East Spar offshore gas field development (Varanus Island, North West Shelf)

Western Mining Co.

Report and recommendations of the Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia
Bulletin 787
July 1995

THE PURPOSE OF THIS REPORT

This report contains the Environmental Protection Authority's environmental assessment and recommendations to the Minister for the Environment on the environmental acceptability of the proposal.

Immediately following the release of the report there is a 14-day period when anyone may appeal to the Minister against the Environmental Protection Authority's report.

After the appeal period, and determination of any appeals, the Minister consults with the other relevant ministers and agencies and then issues his decision about whether the proposal may or may not proceed. The Minister also announces the legally binding Environmental Conditions which might apply to any approval.

APPEALS

If you disagree with any of the contents of the assessment report or recommendations you may appeal in writing to the Minister for the Environment outlining the environmental reasons for your concern and enclosing the appeal fee of $10.

It is important that you clearly indicate the part of the report you disagree with and the reasons for your concern so that the grounds of your appeal can be properly considered by the Minister for the Environment.

ADDRESS

Hon Minister for the Environment
12th Floor, Dumas House
2 Havelock Street
WEST PERTH WA 6005

CLOSING DATE

Your appeal (with the $10 fee) must reach the Minister's office no later than 5.00 pm on 11 August 1995.

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Summary and recommendations

Western Mining Corporation proposes developing the East Spar gas field located in Commonwealth waters approximately 50 kilometres west of Barrow Island. Processing facilities would be constructed and operated on Varanus Island immediately adjacent to the existing Harriet Joint Venture facilities on the island. A new submarine pipeline would bring gas/condensate from the gas field to the processing facilities. The existing Harriet joint venture export pipeline would carry gas to the trunkline on the mainland. Condensate would be exported from Varanus Island *via* tanker through existing Harriet joint venture facilities.

Western Mining Corporation prepared a Consultative Environmental Review (CER) which described five alternative routes for the pipeline, together with multiple options for crossing land/sea boundaries, and with processing facilities being located on either Barrow Island or Varanus Island. The Consultative Environmental Review also stated there would be a production platform in Commonwealth waters.

Since the release of the CER, the proponent has identified the Varanus Island option as the most viable for both economic and environmental reasons. Therefore the proponent is now seeking approval for this option only. In addition, the proponent has modified the project to further minimise possible environmental impacts as follows:

- the processing facilities on Varanus Island are to be located entirely within the, largely cleared, existing Harriet joint venture lease;
- there will be a shared ground flare (a shielded flare shared with the Harriet Joint Venture); and,
- the well head will be sub-sea, that is, there will be no production platform at the East Spar location.

The EPA accepts that the Varanus island option is preferable in terms of reducing environmental impacts. The EPA has identified the main issues associated with the Varanus Island option as:

- impacts from construction of facilities on Varanus Island;
- impacts from pipeline construction;
- contingency plans for oil spills;
- disposal of "produced" (ie waste) water; and,
- decommissioning.

Conclusion

The EPA considers that these and most other issues have been addressed either by environmental management commitments given by the proponent, or by other regulatory processes. Those which are not are the subject of EPA recommendations in this report.

The EPA notes that the existing Harriet Project Environmental Management Program (EMP) for Varanus Island could form the minimum basis of the EMP required for the East Spar proposal. A separate EMP is required for the marine component of the East Spar proposal.

The EPA notes "produced" water will initially be disposed of down existing shallow bores on Varanus Island, following treatment in the Harriet Joint Venture facilities. However, approximately eight (8) years from the start-up date it is likely there will be larger quantities of "produced" water and that alternative means of disposal (such as deep water disposal offshore, or down a deep injection well on Varanus Island) will be required. A further EMP addressing these alternative means of disposal should be prepared and approved at least 12 months before alternative disposal is required.

Finally, the EPA notes that it is essential that the proponent maintains liaison with the operator of the Harriet Joint Venture to ensure best practice environmental management on Varanus island and adjacent coastal waters.

Approval of the proposal should be subject to the proponent's commitments and the recommendations and conclusions in this assessment report.

Recommendation Number	Summary of recommendations
1	**The proposal is environmentally acceptable subject to the proponent's environmental management commitments and other recommendations in this report.**
2	**The existing Harriet Project Environmental Management Program (EMP) for Varanus Island should form the minimum basis of the EMP required for the land component of the proposal.**
3	**A separate EMP should be developed for the marine component of the proposal.**
4	**In the event that an alternative means of disposing of "produced" water is required, a further EMP will be required to address this issue.**
5	**The proponent should maintain liaison with the operator of the Harriet Joint Venture to ensure best practice environmental management on Varanus island and adjacent coastal waters.**

1. Introduction and background

1.1 Purpose of this report

This report and recommendations provides the advice of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental acceptability of the proposed East Spar offshore gas field development.

1.2 Background

Western Mining Corporation (WMC), the proponent, proposes to develop the East Spar offshore gas field. On 29 November 1994, WMC referred its proposal to the EPA to determine the level of environmental assessment required.

In view of the substantial scale of the proposal, and the fact that gas processing facilities will need to be located on an offshore island "C" class nature reserve, the EPA determined that the proposal should be formally assessed.

WMC prepared a Consultative Environmental Review (CER; WMC, 1995) following guidelines provided by the EPA. The CER was released for a four week public review period ending 17 April 1995.

1.3 Structure of the report

This report has been divided into 8 sections.

Section 1 describes the historical background to the proposal and its assessment. Section 2 briefly describes the proposal (more detail is provided in the proponent's consultative environmental review). Section 3 explains the method of assessment and Section 4 gives an outline of submissions received.

Section 5 contains the EPA's evaluation of the proposal. Table 1 in Section 5 summarises information on each environmental issue associated with the proposal.

Section 6 summarises the EPA's conclusions and recommendations and Section 7 contains the recommended environmental conditions. References are listed in Section 8.

2. The proposal

The following project description is based on information in the consultative environmental review (CER; WMC, 1995) and subsequent information provided by WMC in correspondence with the DEP.

WMC proposes developing the East Spar gas field located in Commonwealth waters approximately 50 kilometres west of Barrow Island. The CER (WMC, 1995) described five alternative routes for the pipeline, together with multiple options for crossing land/sea boundaries, and processing facilities located on either Barrow Island or Varanus Island. The CER also stated there would be a production platform in Commonwealth waters.

Since release of the CER, WMC has identified the Varanus Island option as the most viable for both economic and environmental reasons. Therefore WMC is now seeking approval for the Varanus Island option only.

Under this option, processing facilities would be constructed and operated on Varanus Island, a C-class nature reserve, vested in the National Parks and Nature Conservation Authority, and managed by the Department of Conservation and Land Management (CALM; see figures 1 and 2). A new submarine pipeline would bring gas from the gas field to the processing facilities (figure 3). Processing facilities would be located within the existing Harriet Joint Venture lease

Notes on figures

Figure 1.

This aerial photo shows rainwater within the bund as the photo was taken immediately after cyclonic rainfall.

Photo reproduced by kind permission of Apache Energy Ltd.

Figure 2. Proposed East Spar Pipeline Route

Colour key

Brown	-	land
Yellow	-	sand beaches
Red	-	coral reef
Green	-	less than 5m water depth
Pale blue	-	5-10m water depth
Mid Blue	-	10-20m water depth
Dark blue	-	greater than 20m water depth

Figure 3. Shallow marine resources to west of Varanus Island

Information based on diving surveys carved out by Sinclair Knight Merz Ltd.

