Appendix N

Blacktip Project – EIS Health Programme Project Health Review prepared by Worley




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Worley

WOODSIDE ENERGY LTD

Blacktip Project - EIS Health Programme

Project Health Review

450/07245/0

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SYNOPSIS

This report is a desktop study of Health related Hazards for the Blacktip Gas Project. It addresses typical Oil and Gas Industry Hazards for Design Office, the offshore Platform, contracted vessels and the drilling Rig, and the marine and onshore pipelines to, and from, the Onshore Gas Plant (but not the Trans Territory pipeline) and the Gas Plant itself. The report reflects the stage of development of the project with initial risk screening proposals for further studies and support identified where data is currently unavailable. Some cross references to existing Project documents and procedures has been included however population of the 'Procedures' column requires additional input to confirm all identified risks are addressed within the Project Safety Management System documentation.

Disclaimer

PROJECT 450/07245/0 - BLACKTIP PROJECT - EIS HEALTH PROGRAMME

REV	DESCRIPTION	ORIG	REVIEW	WORLEY APPROVAL	DATE	CLIENT APPROVAL	DATE
A	Issued for internal review	R J Shepherd	B Kahl	N/A	19-April-04	N/A	
B	Issued for Client Comment	R J Shepherd	B Kahl	C James	23-April-2004	C Morgan	

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Appendices

1. INTRODUCTION

This preliminary desktop study addresses the Blacktip Gas Project Health related issues. These have been listed, project phase applicability assigned, whether the potential health exposure is to the project workforce or to the public assigned, and a statement of how the issue is normally addressed within the Oil and Gas Industry made.

The issues have then undergone an initial screening, with those of highest significance being identified for further study, work or control. In most instances application of Woodside's, or reputable, experienced contractors, existing procedures should be sufficient to control and mitigate potential health effects; the Woodside Energy Ltd. (WEL) procedures are cross referenced where appropriate.

An outline Health Plan for the Project has been derived from the assessment to ensure carry forward of the significant issues, identified during Front End Engineering Design (FEED) stage, which require further study or work during late FEED, Detailed Design and Operations. It is expected that the document will be revisited during these project development stages, and again prior to decommissioning.

The document is valid at the time of issue based on available data and information and is intended to form the basis for initiation of ongoing Blacktip Project Health Planning. The assessments will require review and update as more information, or changes in available data, become apparent through project development and operations.

The high level study is limited to the Design Office Work (assumed to be in Perth, Western Australia), Offshore Platform, typical Marine support vessels and drilling rig, pipelines to the Onshore Gas Processing plant and from the Gas Plant back offshore; it does not address the Trans Territory pipeline from the Onshore Gas Processing Plant to Gove.

Project Overview

At BOD it is envisaged that the Blacktip field will be developed with a unmanned Wellhead Platform (WHP), a 16" multiphase pipeline to shore and an onshore gas plant. Sales quality gas will be delivered at the fenceline of the onshore gas plant for onward transmission by others to Gove, in a pipeline measuring almost 960 km.

