field, and may be further influenced during flows from the Ashburton River and creeks in the area. Reworking of the seafloor sediments has resulted in extensive silt and sand sheets and shoals which largely cover the Roller field.

Nearby areas contain diverse and sensitive marine and intertidal environments. These include mangrove-lined creek deltas; turtle, amphipod and bird nesting beaches; intertidal rock platforms and reefs; shallow algal and seagrass platforms; and coral reefs. The mangrove stands are considered to be the most environmentally sensitive systems and to have high conservation values while also functioning as nurseries for various recreationally and commercially important fisheries in the region. Ashburton Island is the closest of the islands to the Roller area, and, like most of the other islands, is fringed by a coral reef. These are also regarded as being environmentally sensitive and very susceptible to oil spills. The conservation importance of the region was recognised by the National Estate and Heritage Commission which nominated the area covered by the Exmouth Gulf and Rowley Shelf Islands as significant at the State level.

Besides the existing petroleum industry base the main activities in the region concentrate on its marine resources. Commercial fisheries and tourism-based activities are centred at Onslow, and Thevenard Island also hosts the Mackerel Island resort.

The prawn trawling season begins in April and continues through until November. The proponent's enquiries indicate that the Onslow fishery presently comprises six vessels actively operating in Area 1 in a zone to the south of Ashburton Island (shown in Figure 20 of WAPET's CER) and that the prawn catch in a good year brings an estimated value of around $650,000. The shoreline net fishery involved only three boats in 1990 while the line and trap fishing fleet is now operating in deeper waters along the margins of the Rowley Shelf, away from the area of influence of the Roller field.

4. Public submissions

A total of seven submissions were received, five from government agencies and two from affected industries in the area. The main concerns raised were:

- effects of ongoing activities and particularly the flare on Thevenard Island on the Mackerel Island resort;
- the commercial fishing and prawning areas which would be affected by pipelines and exclusion zones;
- effects of oil spills on the environment and the dependant industries;
- the need for adequate compensation for affected industries in the event of adverse impacts;
- the timing of proposed construction activities and potential conflicts with the fishing industry; and
- the need for sensitive and well planned cleanup procedures on beaches in the event of an oil spill.

WAPET's responses to questions raised are included as Appendix 2.

5. Environmental impacts and their management

Impacts on the marine environment from drilling and production activities can arise either from routine or from accidental discharges from the production platforms or the connecting pipelines. Depending on the size of the spill and the environmental sensitivity of the area, there could be a range of direct and indirect effects varying from insignificant to potentially serious.

There would also be expected to be impacts to prawn trawler fishermen arising from some loss of fishing area in the exclusion zones around the platforms, but less than initially expected because the size of the exclusion zones around the monopods is now anticipated to be 100 metres (consistent with the size of the zones around the Cowle and Yammaderry platforms) rather than the 500 metres stated in WAPET's CER.

Installation of the pipelines on the seabed is not expected to require blasting but there remains the possibility that hard limestone pavement may be encountered within the section where the pipeline is proposed to be trenched. Blasting in the vicinity of marine organisms is likely to cause adverse effects.

The Environmental Protection Authority recommends that any proposal for marine blasting be referred to the Authority for assessment.

(Recommendation 2)

5.1. Routine discharges

These can be grouped into domestic and drilling-associated wastes. Treated sewage, 'grey water' and galley wastes are to be pulverised and disinfected prior to discharge into the sea. WAPET has two options which have the potential to affect the amount and location of domestic wastes:

- either the gas separating stage from the crude petroleum would be done offshore on an occupied platform next to one of the four production monopods; or
- the petroleum crude product would be transferred back to the facilities on Thevenard Island for separation and processing.

With the offshore option 18 people would be needed to manage operations on a fulltime basis versus only five extra if the gas were to be separated at the Thevenard facilities. The former represents another continuous source of nutrients and bacteria from domestic discharge into the marine environment eight kilometres offshore, over the operating life of the field, rather than the more usual period of only a few weeks in the event of a well drilling operation. Human-sourced bacteria have been blamed for deaths of mammals in the North Sea and linked with dolphin deaths at Monkey Mia. The risk of impacts upon the environment would be reduced if the effluent is given at least primary treatment to remove solid objects, and chlorinated to reduce bacterial levels, prior to discharge.

The Environmental Protection Authority endorses the proponent's commitment to disinfect and give domestic effluent primary treatment prior to discharge, and recommends that this approach be taken. (Recommendation 3)

Drilling generates rock cuttings impregnated with residual amounts of drilling fluids. If the rig were to be set up adjacent to an environmentally sensitive area such as a coral reef these wastes could have a significant impact. The Roller field lies under a sea floor of sands and silts, and cuttings deposited into this environment are not expected to cause any significant impacts to the nearest environmentally sensitive areas of reef at Ashburton Island, over 3km to the north. WAPET's proposed drilling practices would include:

- routinely using low toxicity, water-based drilling muds;
- routinely washing the drill cuttings with sea water to recover drilling mud prior to their discharge on the seabed; and
- discharge of excess drilling fluids only when tidal and wind currents are at their strongest and moving away from sensitive marine resources.

5.2. Accidental discharges

Drilling over the last 30 years within the northwest shelf region has shown that there is a low risk of wells entering abnormally pressured reservoirs, thus reducing the risk of blowouts. There are no known incidents in Australian waters of environmentally significant spills as a result of exploration or production activities. While the north west shelf area typically contains reserves of light grade crude petroleum which evaporates and biodegrades quickly in the warm waters and high ambient temperatures common to the region, Roller crude oil is highly biodegraded, has an API gravity of 29.5° (similar in weight to diesel fuel, compared with 48° from the Saladin field), and thus is not typical of the area.