The black line on left of map is the 5m depth contour.

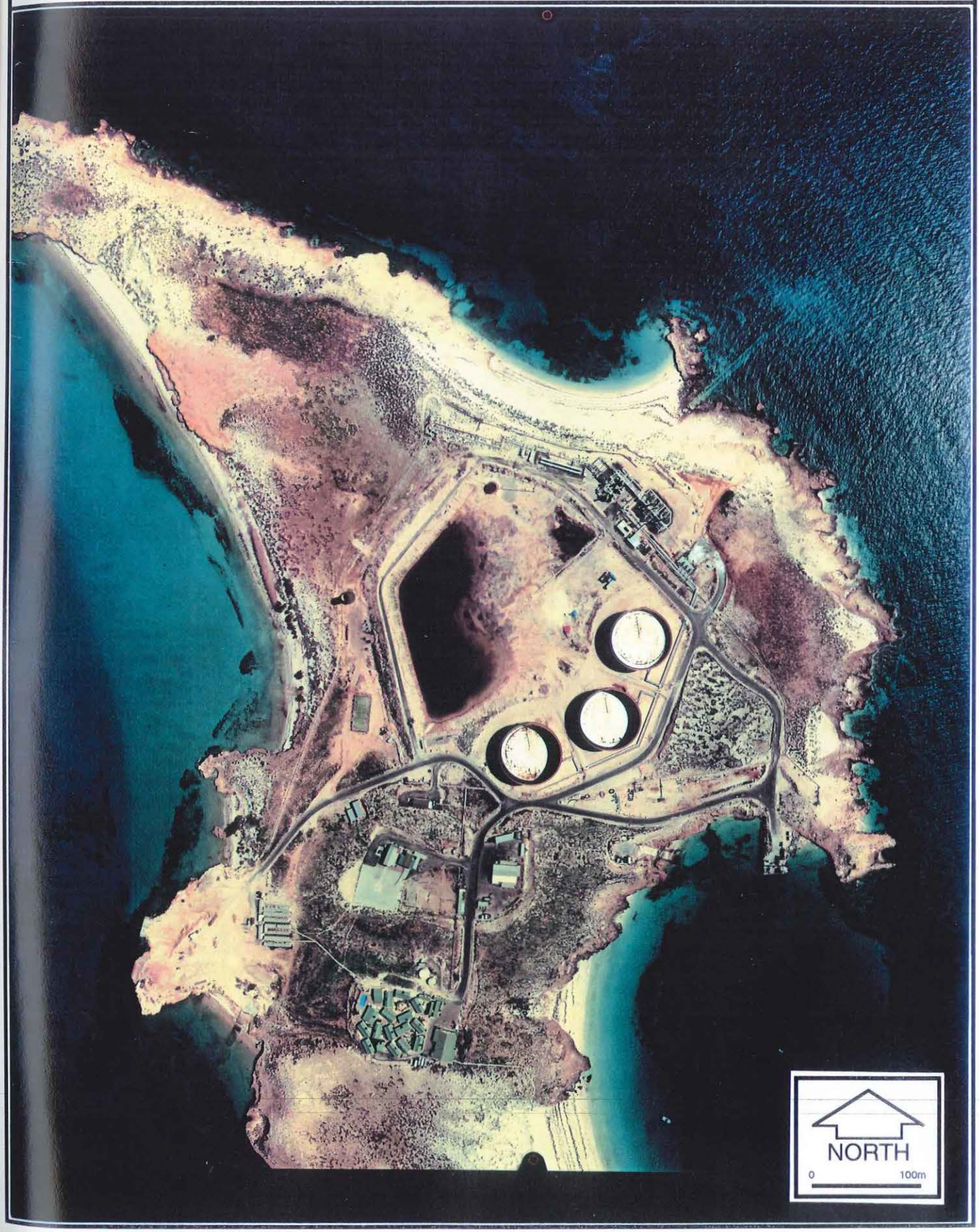
The length of pipeline between Varanus Island and the 5m depth contour is approximately 5 km.

Figure 4. Varanus Island facilities

The proposed location of the pipeline shore crossing is close to the words "North Mangrove Beach" on left of map.