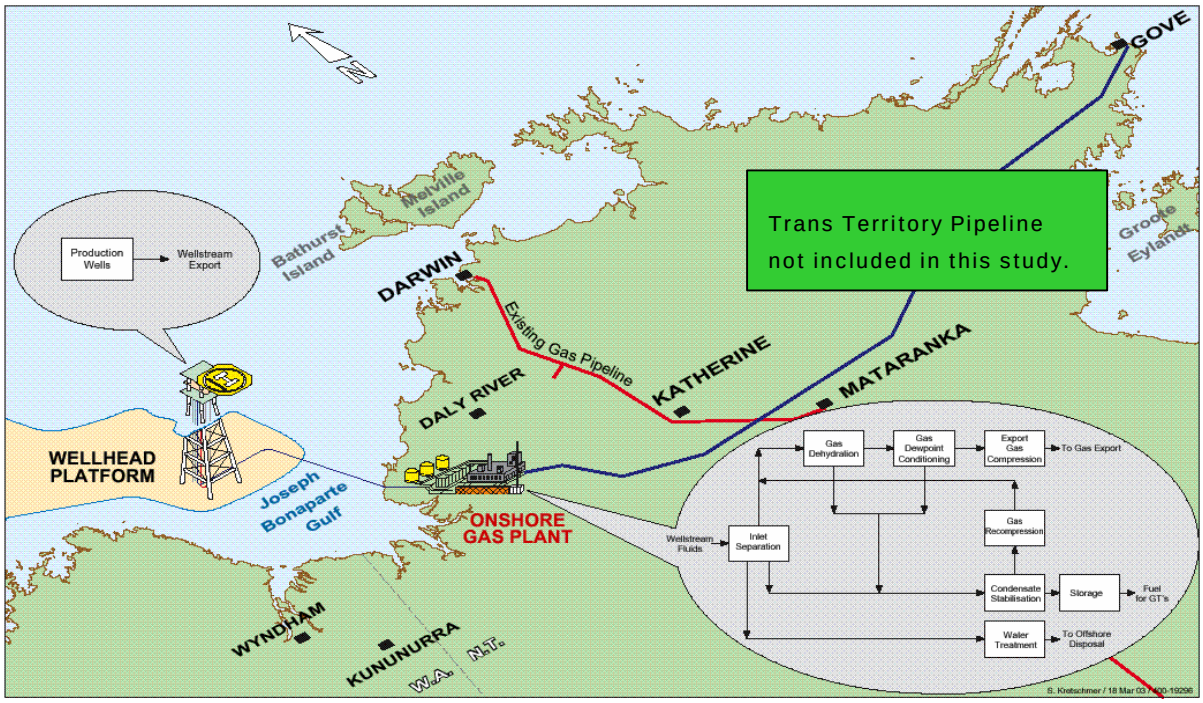
The Onshore Gas Plant facilities will consist of a single process train using Silica gel technology. The sales quality product gas will be exported via 2 x 100% gas turbine driven centrifugal compressors.

Condensate is stabilised in a flash stabilisation system. Stabilised condensate will be exported via a spread mooring situated some 3-4 km offshore.

Produced water is let down in pressure with dissolved gases removed in a degasser. Bulk oil is then removed in an air flotation unit before the water is polished in a settling pond. The effluent water will be disposed of to sea.

A graphic representation of this base case is presented in Figure 1.

Figure 1 Blacktip Base Case



1.1 Abbreviations

ALARP	As Low as Reasonably Practical
BOD	Basis of Design
BTEX	Benzene, Toluene, Ethyl Benzene, Xylene
EIS	Environmental Impact Statement
FEED	Front End Engineering Design
HAZID	Hazard Identification workshop-study
HAZOP	Hazard and Operability workshop-study
Hg	Mercury
HSE	Health Safety and Environment
HU&C	Hook Up and Commissioning
H_2S	Hydrogen Sulphide
IPIECA	International Petroleum Industry Environmental Conservation Association
LSA	Low Specific Activity scale (a form of NORM)
MSDS	Material Safety Data Sheet
NORM	Naturally Occurring Radioactive Material
PPE	Personnel Protective Equipment
WEL	Woodside Energy Limited

2. BACKGROUND

Potential Oil and Gas related Health issues are discussed in a variety of industry related documents. At the world level The World Bank Environment Department's Health Aspects of Environmental Assessment Environmental Assessment Sourcebook, Number 18, Update, July 1997 indicates that 'Exposure to chemicals' and 'Occupational Injuries' are oil and gas sector project related risks.

The International Association of Oil and Gas Producers reports on Strategic Health Management: Principles and Guidelines for the Oil and Gas Industry (Report No. 6.88/307, June 2000), Key Questions in Managing Social Issues in Oil and Gas projects (Report 332, October 2002, with IPIECA) and Managing Health for Field Operations in Oil and Gas Activities (Report No. 343, May 2003) provide more specific analysis of the industry's potential health related impacts.