WAPET has conducted tests to characterise Roller crude oil so as to learn about its behaviour if spilt. As with diesel it would be expected to thin very rapidly to a slick with a thickness less than 0.1mm. While this makes it very difficult to recover from the open ocean its thinness would aid in rapid photo-oxidation (one mechanism of degradation of oil into less toxic components) in the warm waters and high levels of sunlight typical of the area. Other findings indicate that it does not form an oil-in-water emulsion (mousse), does not evaporate readily once spilt and remains liquid for at least 24 hours, making it more amenable to dispersion.

From Table 1 it can be seen that, in the global context, the statistics of oil spills into the marine environment are dominated by the transportation of oil and terrestrial runoff from all sources, which account for 81% of the total in the average year. Attention is currently being focussed on coastal shipping traffic as a result of recent incidents off the Western Australian coast. This is especially relevant to the production stage of an oil programme. In this case, because there is no expected rise in total production over the existing levels (from the Saladin, Cowle and Yamaderry fields) and no increase in tanker traffic is expected, the risk from tanker loading and movements will stay the same.

For the reception and handling of tankers which call at the Saladin loading facility WAPET has developed a document listing regulations and conditions for the use of the terminal. These recognise the potential risks of handling crude petroleum and specify the minimum criteria that each tanker proposing to use the terminal must satisfy before being permitted to berth. In the event of a tanker failing to meet the criteria WAPET may refuse berthing permission (and has done so in the past-details in Appendix 2). Also taken into account are the prevailing and forecast weather and tidal conditions.

Spills may also arise from the pipelines linking the wells to the processing facility. The further the oil has to be transported the greater is the risk of accidental loss from the pipes and the more oil could be lost, due to the volume in transit. Some of the ways that a pipeline could be ruptured are by:

- being poorly anchored on the bottom and dragged out of position by severe currents caused by cyclonic events;
- being damaged as a result of trawling activities; and
- being damaged by a dragging anchor.

In response to specific questions about pipeline rupture (see Appendix 2) WAPET has indicated that the lines would be trenched in all areas where trawling is currently carried out, as indicated by the affected fishermen operating from Onslow. With regard to the pipeline being ruptured by an anchor, WAPET have indicated that the pipeline wall thickness would be determined by the requirement to withstand pipeline laying stresses or by the weight required for on-bottom stability. These are usually greater than hydraulic pressures from the oil at reservoir (ie underground) pressures and "this additional wall thickness gives the pipeline additional strength to resist impact loads." As well the larger lines would require weight coating (using concrete mats) for on-bottom stability, which gives added protection against impact.

In the event of a sudden rupture there would be a loss in pressure in the line which would actuate a cutoff valve in the wellhead, thus reducing the amount of spillage to an estimated maximum of 1000 barrels of oil if all the oil in the pipeline were to be lost. This would be unlikely as the alarm would have been raised by the tripping of the cutoff valve. Slow leaks may not trip the cutoff but would be smaller and the resulting slick would be likely to be

Table 1: Input of hydrocarbons into the marine environment (Source: NAS 1985)

Source	Best estimate (million metric tonnes/year)	Percentage (%)
A Natural Sources		
Marine seeps	0.2	6.2
Sediment erosion	0.05	1.5
Total Natural Sources	**0.25**	**7.7**
Offshore Production	**0.05**	**1.5**
B Transportation		
Tanker operations	0.7	21.5
Dry-docking	0.03	0.9
Marine terminals	0.02	0.6
Bilge and fuel oils	0.3	9.2
Tanker accidents	0.4	12.3
Non-tanker accidents	0.02	0.6
Total transportation	**1.47**	**45.2**
C Atmosphere	**0.3**	**9.2**
D Municipal and Industrial Wastes and Run-off		
Municipal wastes	0.7	21.5
Refineries	0.1	3.1
Non-refining industrial wastes	0.2	6.2
Urban run-off	0.12	3.7
River run-off	0.04	1.2
Ocean dumping	0.02	0.6
Total Wastes and Run-off	**1.18**	**36.3**
TOTAL	3.25	100.0

Conversion: 7.6 barrels (bbl) to the metric tonne

detected by visual inspections of the pipeline route by boat or helicopter. These would be on a daily basis if the option to place the gas separation plant in the Roller field were chosen, corresponding to crew changes from the plant to Thevenard Island.

Concerns raised by the prawn trawling, recreational fishing and tourist industries which are potentially at risk from uncontrolled spills have been addressed in the proponent's responses to submissions and are reflected in WAPET's commitments to manage the operations closely.

The Environmental Protection Authority recommends that the proponent accept responsibility for any adverse environmental impacts which may occur as a consequence of the proposal proceeding, and further recommends that the arrangements for this should be to the satisfaction of the Minister for Environment after consultation with the Minister for Mines and the Minister for Fisheries.
(Recommendation 4)

The most common type of spill is a minor spill of between $1m^3$ and $20m^3$ arising from rig refuelling, tanker loading operations, or from a short term failure of the blowout preventers on a rig while drilling operations are under way. Refuelling of the rig usually occurs once every 10 days on average and would only occur during the development of the wells at the commencement of the project and if further production wells are drilled at a later stage in the life

of the field. The proponent has committed to containing and collecting spills of this order with a boom and skimmer if weather conditions permit. While the boom would be on the rig while the wells were being drilled, the skimmer and other equipment are kept at Thevenard or Barrow Island and could be deployed within an appropriate response time should the need arise.