VARANUS ISLAND FACILITIES

March 1995



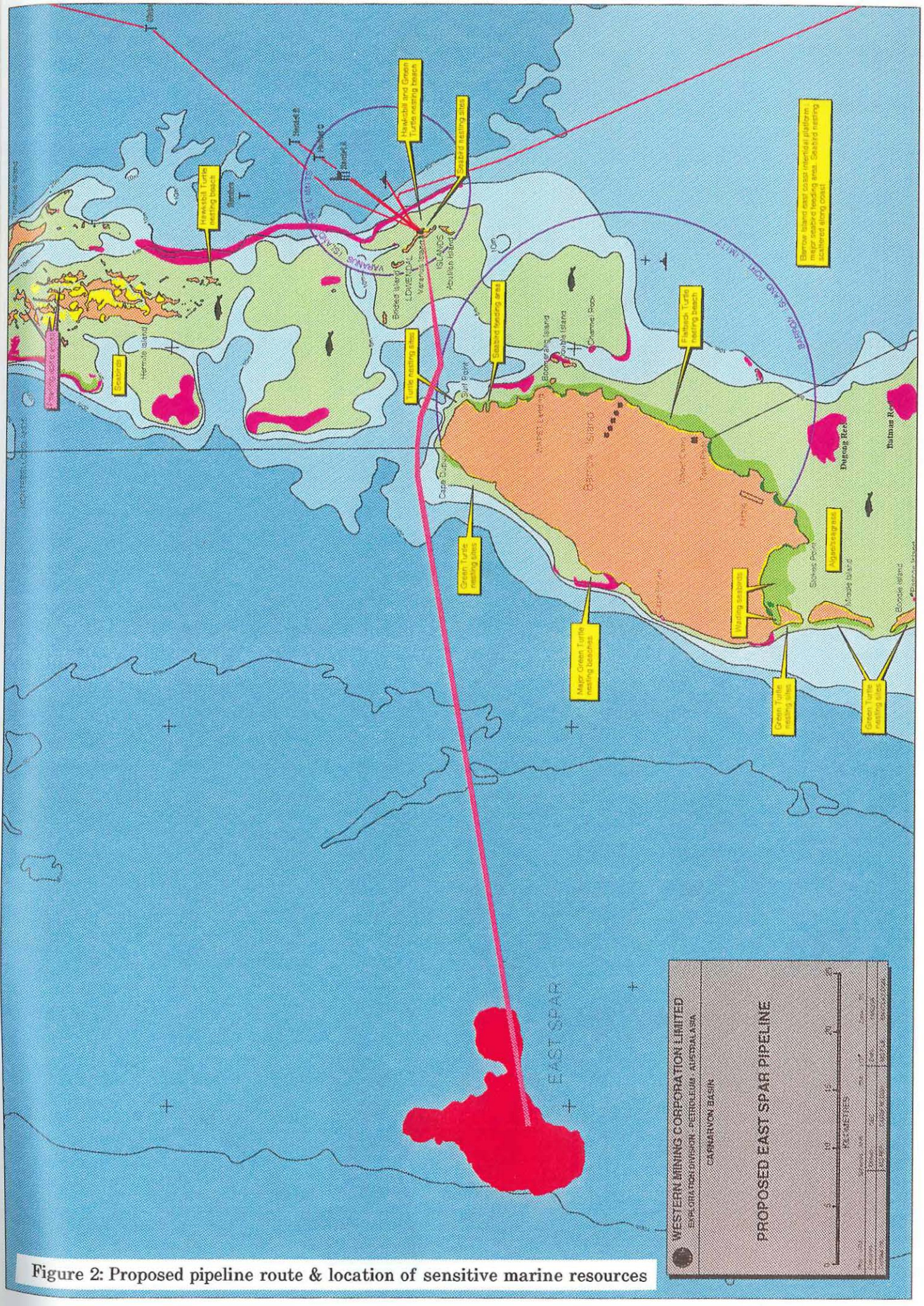


Figure 2: Proposed pipeline route & location of sensitive marine resources

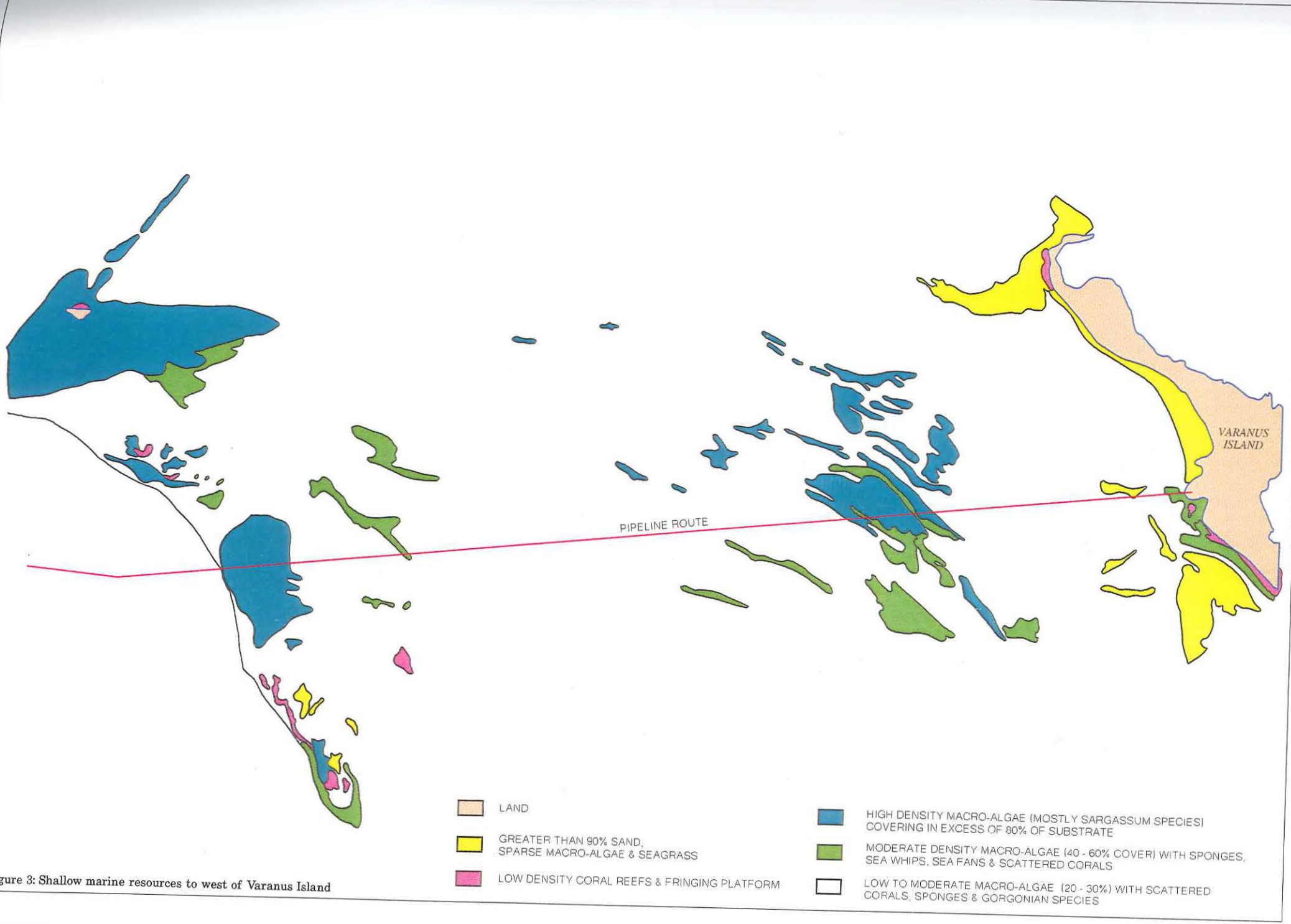


Figure 3: Shallow marine resources to west of Varanus Island

VARANUS ISLAND FACILITIES

CALM LEASE BOUNDARY

PL/12 PIPELINE LICENCE BOUNDARY

PIPELINE

Pipeline Beach

North Mangrove Beach

Amenity Beach

Harriet Beach

PROPOSED FACILITY LOCATION

ROOKERY PROTECTION AREA

SANDHILL & ROOKERY PROTECTION AREA

Flare Knockout Pot

Existing 9 200 Flare Line

Rotaria Separator Water Treatment Skid Oil/Water Separator Skid

Slug Catchers

Pig Receivers/ Launchers

9 324 Sinbad/Campbell

9 324 Sales Gas

9 219 Incoming Crude Line

9 762 Tanker Loading Line

9 169 Harrier Gas

9 155 Rosella Flowline

Track

Gas Compressors

L.T.S. Plant

Diesel Storage

Control Room/ Laboratory

Disposal Bore

Ground Flare

Incinerator

Topsoil Stockpile

Sump

Tennis Court

OPI Unit (Ballast Treatment)

Crude Storage Tank (250,000bbls) D101 (L) - C

Crude Storage Tank (250,000bbls) D101 (L) - B

Crude Storage Tank (250,000bbls) D101 (L) - A

Pipe Corridor (incl Services)

Rock Stockpile

East Laydown Area

Tanami-1 Well Location 7 715 349.920N 352 051.920E

Power Station

Water Maker

Fire Water Pumps & Bores

Store

Manager

Helipad

Workshop/Warehouse

Diesel Storage

Power Station

Bund

Oil Trap

Water Supply Bores

Concrete Ramp

East Mallard Landing Area

Slip

East Wharf

Construction Camp

Roustabout Office & Stores

Construction Camp Water/Power

RO Units

Potable Water Storage Tank

Communication Tower

Windsock

Track

Potable Water Pressure Unit

Sewerage Treatment Works

Swimming Pool

Permanent Quarters

Oil Trap

Satellite Dishes

Amenities

Food Store

Rosella-1 Well Location 7 715 200.310N 351442.440E

West Laydown Area

Mallard Landing Area

Sewerage Line

Fire Escape Track

Sewerage Outfall

North

0 50 100m

7 715 900m N

7 715 800m N

7 715 700m N

7 715 600m N

7 715 500m N

7 715 400m N

7 715 300m N

7 715 200m N

7 715 100m N

7 714 900m N

351 400m E

351 500m E

351 600m E

351 700m E

351 800m E

351 900m E

352 000 E

352 100m E

NJ.m1375

Figure 4

on the island, and adjacent to the Harriet joint venture processing facilities (figure 4). The existing Harriet joint venture export pipeline would carry gas to the trunkline on the mainland. There will be no additional facilities on the mainland in connection with the East Spar proposal. Condensate would be exported from Varanus Island by tanker through existing Harriet Joint Venture facilities.