Standards Australia provides a framework for Occupational Health and Safety management systems in standard AS/NZS 4801: 2001, to address the potential hazards, Oil and Gas proponents, operators and major contractors, generally develop sophisticated Safety Management Systems and specific HSE / Health Related procedures and guidance to control identified potential risks.

Woodside Energy Limited (WEL) has a management system, existing Corporate procedures, considerable practical experience and these are available to and being utilised as appropriate by, the Blacktip Gas Project team. WEL's contracting and HSE approach will ensure that appropriate standards are also in place with their subcontractors.

The intent of this document is to identify, address and provide a preliminary assessment of the health issues, with respect to WEL's Blacktip Gas Project in relation to the first dot point of Section 6 Health and Safety Programme of the EIS Guidelines- Part B, issued by the Northern Territory Government in March 2004. It is understood that the second two dot points will be addressed by WEL.

A number of health related WEL Blacktip Gas Project internal project documents were reviewed during preparation of this report, including eg Basis of Design Data Sheets 'HSE Management' (Ref Drims # 472620) and 'Health and Ergonomics Requirements' (Ref Drims # 476360), which provide the link (and reference to) Woodside's corporate HSE management system, policy (Codes and Standards) procedures and project documentation (References). The Blacktip Remote Area Access Guidelines (Ref Drims # 144703) also provides some specific health related guidance.

Part of the Projects developing documentation is the preparation of a Regulatory Register, designed to capture relevant regulations with which compliance must be achieved as a minimum; for the Blacktip project the prime regulatory influences are the Commonwealth Environment Protection and Biodiversity Conservation Act, 1989, Petroleum (Submerged Lands) Act 1967, and the Northern Territory Environmental Assessment Act, 1982, and relevant health regulations.

Additional background information has been gained from Building Healthier Communities, A Framework for Health and Community Services 2004-2009, and other internet available, publications, produced by the Northern Territory's Government's Department of Health and Community Services, and from Indigenous Health Matters, published by the Department of Health and Ageing of the Office for Aboriginal and Torres Strait Islander Health.

Other WEL Blacktip Gas Project internal project documents reviewed during preparation of this report are identified in section (5 References) below.

3. DISCUSSION

The attached Matricis (Appendicies 1-5) list potential health impacts in terms of Location, Physical, Chemical, Biological and Psyco-social hazards versus their Project Phase (ie Design, Construction, Operations (Maintenance and Shutdown) and potential impacts on the Public or Employees (ie Project Personnel), for Office work, the normally unmanned Platform, contracted Vessels and drilling Rig, the Pipeline from (Offshore) Platform to (Onshore) Gas plant , and the Gas Processing Plant itself.

The health hazards are not unique to the Blacktip Project and therefore existing management approaches, which recognise the (remote) location and local community issues, are expected to be adopted by the project with a minimum of alteration. Many of these are specifically addressed in WEL's Basis of Design Data Sheet 'Health and Ergonomics Requirements (Ref Drims # 476360), and the references, Codes and Standards identified within that document.

Areas where more study and or more control may be needed are identified. It should be noted that this report is a desktop study aimed at identifying likely potential impacts in a systematic manner. The preliminary screening results should be reassessed as the project develops and may change as further information or data becomes available, and as specific aspects of the project are subject to other risk assessment processes (eg HAZID and HAZOP).

The Matrices were developed in two stages;

Stage 1

- Risks were listed, potential exposures and typical (assumed) Oilfield controls noted.
- An initial screening was carried out to determine expected Low, Medium or High risks, in the opinion of the author.

Stage 2

Items assessed to have Medium or High risk were further considered and more specific existing controls sought. Where there was uncertainty about the potential for a health risk, due to lack of information at this stage of the project, the item has been noted as requiring

- further study,
- a new procedure (or project modification of an existing procedure) or
- external support requirement

To ensure appropriate mitigation of potential risks to employee or public health.