The Authority endorses WAPET's initiative in recently upgrading its oilspill handling, retrieval and cleanup equipment and developing a range of exercises to ensure that crews will be familiar with their deployment, possibly under adverse conditions, in the event of an emergency.

The Environmental Protection Authority endorses the proponent's commitments and recommends that any change to the placement of the oil retrieval equipment should be to the satisfaction of the Authority.

(Recommendation 5)

For a reasonable chance of a successful recovery of oil spilt with boom and skimmer, weather conditions need to be near optimal (current speed <0.7 knot, wind speed <15 knots and wave height <1m). As waves and currents become progressively more energetic, increasing amounts of oil would be lost above and beneath the boom so that the attendant oil recovery unit would collect progressively less of the spill. Under more severe weather conditions oils tend to evaporate and disperse more quickly. The doubling of wind velocity, up to the onset of whitecapping, often causes the rate of evaporation to increase by a factor of around 1.7 and with the establishment of extensive whitecapping the rate may increase by a factor of 5 to 10. Recognising that the boom and skimmer have only limited application the EPA makes the following recommendation for refuelling in environmentally sensitive locations:

In order to maximise recovery of spilled oil where an environmentally sensitive location is within the zone of influence from an oil spill, the Environmental Protection Authority recommends that refuelling of the rig should only take place during optimal weather conditions, to the satisfaction of the Authority, on advice from the Department of Mines. (Recommendation 6)

Refuelling in conditions where winds, current speeds and wave heights are within safe limits acceptable to the Department of Mines would be regarded as satisfactory.

The Environmental Protection Authority recommends that, prior to the commencement of the first well, the proponent successfully trial runs a simulated Oilspill Contingency Plan up to the point of deployment of resources, to ensure that the plan is workable to the satisfaction of the Authority. The Environmental Protection Authority also recommends that, while drilling is occurring, further simulated Oilspill Contingency drills be run at least once a year, or for each change of drilling rig, whichever is sooner, to maintain a high level of preparedness among all involved personnel.

(Recommendation 7)

The Environmental Protection Authority recommends that the proponent be responsible for removing the monopods and the facilities on Thevenard Island, and rehabilitating the site and its environs at the end of the project, to the satisfaction of the Authority, on advice from the Department of Mines and the Department of Conservation and Land Management. (Recommendation 8)

6. Discussion and conclusion

This proposal has raised public concerns based on fears that significant prawn trawling areas would be excluded from use, and widely held perceptions about the damage that can arise from oil spills.

Apart from the 100 metre wide exclusion zones which will be required around the monopods (as indicated by WAPET in their response to submissions) there is unlikely to be further loss of productive trawling area as the pipelines would be buried within recognised fishing areas.

In the case of a producing field, activities and their potential to affect the environment centre around the transfer and transport of petroleum product and the time frame of the life of the field. WAPET has conducted tests which sought to characterise Roller crude oil. Initial findings indicate that the oil does not form a water-in-oil emulsion, (mousse), does not readily evaporate once spilt, and will remain liquid for at least 24 hours, thus making it easier to disperse. Tests with two Corexit dispersants indicate that the oil is expected to disperse rapidly under a range of test temperatures if there is a moderate wind. Therefore, badly oiled beaches and birds which have resulted from tanker spills of heavy oils elsewhere around the world do not accurately represent the most likely impacts of a spill of Roller crude oil. Coupled with this is the fact that the great majority of oil spilled into the oceans comes from sources other than drilling or production facilities. The risk of a medium to large spill occurring from production facilities is low in Australian waters, and small spills have lesser impacts.

WAPET's document listing regulations and conditions for the use of the Saladin tanker loading terminal shows that the company appreciates that prevention of a spill is better than a cleanup after the event and has targeted where spills are most likely under their area of control.

The Authority considers that WAPET has satisfactorily dealt with the issues raised in submissions. Accordingly the EPA considers that the proposal, subject to the commitments given by WAPET and the EPA's recommendations in this report, could be implemented in an environmentally acceptable manner.

The Environmental Protection Authority concludes that the proposal to develop the Roller oilfield as described in the Consultative Environmental Review, is environmentally acceptable. In reaching this conclusion, the Authority identified the main factors requiring detailed consideration as the effects of routine and accidental discharges arising from the drilling and production operations upon the environment and their effects on the dependant trawling and recreation industries.

The Environmental Protection Authority considers that these and other issues have been addressed by either environmental management commitments given by the proponent or by the Authority's recommendations in this report.

Accordingly the Environmental Protection Authority recommends that the proposal could proceed, subject to:

- **the proponent's revised commitments; and**
- **the Authority's recommendations in this report.**

(Recommendation 1)

No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent should 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.

The Authority notes that during the detailed implementation of proposals, it is often necessary or desirable to make minor and non-substantial changes to the design and specification which have been examined as part of the Authority's assessment. The Authority believes that subsequent statutory approvals for this proposal could make provision for such changes, where it can be shown that the changes are not likely to have a significant effect on the environment.

The Authority believes that any approval for the proposal based on this assessment should be limited to five years. Accordingly, if the proposal has not been substantially commenced within five years of the date of this report, then such approval should lapse. After that time, further consideration of the proposal should occur only following a new referral to the Authority.

Appendix 1

Proponent's commitments

LIST OF COMMITMENTS

West Australian Petroleum Pty. Limited (WAPET) undertakes to abide by all of the commitments made in the Roller Oilfield Development Consultative Environmental Review (CER), and in all cases will fulfill those commitments to the satisfaction of the appropriate statutory authority(s).

The major commitments given by WAPET within the CER are listed in the following section.