In addition, partly in response to concerns raised in submissions, the proponent has modified the proposal to further reduce possible environmental impacts as follows:

- the processing facilities on Varanus Island will be located entirely within the existing Harriet Joint Venture lease. There will therefore be no direct disturbance to nesting shearwaters. There will also be no direct disturbance to vegetation from construction of processing facilities as this area has been cleared in the past;
- the location of the pipeline shore crossing is being finalised in consultation with CALM. While all processing facilities will be located within the existing Harriet Joint Venture lease, to avoid a limestone cliff it may prove necessary for the pipeline shore crossing, and a short section of pipeline onshore, to be placed just outside the lease area. In any event, the shore crossing and pipeline will be located so as to avoid mangroves and shearwater nesting areas, and so as to minimise any other environmental impacts;
- a diver survey of the pipeline route through the Lowendal shallows has been completed. The survey results indicate there are few hard (reef building) corals along the proposed pipeline route. The pipeline will nevertheless be placed to minimise disturbance to coral patch reefs or other sensitive resources. Some sections of the pipeline will pass through beds of macro-algae (brown seaweed, chiefly *Sargassum* species). However such seaweed beds can be expected to recover readily from disturbance and so are not considered to be sensitive resources;
- there will be a shielded ground flare (shared with the Harriet Joint Venture) and an additional emergency flare; and,
- the well head will be on the sea bed, that is, there will be no platform at the East Spar location.

3. Environmental impact assessment method

The purpose of the environmental impact assessment is to determine whether a proposal is environmentally acceptable or under what conditions it could be environmentally acceptable.

The environmental impact assessment for this proposal followed the administrative procedures shown in Appendix 1.

The first step was to identify the environmental issues to be considered. A list of topics (or possible issues) was identified by the DEP, on behalf of the EPA, through the preparation of guidelines.

These topics were addressed by the proponent in the Consultative Environmental Review (CER). The CER identified potential impacts and examined project modifications or environmental management strategies to reduce these impacts.

The DEP checked the draft CER to ensure that each topic was adequately addressed. The CER was then released for a four week public review period as required under the *Environmental Impact Assessment Administrative Procedures.*

Following the public review period, and also as required under the *Environmental Impact Assessment Administrative Procedures*, the proponent responded to issues raised in submissions.

Finally, the EPA analysed each of the environmental management issues associated with the proposal against the EPA's environmental management objectives. The EPA considered submissions, and the proponent's responses to submissions and proposed environmental figure

management commitments. Based on this information, the EPA determined, firstly, whether the proposal is environmentally acceptable, and, secondly, whether any modifications are required to make it acceptable.

In carrying out this assessment, the EPA has referred to the Independent Review of the Environmental Impacts of the Offshore Petroleum Exploration and Production Industry in Australia, (Swan *et al*, 1994), commissioned by the Australian Petroleum Exploration Association (APEA). This review includes comprehensive and authoritative information on the environmental impacts of offshore and coastal petroleum processing facilities of the type proposed here.

Limitation

This evaluation has been undertaken using information currently available. The information has been provided by the proponent through preparation of the CER document (in response to guidelines issued by the EPA), by DEP officers utilising their own expertise and reference material, by utilising expertise and information from other State government agencies, information provided by members of the public and industry groups, and by contributions from EPA members.

The EPA recognises that further studies and research may affect the conclusions. Accordingly, the environmental approval for the proposal is limited.

If the proponent has not substantially commenced the project within five (5) years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced.

Any application to extend the period of five years referred to in this condition shall be made, before the expiration of that period, to the Minister for the Environment.

Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years.

4. Submissions, proponent's responses and proponent's commitments

Nine submissions were received, including submissions from the Australian Nature Conservation Agency (a Commonwealth Government agency), the Department of Conservation and Land Management, the Conservation Council of Western Australia Inc., WA Fisheries Department, the Western Australian Museum, Apache Energy Ltd, and a private individual. (One submission specifically addressed the option of shore facilities on Barrow Island. Since the proponent has now abandoned this option, this submission is not considered further in this report.)

A list of issues raised in submissions relating to the Varanus Island option, together with the proponent's responses, is given in table 1. The list of submitters appears in Appendix 2.

All environmental management commitments made by the proponent, in the CER and subsequently, are listed in Appendix 3.

The EPA has considered the submissions received and the proponent's responses and environmental management commitments as part of the evaluation of the proposal.

5. Evaluation

Table 1 summarises the EPA's evaluation of this proposal. The topics associated with the proposal are listed, together with the the EPA's environmental management objectives. Other columns summarise submissions on each issue, and the proponent's responses and proposed environmental management commitments. The final column indicates whether there are any issues not addressed by proponent's commitments or other regulatory processes and which therefore require further EPA evaluation. For this proposal all topics are addressed either by the proponent's environmental management commitments or by other regulatory processes. Therefore there are no remaining issues requiring further EPA evaluation.

The EPA notes that the existing Harriet Joint Venture Project Environmental Management Program (EMP) for Varanus Island could form the basis of the EMP for the land component of the East Spar proposal. A separate EMP is required for the offshore component of the East Spar proposal.

The EPA notes "produced" water will initially be disposed of down existing shallow bores on Varanus Island, following treatment in the Harriet Joint Venture facilities. However, approximately eight (8) years from the start-up date it is likely there will be larger quantities of "produced" water and that alternative means of disposal (such as deep water disposal offshore, or down a deep injection well on Varanus Island) will be required. A further EMP addressing these alternative means of disposal should be prepared and approved at least 12 months before alternative disposal is required.

Finally, the EPA notes that it is essential that the proponent maintains liaison with the operator of the Harriet Joint Venture to ensure best practice environmental management on Varanus island and adjacent coastal waters.

Other approvals required

Approvals are required from the Department of Minerals and Energy (DME) for the emergency management plan, and oil spill contingency plan. A pipeline licence is also required from DME.

Additional approvals required from the Department of Environmental Protection (DEP) are: works approvals, and licences to operate.

The proponent has advised that it intends to apply to have the proposal designated under the Commonwealth *Environment Protection (Impact of Proposals) Act.* If designated, the proposal may be subject to environmental assessment under that Act.

Table 1. East Spar gas field development: issues requiring EPA evaluation

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Biophysical					
Overall environmental management.	Potential impacts on marine and terrestrial environments. Main impacts during construction phase.	To ensure the project is managed, in both construction and operation phases, to avoid unnecessary impacts and to properly manage unavoidable impacts to an acceptable level.	Apache should maintain overall responsibility for onshore environmental management.	WMC to agree with Apache that Apache will perform environmental management. Environmental Protection Guidelines to be included in construction contracts. Post-construction audit will be carried out in consultation with DEP, CALM and DME.	Addressed by proponent commitment for land-based issues (recommendation 2). Separate EMP required for offshore component (recommendation 3).
Quarantine issues.	Possible introduction of animals and plants to Varanus Island.	To maintain Varanus Island free of introduced plants and animals.	Apache should maintain overall responsibility for quarantine.	Commitment that proponent will adhere to existing Apache quarantine rules.	Addressed by proponent commitment. Detailed EPA evaluation not required.
Impacts on shearwater colony on Varanus Island.	Pipeline and facilities will be inside existing Apache lease so will not impact directly on shearwater colony. Uncontrolled run-off could flood burrows.	To maintain the shearwater colonies on Varanus Island.	Drainage system needed, starting from the construction phase, to avoid flooding shearwater burrows. CALM to approve.	CALM approval will be obtained for drainage measures at design stage. CALM have agreed to audit.	Addressed by proponent commitment. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Impacts of pipeline assembly ("stringing") onshore.	Pipeline assembly onshore may disturb native plants and landforms.	To maintain the native plant communities of Varanus Island. To maintain the natural land forms of Varanus Island.	Preference for pipeline assembly offshore.	Commitment to carry out assembly offshore. CALM has agreed to audit.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Impacts of pipeline laying onshore.	Laying of pipeline onshore may disturb native vegetation and a small sand dune.	To maintain the native plant communities of Varanus Island. To maintain the natural land forms of Varanus Island.	Guidelines for minimising disturbance to vegetation and ensuring effective rehabilitation to be given to contractors prior to start of construction.	Commitment that CALM will be consulted on proposed measures. Contractors will be inducted prior to start of work. CALM has agreed to audit.	Addressed in proponent's commitments. CALM advice to be sought. Detailed EPA evaluation not required.
Impacts of light from electric lights and flares on fauna.	Artificial lights and illumination from flares (ground flare and emergency flare) may disturb behaviour of turtles and shearwaters, possibly resulting in increased mortality.	To ensure that turtles and shearwaters are not disturbed by artificial lights.	A post-commissioning light audit should be carried out by CALM. Regular audit and improvement should be carried out.	Commitment to share shielded ground flare with Apache. Emergency flare will have either electronic ignition or shielded pilot light. Proponent to liaise with DEP / CALM / DME on location of emergency flare. Commitment to liaise with CALM re plant lighting during design stage. CALM has agreed to audit.	Addressed in proponent's commitments. CALM / DME advice to be sought. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Impacts of pipeline construction on marine communities.	Pipeline laying may cause physical damage to sensitive environments such as mangroves and coral reefs.	To maintain existing coral reefs, mangroves and other sensitive marine communities.	Need to avoid impacts on mangroves. Opposition to routing pipeline through the Lowendal Shallows. Inadequate information on extent of expected damage and expected recovery rates.	Diving survey of pipeline corridor has been completed. Commitment to route pipeline to avoid sensitive habitats such as coral patch reefs and mangroves. Commitment to liaise with DEP / CALM and implement accordingly.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Pipeline stability.	The pipeline will approach Varanus Island at right angles to prevailing currents, therefore pipeline stability must be assured.	To ensure the pipeline is designed and constructed to ensure stability.	Pipeline stability must be assured.	Commitment that engineering studies will be carried out to assess stability requirements and pipeline laid accordingly (DME condition).	Addressed under DME conditions. Detailed EPA evaluation not required.
Beach erosion.	Placement of pipeline may result in beach erosion.	To maintain natural coastal processes.		Commitment to consult DEP and CALM at design stage and implement accordingly.	Addressed in proponent's commitments. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Pollution issues					
Oil spill from pipe-laying barge.	An oil spill may occur from the pipe-laying barge as result of refuelling or barge sinking.	To protect sensitive marine environments from oil spills.	Oil spill contingency plan (OSCP) should be developed in cooperation with other companies in the area. A refuelling procedure to be developed prior to commencement of work.	Commitment that OSCP to be updated prior to any work commencing (to satisfaction of DME and DEP). Commitment that refuelling procedure, agreed with DME and DEP, will be developed before project commences.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Sewage and waste from pipe laying barge.	Work on the barge will give rise to sewage and waste.	To maintain the environment free from significant pollution impacts.	Barge must comply with all relevant legislation with regard to waste disposal.	Covered by DME conditions.	Addressed in DME conditions. Detailed EPA evaluation not required.
Onshore garbage / waste.	Construction work on Varanus Island will give rise to garbage and waste.	To protect the environment from significant damage from garbage and waste.	Minimise amount of waste. House-keeping rules required, including storage of litter and drums of chemicals. Contractors must adhere to existing Apache rules.	Commitment to minimise waste and abide by Apache environmental guidelines.	Addressed in proponent's commitments. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Dust.	Construction activities onshore will give rise to dust.	To protect the environment from significant impacts caused by dust.	Management strategy for dust required. Saline water should not be used for dust suppression.	Commitment to liaise with CALM on dust control, and implement control measures accordingly.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Sediment plumes.	Plumes of sediment will be created during marine pipe-laying.	To protect sensitive marine resources such as coral reefs from significant impacts caused by sediment plumes.	Inadequate information on size and duration of plume events. Construction must avoid coral spawning and settlement period.	Commitment to time construction activities to avoid any impact on coral spawning in the area adjacent to Varanus Island.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Disposal of drilling fluids.	Drilling fluids are used in drilling new wells.	To maintain the environment free from significant pollution impacts.	Inadequate information on disposal of drilling fluids.	Not an issue.	Not an issue - there will be no new production wells drilled in connection with this proposal.
Disposal of hydrostatic test water.	Chemically treated water is used to hydrostatically test the pipeline prior to commissioning. Water must then be disposed of.	To maintain the environment free from significant pollution impacts.	Concern about toxicity of biocides and corrosion inhibitors. Guidelines for disposal of test water to be given to contractors prior to start of construction.	Commitment to supply details of volume, composition and concentration of hydrostatic test water to DEP. Commitment to have independent eco-toxicity testing carried out. Commitment to dispose of test water on land within bund.	Addressed in proponent's commitments. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Disposal of produced water (first 8 years of project).	In first 8 years of project, small quantities (less than 0.2 kilolitres per day) of water will be produced and will be treated through existing Harriet system and disposed of down existing shallow wells on Varanus Island. (Wells are already in use for disposal of Harriet produced water).	To maintain the environment free from significant pollution impacts.	Apache is carrying out research on Varanus ground water. Some contamination occurred prior to installation of new treatment equipment. Further studies to be carried out on connectivity of groundwater with surrounding sea water.	Commitment not to release produced water to shallow sea disposal off Varanus Island.	Specific management controls placed on proponent through works approval and licensing, and DME conditions, including monitoring for environmental impacts and setting levels for hydrocarbon control in produced waters.
Disposal of produced water (later stages of project).	Larger quantities of produced water will be produced in later stages of project and will be disposed of by alternative means (such as through an ocean outfall deeper than 10 metres or a deep injection well on Varanus Island).	To maintain the environment free from significant pollution impacts.		Commitment that an environmental management program will be prepared before construction of alternative disposal facilities commences.	A further EMP required to be submitted and approved 12 months before alternative disposal required (recommendation 4).