ENVIRONMENTAL MONITORING AND EDUCATION

1. Prior to start of construction, the existing Marine Biological Monitoring Programme for the Saladin Field will be expanded to ensure that important marine resources that could be affected by either the development or operation of the Roller field are covered by the monitoring programme, to the satisfaction of the EPA.

2. Before commencement of their duties, each worker or contractor (including workboat and supply vessel crews) will be given an induction including advice on the sensitive nature of the environment in which the drilling rig and oilfield is located.

SAFETY AND OIL SPILL CONTINGENCY

1. Drilling procedure, production operation and maintenance procedure manuals based on WAPET's experience of the Barrow Island and Saladin Fields will be prepared and made available for review by relevant statutory authorities prior to commencement of the relevant operation. These manuals will cover normal and emergency procedures to the satisfaction of EPA on advice from the WA Department of Mines.

2. To improve operational safety, commercial and recreational vessels will not be permitted closer than 500 m to the drilling rig during the construction phase.

3. The drilling rig to be contracted will be capable of withstanding cyclonic wind and wave conditions. Detailed procedures which set out the various levels of responses to cyclones will be contained in the operator's Emergency Procedures Manual.

4. The existing Permit Area TP/3 Oil Spill Contingency Plan (OSCP) will be expanded with insertion of relevant information for the Roller field. WAPET will abide by all procedures detailed in the OSCP, as summarised in Section 6.4.2 of the CER, to the satisfaction of EPA on advice from WA Department of Mines.

5. An oil spill containment boom will be present at the site during drilling. A vessel will be in the vicinity of the drilling rig at all times to deploy the boom and skimmer in the event of an oil spill.

6. During any spill event, WAPET would make available oil spill equipment, vessels, aircraft and personnel to help with containment and clean-up measures.

7. Existing WAPET procedures for cyclone response will be followed to safeguard the wells, rig, offshore structures, vessels and personnel.

8. Where practicable rig refuelling will only take place under favourable metocean conditions.

9. With regard to any oil spill or discharge resulting from the drilling of any well in the Roller Oilfield or production of petroleum there from WAPET makes the following commitments:

   a) to be fully responsible for the cost of operations conducted by it or any Governmental agency aimed at containing or dispersing or recovering any such petroleum or cleaning-up any areas polluted by such petroleum;

   b) to promptly pay to any person, company or Government (Federal, State or Local) any damages to which any of those entities is lawfully entitled from WAPET;

   to the satisfaction of the Minister for Environment after consultation with the Minister for Fisheries.

DRILLING RIG OPERATIONS

1. Prior to spudding in, the rig operator will conduct surveys and tests in accordance with Department of Mines regulations to ensure stability of the rig and to minimise the risk of abnormal penetration of the seabed during storm conditions.

2. The blowout preventor (BOP) stack will be tested in accordance with Department of Mines regulations after the surface casing has been installed.

3. All casing strings installed below the BOP stack will be pressure tested in accordance with Department of Mines regulations before drilling is resumed.

4. Drilling fluids used will be those approved for offshore use by the Department of Mines.

5. Chrome lignosulphonates will not be used in any drilling fluids.

6. Drill cuttings will be disposed of into the ocean after separation from the drilling fluid through solids control equipment.

7. Drilling fluid residue will be disposed of into the ocean at controlled intervals, under the direction of the drilling superintendent.

8. Oily water collected from the rig floor drains will be ducted to a separation tank where oil is drawn off into drums for shipment to Port Hedland for recycling. Separated water is discharged overboard.

9. Sanitary wastes from the kitchen, showers and laundry will be passed through a sewage treatment plant for comminution and disinfection by chlorination before being discharged overboard. Biodegradable detergents will be used for cleaning functions.

Combustible materials will be burnt on the rig. All non-combustible material including solid food wastes will be returned to the shore base for disposal at an approved land site.

PIPELINES AND OFFSHORE STRUCTURES

1. Surveyors and divers contracted for pipe laying operations will be informed that the discovery of any new shipwreck must be promptly reported to the Marine Department at the Western Australian Museum in accordance with the Marine Archaeology Act 1973.

2. All subsea lines will be stabilised. Pipelines will be trenched where they cross commercial trawling grounds (as identified by members of the Onslow Prawn Trawling Association) lying between Roller A and Ashburton Island. If Option 2 is selected, the various lines between the monopod at Roller D and the modified jack-up rig will run along a piperack bridge.

3. A marine exclusion zone will be required around the monopods and the subsea pipelines (where they cannot be buried). The location and width of the exclusion zones will be determined by consultations between WAPET and the appropriate government authorities.

4. Flowlines transmitting unseparated product (two-phase or three-phase) will be hydrostatically tested, with the test waters disposed of through the production plant at Thevenard Island.

5. Corrosion control of subsurface structures will be by paints, cathodic protection or by a continuous external coating to standards cited by Government codes.

THEVENARD ISLAND FACILITIES

1. No additional temporary accommodation is likely to be needed for the construction and drilling workforce, other than that currently deployed on Thevenard Island for the Cowle and Yammaderry development, and such accommodation will not be installed without first obtaining approval from the Department of Conservation and Land Management (CALM).

2. No additional terminal storage or tanker facilities will be required on Thevenard Island.

3. In the event that the total amount of discharged water at Thevenard Island is likely to exceed the existing total oil and water treatment capacity of the Thevenard Island facility, then additional equipment will be installed to comply with (4) below.

4. The quality of all produced water discharged from the Thevenard Island outfall will comply with Clause 616 of the Specific Requirements as to Ofshore Petroleum Exploration and Production 1990 [issued under the provisions of the Petroleum (Submerged Lands) Act 1982].

5. Gas will be flared either offshore beside Roller D (Option 2), or from the ground flare presently located on Thevenard Island.