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Impacts on underground fauna.	Produced water will be disposed of down shallow disposal wells on Varanus Island for first 5-7 years.	To maintain any underground fauna on Varanus Island free from impacts from toxic materials.	Research indicates it is most unlikely there is any underground fauna at Varanus Island. Confirmed with WA Museum expert.	Not an issue. There are no caves at Varanus Island and no known surface openings into cracks or voids in the rock.	Not an issue. Unlike Barrow Island, research indicates it is most unlikely there is any underground fauna at Varanus Island.
Loss of control fluids.	Hydraulic fluids are used in control cables. Some routine leakage of small quantities of fluids is unavoidable.	To maintain the environment free from significant pollution impacts.		Commitment that fluids will be subject to independent eco-toxicity testing. (Only small quantities of fluid involved - unlikely to be a significant issue).	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Pipeline corrosion inhibitors.	Chemicals (corrosion inhibitors) are used to control pipeline corrosion.	To maintain the environment free from significant pollution impacts.	Inadequate information on corrosion inhibitors.	Commitment to a 20 year corrosion management system and automatic shut down system in case of leaks. Independent eco-toxicity testing of corrosion inhibitors.	Addressed in proponent's commitments and DME conditions. Detailed EPA evaluation not required.
Pipeline rupture.	Pipeline rupture may result in large release of gas and condensate into the sea.	To ensure pipeline integrity is maintained and avoid environmental impact from gas/condensate release.	Likelihood of rupture of pipeline during cyclone is an unacceptable risk.	Issue is addressed under DME conditions.	Primarily a safety issue and is addressed under DME conditions. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Rain water run-off.	There is potential for rainwater run-off from shore facilities may flood shearwater burrows and cause erosion.	To maintain the natural environment and shearwater rookeries free from rainwater run-off damage.		Commitment to consult CALM at design stage. CALM has agreed to audit.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Adequacy of bund.	There is potential for bund to overflow, and for toxic materials to flow to surrounding natural ground.	To ensure bunding is designed and installed in such a way containment is assured.		Commitment to consult CALM at design stage. CALM has agreed to audit.	**Bund must be adequate and fully lined.** Covered by works approval and licensing. Detailed EPA evaluation not required.
Damage to sub-sea well head.	Damage to sub-sea well head (eg from impact by a trawl) may result in loss of well control ("blow-out").	To ensure integrity of well head is maintained.	Concern that trawl damage may result in uncontrolled blow-out.	Commitment to liaise with DME (issue comes under DME legislation).	Addressed by DME conditions. Outside EPA jurisdiction (in Commonwealth Waters).
Ballast water.	Tankers arriving at Varanus Island discharge ballast water which could introduce non-native marine species.	To maintain the marine environment free from further introduced marine species.	Covered by existing Apache environmental management program. Tankers must adhere to national ballast water guidelines.	Commitment not required (covered by Apache EMP).	Addressed in existing Apache environmental management program. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Spillage from tanker accident.	Condensate will be exported from Varanus Island via tankers.	To ensure every precaution is taken to avoid tanker accidents and possible release of oil or condensate.	All tankers calling at Varanus covered by existing Apache environmental management program. Unsafe tankers not permitted to load.	Commitment that oil spill contingency plan to be updated prior to any work commencing (to satisfaction of DME and DEP).	Addressed in existing Apache environmental management program. Detailed EPA evaluation not required.
Greenhouse gas (carbon dioxide) emissions.	Project will result in unavoidable emissions of carbon dioxide during extraction and processing of gas/condensate.	To ensure plant and equipment are designed and operated so as to minimise greenhouse gas emissions.		WMC states that carbon dioxide content of gas field is low (approx 2% mol) and that the project will result in a nett reduction in carbon dioxide emissions by displacing some carbon dioxide production from Collie coal-fired power station.	Project expected to result in overall reduction in greenhouse gas emissions. Detailed EPA evaluation not required.
Social surroundings					
Impacts on recreational and commercial fishing.	A strip of seabed 500m on each side of the pipeline will be closed to commercial fishing.	To ensure fisheries productivity (commercial, recreational and subsistence) is maintained at sustainable levels.	No significant negative impact on fisheries expected (pipeline is outside trawl grounds).		No impact on fisheries expected (may be nett benefit from pipeline acting as artificial reef). Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Impacts on heritage sites (eg ship wrecks, Aboriginal sites).	Construction of pipeline could damage ship wrecks or other marine heritage sites. Construction of shore facilities could disturb Aboriginal sites.	To maintain cultural heritage sites in an undisturbed state.		Commitment to seek advice from WA Museum if cultural sites are discovered and to re-route pipeline if necessary.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Environmental monitoring					
Terrestrial and marine monitoring programs.	A reactive monitoring program is required to determine impacts on marine and terrestrial environments, and to provide for management responses as appropriate.	To ensure a scientifically rigorous monitoring program is put in place, and that appropriate management actions are taken in response to results of monitoring.	WMC should integrate with Apache monitoring program to avoid duplication of effort. Monitoring program design should be subject to peer review.	Commitment to develop a scientifically rigorous monitoring program in consultation with CALM, DEP and Apache.	Addressed in proponent's commitments. Detailed EPA evaluation not required.
Decommissioning					
Decommissioning structures on land and rehabilitation.	At end of project life cycle, facilities and buildings will remain on Varanus Island.	To ensure that all structures on land are removed and disposed of appropriately at end of project life cycle and that rehabilitation is carried out as required.	There is no information on impacts of ultimate removal or abandonment of pipeline or facilities.	Commitment to remove all structures on island and rehabilitate at end of project life cycle, unless structures required for another purpose.	Addressed in proponent's commitments. Detailed EPA evaluation not required.

Topics	Proposal characteristics	EPA objective	Submissions	Proponent responses / commitments	Identification of issues
Decommissioning submerged structures and (if required) rehabilitation.	At end of project life cycle, the pipeline and sub-sea well head will remain on sea bed.	To ensure that decisions on removing or retaining sub-sea structures are made on the basis of nett environmental benefit.	There is no information on impacts of ultimate removal or abandonment of pipeline or facilities.	Commitment to consult, at end of project life cycle, EPA, CALM, DME, and other appropriate government bodies, on any requirements for rehabilitation. Commitment to rehabilitate as required.	Addressed in proponent's commitments and in standard conditions. Detailed EPA evaluation not required.

6. Conclusions and recommendations

The EPA concludes that the proponent's environmental management commitments are comprehensive and adequately address the environmental management issues associated with the proposal.

The EPA notes that the existing Harriet Project Environmental Management Program (EMP) for Varanus Island is adequate to form the basis for the land component of the East Spar proposal and could form the basis of the EMP required for the East Spar proposal.

A supplement to the EMP is required to address the marine component of the East Spar proposal.

The EPA also notes that, should alternative means of disposing of produced water be required, a further supplement to the EMP will be required addressing this issue.

Finally, the EPA notes that it is essential that the proponent maintains liaison with the operator of the Harriet Joint Venture to ensure best practice environmental management on Varanus island and adjacent coastal waters.

Based on the the information currently available, the EPA makes the following recommendations.

The EPA recommends that:

Recommendation 1

The proposal is environmentally acceptable subject to the proponent's environmental management commitments and the EPA's recommendations in this report.

Recommendation 2

The existing Harriet Project Environmental Management Program (EMP) for Varanus Island should form the minimum basis of the EMP required for the land component of the proposal, to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy.

Recommendation 3

A separate Environmental Management Program (EMP) should be developed to address the marine component of the proposal. The separate EMP should be prepared and approved before pipelaying commences, to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy.

Recommendation 4

In the event that an alternative means of disposing of "produced" water is required, a further Environmental Management Program (EMP) will be required to address this issue. This further EMP should be prepared and approved before the alternative means of disposal is required and should be to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy.

Recommendation 5

The proponent should maintain liaison with the operator of the Harriet Joint Venture facilities on Varanus Island to ensure best practice environmental management on Varanus island and adjacent coastal waters.

7. Recommended environmental conditions

Based on its assessment of this proposal, and on the recommendations in this report, the Environmental Protection Authority considers that the following Recommended Environmental Conditions are appropriate:

1 Proponent Commitments

The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments made in the Consultative Environmental Review and in response to issues raised following public submissions; provided that the commitments are not inconsistent with the conditions or procedures contained in this statement.

A schedule of those Environmental Management Commitments (July 1995) which will be audited by the Department of Environmental Protection was published in Environmental Protection Authority Bulletin 787 (Appendix 3) and a copy is attached.

2 Implementation

Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal.

2-2 Where, in the course of the detailed implementation referred to in condition 2-1, the proponent seeks to change the designs, specifications, plans or other technical material submitted to the Environmental Protection Authority in any way that the Minister for the Environment determines, on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Varanus Island Environment

3-1 The proponent shall protect flora, fauna, landforms and groundwater on Varanus Island.