6. Existing procedures on Thevenard Island for fire control, workforce movements, island flora and fauna protection, custody transfer of produced crude to tankers will be maintained.

OPERATION OF VESSELS AND AIRCRAFT

1. Helicopter pilots will be instructed not to overfly islands.

2. Regular crew transfers between Roller, Thevenard Island and Perth will use existing routes involving helicopter/light aircraft transfers to Barrow Island or other regional airports and chartered commercial flight direct to Perth.

3. All refuelling operations for the supply vessels will be conducted in accordance with strict Port Authority requirements, including continuous visual monitoring and the use of reinforced hoses and fail-safe valves and fittings.

4. It will be a contractual requirement for the various vessels and barges to comply with all State and Commonwealth legislation for the control of pollution and dumping at sea.

5. Masters of barges and supply vessels will be instructed not to allow crew to disturb islands or wreck sites, not to anchor close to coral reefs.

FIELD CLOSURE

1. The wells will be plugged and sealed with concrete and cut off at 4 m below the surfloor, as is presently required by the Department of Mines for the abandonment of dry wells.

2. No subsurface structure will be left protruding from the seabed so as to cause a hazard to navigation or fishing operations.

3. Subsea flow and gas-lift lines will be flooded with seawater and left in situ, unless specific requirements deem their removal in certain areas.

Appendix 2

Summary of submissions and responses by the proponent

ROLLER OILFIELD DEVELOPMENT
CONSULTATIVE ENVIRONMENTAL REVIEW
WAPET RESPONSE SUBMISSIONS

RESPONSE TO MACKEREL ISLAND SUBMISSIONS

Submission

In recognition of the fact that our four older cabins would be situated too close to WAPET's processing facilities, we built four accommodation cabins along the beachfront, a recreation cabin, and another storage shed, which now gives us a total of fourteen buildings. The Review incorrectly states at paragraph 4.3.4 that the present total is eight buildings. The majority of the buildings are spacious and comfortable and the expression of "holiday camp" used widely in the Review is hardly descriptive of the resort.

Response

WAPET acknowledges the correction concerning the present number of fourteen rather than eight buildings that make up the Mackerel Island holiday resort.

Submission

In recent months, the failure of the shield around the gas flare with the change to flaring the gas from an open pit has no doubt been of much concern to WAPET, and we understand that they are trying to overcome the problem; nevertheless, the constant noise, black smoke, and very noticeable flare at night, make it unpleasant for our guests and will result in loss of repeated bookings.

Response

After months of remedial works, the flare tower is now operational and its performance is extremely good. The open flare pit is not in use now and flaring from this pit will only resume if the main flare tower requires maintenance. The smoke and noise from the open flare pit are no longer in evidence.

Submission

The frequency of the use of our airstrip by fixed wing aircraft, and the frequency of the helicopter flights close to our cabins, both of which commence as early as 7.00 am, are much more than we anticipated.

Response

In the first half of 1991, levels of activity on and around Thevenard Island were high due to the Yammaderry and Cowle Fields' development, the installation of gas lift facilities and the remedial works associated with the jetty. Limited accommodation on Thevenard Island required that the additional workforce commute daily from Onslow and Barrow Island, which resulted in a significant increase in fixed wing and helicopter movements. These works have now been completed and transport movements are decreasing accordingly.

Submission

We also sympathise with WAPET in the need to demolish the jetty and build another of different design, but here again, our guests are being inconvenienced and are subjected to what they regard as unreasonable noise and activity, not only around the jetty but also in the increased boat and barge trips. The tendency for the tugs to moor offshore and leave their spotlights on the cabins can be annoying.

Response

Demolition of the jetty was completed in late May 1991 following completion of the replacement jetty earlier in the month.

Submission

The proposed development of the Roller Oilfield does cause us concern because of the additional pipe laying and other construction activities which will take place on or close to Thevenard Island. Although the construction stage may be

only months in duration, it will impact adversely on our business at a time when the WAPET activities should have settled down to a low-key mode.

Response

At present the construction schedule has not been finalised, but when it has we will advise concerned parties and keep them updated as the project progresses so as to minimise disruption to ongoing activities.

Submission

It is unfortunate that the presence of WAPET has not settled down to the intended maintenance by fifteen personnel, with low noise levels.

Response

Since the ERMP for the Saladin Development was produced, ongoing exploration in the region has resulted in the discovery of additional oil fields. While approximately an additional five people may require accommodation on Thevenard Island, it is not anticipated that they, or the additional processing equipment that may be necessary, will cause any increase in the noise levels that currently exist on Thevenard Island.

Submission

Once the construction phase has been completed, we would not expect any effect on us from the Roller oilfield itself, but the option to be selected for gas separation and compression could well be most important. In view of the inability to flare off the gas from the Saladin oilfield in a way which is not noticeable to tourists and of no effect on the turtle population, we are very apprehensive at the suggestion of increasing the gas flow to the island. From our point of view option 2 would seem much more preferable.

Response

The main flare is functioning satisfactorily since the most recent modifications were completed. This flare will be used to handle the gas production from Roller field. As Saladin, Yammaderry and Cowle production declines, the capacity in the flare will be taken up by Roller production.

RESPONSE TO MINES, WAFIC AND FISHERIES SUBMISSIONS

Submission

When will the results of the tests on the weathering behaviour and dispersability of Roller crude as mentioned in page 51 be available?