3-2 To achieve the objective of condition 3-1, prior to any ground-disturbing activities, the proponent shall prepare an Environmental Management Program to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy (see procedure 3).

3-3 The proponent shall implement the Environmental Management Program required by condition 3-2.

4 Offshore Environment

4-1 The proponent shall protect the offshore environment from significant environmental impacts resulting from the project.

4-2 To achieve the objective of condition 4-1, prior to the commencement of pipeline laying, the proponent shall prepare an Environmental Management Program (Offshore Environment) to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy.

4-3 The proponent shall implement the Environmental Management Program (Offshore Environment) required by condition 4-2.

5 "Produced" Water Disposal

As extraction of gas/condensate from the gas field proceeds, quantities of so-called "produced" water will require disposal in an environmentally sensitive manner.

5-1 The proponent shall avoid disposing of "produced" water in such a way that a significant environmental impact occurs, or significant groundwater contamination occurs.

5-2 In the event that alternative means of disposal of "produced" water are to be utilised, the proponent shall prepare an Environmental Management Program for "Produced" Water, to the requirements of the Department of Environmental Protection, the Department of Conservation and Land Management, and the Department of Minerals and Energy. The Environmental Management Program for Produced Water shall be prepared at least twelve months prior to commencement of construction of alternative disposal facilities.

5-3 The proponent shall implement the Environmental Management Program for "Produced" Water required by condition 5-2.

6 Liaison

6-1 The proponent shall liaise with the operator of the adjacent Harriet Joint Venture Project to ensure best practice environmental management of Varanus Island and adjacent waters, to the requirements of the Department of Environmental Protection, on advice of the Department of Conservation and Land Management, and the Department of Minerals and Energy.

7 Decommissioning

7-1 The proponent shall carry out decommissioning of the project, removal of the plant and installations and rehabilitation of the site and its environs.

7-2 At least six months prior to decommissioning, the proponent shall prepare a decommissioning and rehabilitation plan to achieve the objectives of condition 7-1.

7-3 The proponent shall implement the plan required by condition 7-2.

8 Proponent

The environmental conditions legally apply to the nominated proponent.

8-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment 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 shall 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.

9 Time Limit on Approval

The environmental approval for the proposal is limited.

9-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced.

9-2 Any application to extend the period of five years referred to in this condition shall be made, before the expiration of that period, to the Minister for the Environment.

9-3 Where the proponent demonstrates to the requirements of the Minister for the Environment on advice of the Department of Environmental Protection that the environmental parameters of the proposal have not changed significantly, then the Minister may grant an extension not exceeding five years.

10 Compliance Auditing

To help determine environmental performance, periodic reports on progress in implementation of the proposal are required.

10-1 The proponent shall submit periodic Progress and Compliance Reports, in accordance with an audit program prepared by the Department of Environmental Protection in consultation with the proponent.

Procedure

1 The Department of Environmental Protection is responsible for verifying compliance with the conditions contained in this statement and for issuing formal clearance of conditions with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

2 If the Department of Environmental Protection, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

3 An Environmental Management Program has already been prepared by the operator of the Harriet Joint Venture Project which covers Varanus Island and adjacent waters and is substantially adequate for the land component of the East Spar Offshore Gas Field proposal. Accordingly, the Environmental Management Program required by condition 3-2 can be based upon the existing Harriet Joint Venture Environmental Management Program.

8. References

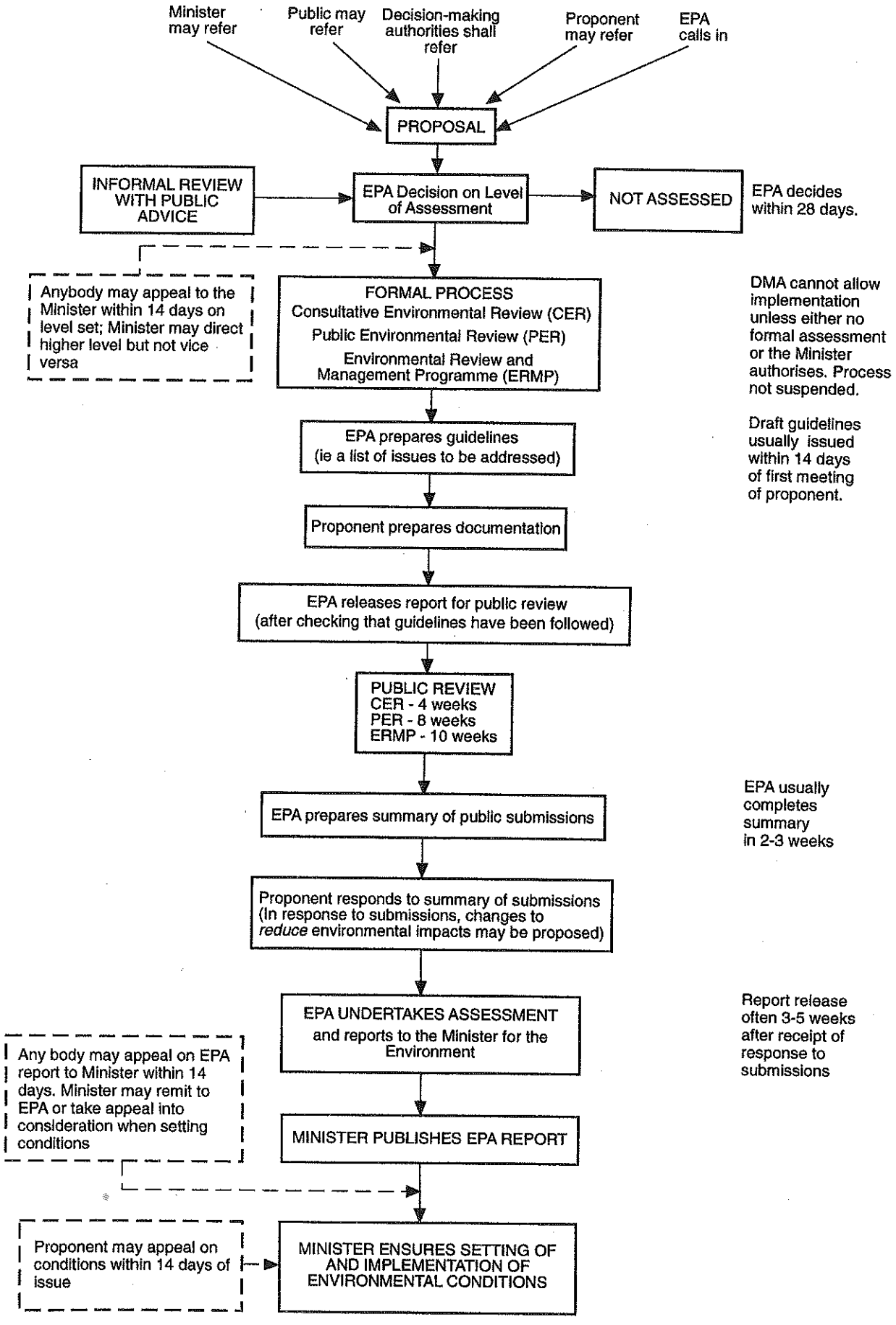
Swan, J.M., Neff, J.M. and Young, P.C., (Eds), 1994. Environmental implications of offshore oil and gas development in Australia - the findings of an independent scientific review. Australian Petroleum Exploration Association, Sydney, New South Wales.