Response

The dispersability and weathering tests have been partially completed. The preliminary results suggest that:

i) Roller oil will not form water-in-oil emulsion (mousse).

ii) Little or no evaporation of Roller oil will occur once spilt.

iii) Roller oil will remain liquid for at least twenty four hours and possibly longer.

iv) Fresh Roller oil is characterised by very good dispersion ratios using Corexit 9527 and 9550 at the three temperatures tested (19°C, 25°C, 31°C) and under simulated 15 knot winds. Moderately good dispersion was observed under calm conditions.

Chemical - physical analyses are continuing and will give quantative data to support the more qualitative observations summerised above. We anticipate these results by the end of August.

Submission

It is understood that the likelihood of an accidental oil spill from the drilling and production platforms is extremely slight. However, were such a spill to occur it could have serious consequences to the viability of the prawn fishery, both from degradation of shallow juvenile habitats, particularly mangrove areas, and from death or tainting of prawns. Since the prawn stocks depend upon yearly recruitment the effects of such a spill could be felt in subsequent years.

It is therefore imperative that the oil spill contingency plan be fully operational for rapid deployment at all times during the drilling and production phases and include a capacity for transferring recovered oil to suitable containers.

Does WAPET intend to carry out oil spill contingency exercises for the purpose of testing the effectiveness of its oil spill contingency plan?

Does WAPET have sufficient number of personnel, booms, dispersants, etc, to contain an oil spill?

Response

WAPET is in the process of updating the permit wide oil spill contingency plan to include recently acquired biological, chemical and physical data.

WAPET has recently increased its oil spill handling ability and effectiveness with the purchase of additional booms, a skimmer, shore clean-up equipment and flotation tanks. All of this equipment is light weight and capable of being readily transported throughout the area by light plane, helicopter or small vessel. This equipment is presently being mobilised to site and a range of exercises are being developed using this equipment.

Submission

That the EPA recommends that the precise location and width of exclusion zones surrounding the monopods be determined through consultation involving the Department of Mines, Department of Marine and Harbours and Fisheries, the EPA, WAPET and WAFIC.

The development will be situated within a productive trawling area of the Onslow prawn fishery and will thus interfere with normal trawling practice to the detriment of the annual catch of tiger prawns. As there will be four monopod structures in the trawling area the proposed 500 metres radius enclosure zone around each one will result in removal of approximately three square kilometers of trawling area.

Response

It is anticipated that the exclusion zone will be 100 metres.

Submission

In regard to pipelines linking the oilfield, it is uncertain whether these pipes can be buried or not. If not, there is the potential that these pipes may interfere with prawing in the area. It is suggested that prior to final approval for this project that the best and worst case scenarios are anticipated by consultation between WAPET and WAFIC, and agreed remedies are documented to the satisfaction of the Ministers for Mines, Fisheries and the Environment.

It is anticipated that this will require a meeting at Onslow between the fishermen, WAPET, WAFIC and possibly representatives from the above Ministers.

In addition, if the pipeline is not totally buried within the trawling area further loss of trawling area will occur.

Response

WAPET will trench from the Roller Field to north of Ashburton Island. The pipelines will be set in the trench. It is expected that current-transported sediments will cover the pipeline and fill in the trench over a period of approximately six to nine months.

Submission

According to the CER the pipelaying operations are scheduled to take place between January and April 1993. The company should endeavour to remain close to this schedule so that the operation will not occur during the prawning season, April to November. Again, liaison with the local industry and WAFIC will be essential.

Response

The schedule is not finalised at this stage. We will maintain liaison with the local industry and WAFIC on this matter.

Submission

Recently, oil companies operating in commercial fishing areas in Western Australia have been required to obtain an insurance agreement which covers third party loss of profits or business interruption in the event of an oil spill. Such an agreement must be in place to the satisfaction of the Fisheries Department before the drilling phase of the development proceeds.

a) That the proponent accept full responsibility for any adverse environmental effects which may occur as a consequence of the proposal, e.g. oil spill.

b) That the proponent accept full responsibility and liability to pay as damages to the fishing industry for bodily injury (fatal or non-fatal) and/or loss of, damage to or loss of use of property and/or loss of profits or business interruption caused directly or indirectly as a consequence of the proposal.

That the proponent shall be required to take out appropriate insurance provisions that demonstrate that the proponent can meet the conditions proposed in (a) and (b) above to the satisfaction of the Minister for Mines after consultation with the Ministers for Fisheries and Environment.

No mention is made in regard to compensation to the fishing industry should an oil spill occur.

Response

WAPET, on behalf of its joint venture principals, i.e. Chevron, Texaco, Ampolex, Shell and WMC, will do the following:

1. Give an undertaking to the State of Western Australia and the Commonwealth to be fully responsible for the cost of operations conducted by it or by any Government agency aimed at containing, dispersing or recovering petroleum discharged or spilled while drilling any well in the Roller oilfield or from production facilities and for clearing up any areas polluted by such petroleum. In addition, WAPET will also undertake to promptly pay to any person, company or government agency, any damages to which any of those entities is lawfully entitled from WAPET; and

2. Provide evidence of insurance carried by its principals. We are currently investigating the extend of the insurance cover and will revert to you in this respect in due course.

RESPONSE TO CALM SUBMISSION

Submission

Use of the existing ground flare on Thevenard Island is mentioned on page viii. Clarification is required as to whether WAPET intend to use the enclosed gas flare or the flare pit.

Response

WAPET intends to use the enclosed gas flare.

Submission

Consultation with CALM is required prior to construction of any additional production facilities.

Response

WAPET will consult with CALM prior to construction of additional production facilities.

Submission

It appears possible that under prevailing south or southeast winds and spring tides (Fig. 1-4, Appendix 4), Tortoise Island may be at risk. There has been no risk assessment given on this possibility.

Response

Not all islands and reefs are entered into the oil spill trajectory model as they would clutter the resulting plot. Tortoise Island, Direction Island, Table Island, Ward Reef, Brewis Reef, Bowers Ledge, etc, are all such cases.

WAPET accepts that the shoreline of Tortoise Island is at risk from an oil spill under South to South-Southeast wind conditions. The time to impact is approximately 6 hours.

Submission

Clean up of the turtle nesting beaches following an oil spill should be given a high priority. Use of mechanised equipment should be kept to a minimum and carefully supervised to prevent the destruction of turtle nests and the removal of excessive volumes of sand.

Response

Clean up of turtle nesting beaches is given a very high priority, particularly in the breeding season. The use of mechanised equipment is the most effective way to clean a beach of stranded oil. As turtle nests occur above the high tide line there is no need for equipment to disturb this area except at entry and exit points. Only the minimum amount of uncontaminated sand will need to be removed from the beach.

Submission

The shallow fringing reef adjacent to the proposed pipeline shore-crossing at Thevenard Island has been smothered by sand, possibly as a result of propwash sedimentation and by the entrapment of sand deflected around the sheet pile jetty.

If this reef is in a recovery state then further sedimentation during pipeline burial may prove critical.

I believe the status of the reef should be assessed before and after pipeline burial. If the initial inspection finds that the reef is showing signs of recovery then means should be employed to minimize further sedimentation, e.g. burial work to occur during ebb tides only when current direction will favour the plume moving away from this reef.

Response

WAPET maintains two coral monitoring sites adjacent to the proposed pipe route and the new open pile jetty. The sheet pile jetty was removed in May 1991. These coral sites are monitored every six months and this will continue through the Roller construction and commissioning phases. Jetting pipe below the surface near the shore crossing will not cause any significant sedimentation at the coral reefs.

Submission

As a general rule pipe laying should not occur during the period(s) of coral spawning.

Response

If it becomes necessary to pipelay during the coral spawning season, advice from the EPA will be taken as to the exact timing of the event. As with the Saladin construction, pipelaying would be moved to deep water, well away from any coral reefs for that time and an appropriate margin either side.

Submission

WAPET propose to discharge excess drilling fluids when tides and currents are favourable. No details have been provided however, on whether temporary storage of excess fluids is possible and whether drilling will be able to continue in unfavourable conditions. No details have been provided as to supervision of this process.

Response

Sections 2.3.1.3 (ii) and 6.2.1.1 both refer to discharge of excess drilling fluid.

The discharge of excess drilling fluids can be planned well in advance of actually having to discharge the fluid. As the periods of high tidal movement can be forecast from the tide tables, it is therefore a matter of planning to discharge at those times. Additional storage of fluids is not required.

The drilling supervisor will provide the mud engineer with clear instructions as to when discharges are permitted.

Submission

In general, the CER adequately details the extensive and significant marine resources at risk from a serious oil spill. It is acknowledged that risk of spill is minimal, but is maximized in cyclone conditions. In the case of a cyclone, development and production operations should be shut down such that potential damage to platform or wells could not result in oil discharge.

Response

It is normal operating procedure to shut down drilling and production operations prior to a cyclone.

Submission

This Department (CALM) has already written to the EPA (Ref: P01.14:169) regarding the use of dispersant in certain extreme cases. However, because of the conservation value of the area and the minimal oil spill response time, it is suggested that in addition to the standard measures generally employed, 'normal' requirements regarding oil spill combat equipment and trained personnel should be extended to reflect the sensitivities and unique problems outlined. Equipment and trained personnel sufficient to treat a rig spill should be located either on board or within 1 hours transport time, at all times.

Response

WAPET will have some oil spill equipment at the drill site and will have additional supplies of men and equipment on Thevenard Island. As this additional equipment can be transported by helicopter it is within the one hour time frame.

PART 3

West Australian Petroleum Pty. Limited.

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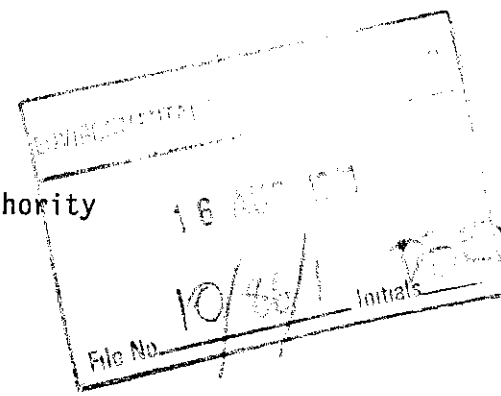

15 August 1991

Environmental Protection Authority
1 Mount Street
PERTH WA 6000

ATTENTION: DOUG BETTS

Dear Sir

SUBJECT: ROLLER DEVELOPMENT

In reply to your fax dated 30 July 1991, please find below the further details requested:

Question 1: "Trenching of Pipelines"

Answer: The area identified as requiring trenching of pipelines was identified after discussions with the Onslow prawn trawling fishermen. Because the bulk of their trawling is done in a small area between the Ashburton Delta and Ashburton Island (see Fig. 20 of CER) the fishermen were concerned with this area only and requested the pipelines be trenched throughout this area.

Question 2: "In the event of a rupture, how much oil could escape? At what intervals will there be a cutoff valves/suckback pumps?"

Answer: Pipelines either will be designed to withstand the maximum pressure in the reservoir or will be protected from overpressure by pressure sensor/emergency shutdown devices and relief valves where required. Therefore, rupture of the pipeline due to overpressure will be extremely unlikely. The most likely cause of a rupture is impact from anchor handling/dragging or impact from prawn trawler nets. A rupture of the pipeline due to impact would be small and is very unlikely for the following reasons:

(a) The pipeline wall thickness is usually controlled by laying stresses or by the weight required for on bottom stability. The thicknesses needed for laying and for stability are usually significantly greater than the thickness required to withstand internal pressure. This additional wall thickness gives the pipeline additional strength to resist impact loads.