Western Mining Corporation, 1995. East Spar Offshore Gas/Condensate Proposal. Consultative Environmental Review. Western Mining Corporation. Perth. Western Australia.

Appendix 1

Environmental impact assessment flow-chart

EIA PROCESS FLOW CHART



Appendix 2

List of submitters

Commonwealth Government Agencies

Australian Nature Conservation Agency

State Government agencies

Department of Conservation and Land Management (CALM)

Department of Minerals and Energy

Fisheries Department of Western Australian

Pilbara Development Commission

Non-government organisations

Coastal Heritage Association of Western Australia Inc.

Conservation Council of Western Australia Inc.

Other industry groups

Apache Energy Ltd

Western Australian Fishing Industry Council

West Australian Petroleum Pty Ltd

Members of the public

Evans, N

Appendix 3

Proponent environmental management commitments

The following is a consolidated list of all environmental management commitments.

Consolidated Commitments for East Spar Proposal

Emergency Response Issues

- The Oil Spill contingency Plan will be updated to incorporate the East Spar project to the satisfaction of the Department of Minerals and Energy prior to any work commencing on the project.

- WMC's Oil Spill Contingency Plan will be invoked in the unlikely event of an oil spill from the pipelay barge during construction of the pipeline.

- An Emergency Response Plan, incorporating a Cyclone Contingency Plan, will be formulated to cover all aspects of operations related to the offshore facility, pipeline and onshore facility.

- An Emergency Response Plan will be implemented for the pipelay fleet to ensure the safety of all personnel.

- WMC will develop refuelling procedures consistent with industry best practice prior to commencement of the project.

Produced Water

- Before produced formation water reaches volumes which exceed the capacity of existing Varanus Island facilities, WMC will install an appropriate water treatment plant. In the interim the existing Harriet Joint Venture facilities will be capable of handling the water associated with early years' production.

- If monitoring of the volumes of daily water production shows a trend substantially higher than that predicted, installation of water treatment and water disposal facilities will be brought forward.

- WMC is committed to either deep well injection or deep ocean outfall for produced formation water when the quantity of this water begins to exceed the existing Varanus Island facilities capacity. The possibility of a joint deep well disposal system with the Harriet Joint Venture is being pursued.

- An environmental management plan will be prepared in consultation with CALM & Apache Energy, at least twelve months before the change in disposal method is predicted, for approval by the DEP and implemented accordingly.

Onshore Construction

- All stages of the construction phase will be adequately supervised to ensure that the contractors follow the environmental criteria and safeguards required by the proponent and regulatory authorities.

- Waste generated during construction will be disposed of in a manner conforming to State and local regulations and utilising strategies and procedures operating the respective areas.

- The existing construction camps and laydown areas on Varnaus Island will be utilised.

- Wherever practical disturbed landforms eg. sand dunes, will be restored to the previous form.

- Damage to landforms, flora and fauna will be kept to a minimum by ensuring that all constructions take up the minimum area in line with safety requirements and utilising existing disturbed areas where possible.

- Topsoil, where removed, will be stockpiled to one side of the pipeline corridor and replaced after construction where possible.

- All contracts for the construction activities on Varanus Island will have Apache environmental conditions incorporated into them.

- WMC will consult with CALM and Apache Energy on drainage design for the proposed facilities on Varanus Island and will monitor the outfall for the storm water drainage.

- All process facilities will be placed within the existing Harriet Joint Venture lease.

- WMC will liaise with Apache Energy and CALM on dust suppression techniques during the construction phase and control measures will be implemented accordingly.

- When the facilities/structures to be installed on Varanus Island by WMC are no longer required they will be removed. The area that was covered by the WMC facilities will be returned to the condition that it was when WMC first commenced construction. This work will be done in consultation with CALM and implemented accordingly.

- The pipeline will come ashore at a site within the existing Harriet Joint Venture Pipeline Licence area in a manner which minimises environmental impact.

- A close out audit will be conducted after completion of construction in consultation with CALM, DEP, & DME and Apache Energy.

Offshore Construction

- Timing of the construction of the submarine pipeline in the vicinity of Varanus Island will be planned to avoid impact on any coral spawning in the area adjacent to Varanus Island.

- A survey of marine habitats will be taken along the pipeline route in the vicinity of Varanus Island to map the pipeline route and ensure that no sensitive marine assemblages will be adversely impacted during construction of the pipeline and to ensure the selected pipeline route will optimise the separation between the pipeline and sensitive marine resources..

- WMC will liaise with museum personnel to route the pipeline so that it avoids areas that contain any identified shipwrecks, or highly significant cultural sites and ensure construction activities do not impinge upon them.

- The pipeline route will be selected to avoid any coral patch reef areas.

- Pipeline stringing will occur offshore from a pipelaying barge, except for a short section adjacent to and on Varanus Island.

- To ensure stability of the pipe it will be weight coated, rock bolted and/or trenched where necessary. Engineering studies will be carried out to assess stability requirements.

- The pipelaying barge will adhere to PSLA requirements during the pipe laying operation.

- The pipeline route will be selected to optimise the separation between the pipeline and sensitive marine resources.

- WMC will consult with CALM & DEP on the final location of the pipeline crossing point on Varanus Island and implement management strategies accordingly.

Operation & Management

- All operators and construction workers will be given a full induction designed to provide an understanding and appreciation of the need for sound environment, safety and operations management when working on Varanus Island. the program will clearly explain prohibited areas on Varanus Island and the procedures to follow that will ensure flora and fauna on Varanus Island are protected.

- WMC will develop a scientifically rigorous environmental monitoring program within a broader environmental management framework in consultation with CALM, DEP, DME & Apache Energy.

- WMC will abide by the existing Environmental management plan in place for Varanus Island. WMC will liaise with Apache, DME and CALM on the implementation of the existing plan requirements.

- Strict quarantine procedures currently in place for all staff, goods and materials arriving on Varanus Island will be strictly followed during every phase of the East Spar project to ensure exotic species of flora or fauna are not allowed to reach the island.

- Tanker loading activities are covered by the existing Apache arrangements at Varanus Island. No new tanker loading facilities are required.

- A corrosion management system will be put in place to ensure that the 20 year design life of the pipeline will be achieved. A low pressure shut down system will be provided which will shut down the operation immediately in the event that leakage from the pipeline is suspected.

Other Issues

- WMC will liaise with the DEP, CALM, DME and other appropriate government bodies, at the end of the field's life on any requirements for rehabilitation. This may include the removal and disposal of portions of sub-sea structures on the basis of net environmental benefit.

- Details of volume, composition and concentration of hydrostatic test water will be supplied to the DEP.

- Environmental management will be performed under the Apache Energy Environmental Management Plan for Varanus Island but will remain the responsibility of WMC.

- WMC will be using the existing fully enclosed shielded flare on Varanus Island in order to minimise the impact of light from the flare on nesting turtles and Wedge Tailed Shearwaters.

- In addition to the existing flare, an emergency flare tower will be installed. The ignition of this flare will either be electronic or by a shielded pilot light.

- Clearing of the pipeline will take place from the East Spar location to Varanus Island. The water will be discharged into the bunded area on Varanus Island and allowed to evaporate. Apache Energy will be informed of the composition and quantity of water prior to discharge.

- Ecotox testing of control fluid will be carried out before the fluid is used. Results of the tests will be forwarded to the DEP for information.

- WMC will consult with CALM during the design stage on lighting for the plant. Where possible plant lighting will operate on timer devices and be of a type that minimises light visible outside the area to be illuminated. Lighting design will have to take in operational safety considerations.