(b) Weight coating will be required on the larger lines for on-bottom stability. The weight coating gives added protection against impact.

2/-

(c) The pipelines will be trenched from the field to north of Ashburton Island to put the pipelines below seabed level to minimise the possibility of impact from prawn trawler nets.

Cut-off valves will be located on the platform or monopod and on Thevenard Island. If a rupture occurred, the cut-off valves would be closed and pipeline pressure would be bled off. In the event of a large pressure drop, the cut-off valves would operate automatically. For a small rupture, oil could escape from the pipeline until reported to the operator or until the pipeline pressure decreased to less than the sea water pressure at the rupture. For the largest line being considered, we estimate that up to 1,000 barrels of oil could escape. Once the pipeline has been depressurised, the rupture can be temporarily repaired and the oil can be pigged from the pipeline and the pipeline filled with sea water prior to making the permanent repair.

We do not plan to use suckback pumps for the following reasons:

(a) The maximum suction the suckback pump can develop is atmospheric pressure less the vapour pressure of the oil. Since the vapour pressure of the oil which contains dissolved gases is high, no appreciable suction effect can be generated using a suckback pump in this particular case.

(b) There is no space or source of power for a suckback pump on a monopod. There is no tank or vessel on a monopod which could be used to temporarily store oil sucked out of the pipeline. It is not practical to put a suckback pump on a minimal facility such as a monopod.

Question 3: **"If cut-off valves are actuated by sudden pressure changes, how would you detect slow seeps from the line?"**

Answer: There is no reliable way to detect small leaks in multi-phase flowlines using instrumentation. Generating a trip based on rate of change of pressure could be attempted but this is prone to a high level of spurious trips due to the natural pressure variations of a flowing well. Providing a rate of change alarm for an operator to evaluate and respond to is no better, as the operator soon begins to relate each alarm to some event on the platform, such as pressure variations of the flowing well, and when a genuine alarm arrives it is ignored.

The pipeline will be designed to a standard in excess of that required by the codes in area of particular environmental concern; will be protected by the injection of corrosion inhibitor and by continuous corrosion monitoring; and the pipeline route will be regularly surveyed during helicopter and boat visits to the platforms to detect signs of small oil leaks on the surface of the sea. In addition the operator would have the facility to shut down the line if he suspected a leak based on a report from a third party in the area. (Third party activity is the most likely cause of damage to the pipelines).

3/-

In summary, the integrity of the pipeline is guaranteed by design, protection and visual inspection. The Oil Spill Contingency Plan for Permit TP/3 (Part 1) details all the response to be taken in the unlikely event of an oil spill.

Question 4: **"Where will all the corrosion inhibitor/biocide mix for the new pipelines go, and will there be sufficient storage capacity/residence time for it to reach suitably low levels for discharge to be at safe levels? What volume and concentrations/toxicities are you expecting?"**

Answer: Hydrotest fluid would be displaced by either gas or oil and would flow to Thevenard Island. The displacement would be done at a rate which would allow dilution with Saladin's waste water and discharge in a continuous operation.

At this stage we plan to use the same formulation that was used for Yammaderry and Cowle:-

- 200ppm of biocide (B61W)
- 120 ppm of oxygen scavenger (Coat 777)

Bioluminescent toxicity tests of the Cowle hydrotest fluid indicated that the biocide toxic concentration declined from 200 ppm to 40-50 ppm during the hydrotest.

Displacement and dilution of the hydrotest fluid will be controlled to maintain toxicity levels less than EC50 in the waste water. The waste water will be additionally greatly diluted within a few metres of the outfall.

Question 5: **"Terminal Limitations"**

Answer: The Saladin Marine Terminal will be closed when weather or other conditions, in the opinion of WAPET, make for unsafe berthing. All decisions regarding the opening and closing of the terminal shall be made at the discretion of WAPET.

Quantitative data are contained in the attached draft "Information, Regulations and Conditions For the Use of the Saladin Marine Terminal", which reflects our current practice. Specific information on the terminal limitations occurs on pages 9 (item 12), 10 (item 13), 13-15 (items 12, 13), p 26 and p 41.

Question 6: **"Minimum Standards of Acceptance"**

Answer: WAPET may at its discretion refuse to moor or load any tanker which does not conform to the requirements of Section 4 of the attached draft document. See p 17-22 for details.

Note that 3 tankers have been rejected by Wapet. The specific reasons were:

Insufficient mooring equipment
Anchor chair undersize
Mooring equipment deficient and tanker unable to do a closed loading.

4/-

The last tanker rejected was at Barrow Island several weeks ago.

Question 7: **"Dispersants"**

Answer: All dispersants held by Wapet are third generation concentrates, i.e. corexit 9527.

Question 8: **"Are Tests to characterise Roller Oil Concluded on Ongoing?"**

Answer: The initial Marine Science Laboratories weathering and dispersability tests have been concluded. The results of this phase of testing were summarized in the WAPET response to public submissions forwarded to your office on 5 July 1991. The analytical results of chemical and physical tests are currently being carried out and we still expect a report by the end of August.

If you require any further information, please contact L.N. Bundesen or K.L. Pendoley.

Yours faithfully
WEST AUSTRALIAN PETROLEUM PTY. LIMITED

C A PRATTINI
Manager, Drilling & Production

Attach.

LNB:oam

EHS-OAM.802.KLP