A number of the potential issues are addressed in the requirements of Guidelines for Preparation of a Draft Environmental Impact Statement for the Proposed Blacktip Gas Project, and, while the EIS and the Social Impact Assessment documents are still in preparation, cross reference is made, in the further study column of the matrix, to allow checking of information / consistency of approach with these documents when available.

4. CONCLUSIONS

No unusual Health related risks were identified for the offshore works provided WEL's normal sub contractor hire selection and contract process is followed, and Safety Case (and bridging document) development follows appropriate industry standards.

Onshore works hazards to the workforce are largely related to the remote location, very limited local medical support, potential interaction with wildlife (snakes, bighting insects etc) and subsequent bacterial or viral infection, heat-humidity and exposure to the sun, and occupational hazards (slips, trips, strains, and falls). These hazards may be compounded if effective communications are not available.

Potential impacts to the public from the facilities (eg noise, lighting, exhausts, etc) are unlikely, however if construction and operational sites are not secure, then there are risks to curious third party intruders. In this respect special security consideration should be given to rotating or mobile machinery (vehicles, cranes, motors etc) hazardous materials, chemicals and any medicines stored on site.

Social interaction with the local community may give rise to the potential for a variety of impacts, which should be addressed in the Social Impact Assessment; from a health perspective the most significant is the (two way) spread of diseases. Construction workforce interaction may be minimal, dependant on entertainment facilities provided in the construction camp and management policy for shift rotas and domestic issues, including use of local accommodation and facilities.

Physical and Chemical Issues are typically addressed in the Basis of Design and it is expected that once the Data sheets for that document for the Blacktip Project are completed, in accordance with the HSE Management sheet (Drims Ref 476360) these will be adequately addressed.

Chemical selection has not been finalised and therefore their mode of use and disposal route remain uncertain. However, development of a project specific operational chemical control procedures and a Waste Management Plan should address Health, safety and environmental concerns with respect to chemicals: this may be best addressed when actual chemicals are selected, design finalised and a Waste Disposal Contractor chosen.

The intended unmanned operation of both the offshore and onshore plant, in a remote area, present a number of health related concerns which will need to be addressed prior to adopting that mode of operation. Ad hoc visits to the field are currently controlled by the Blacktip Remote Area Access Guidelines (Ref Drims # 144703). It is expected that these will be developed and information included in pre visit induction and a re-occupation-leaving site training and information sheets/procedures eg a Site Visit checklist to address HSE related issues, including a preliminary site inspection to ensure that eg there are no dangerous animals present, water lines are flushed to 'spec' quality, safety and emergency gear and communications equipment are serviceable, First Aid kit is complete for the intended work, that there are no leaks or spills and stored inventories (eg chemicals, consumables etc) are present and secure; and on leaving the site that eg wastes are removed, materials are all securely stored, fridges clean and secure, and that consumable or perishable items requiring replacement for the next site visit are identified.

An outline Health Programme is given in Appendix 6.

5. REFERENCES

1) Health Aspects of Environmental Assessment Environmental Assessment Sourcebook, Number 18, Update, July 1997, World Bank, Environment Department

2) Strategic Health Management: Principles and Guidelines for the Oil and Gas Industry (Report No. 6.88/307, June 2000), International Association of Oil and Gas Producers

3) Key Questions in Managing Social issues in Oil and Gas projects (Report 332, October 2002) International Association of Oil and Gas Producers with IPIECA

4) Managing Health for Field Operations in Oil and Gas Activities (Report No. 343, May 2003) International Association of Oil and Gas Producers

5) Occupational Health and Safety Management Systems (AS/NZS 4801: 2001) Standards Australia

6) Guidelines for Preparation of a Draft Environmental Impact Statement for the Proposed Blacktip Gas Project, Part A & Part B, March 2004, Northern Territory Government.

7) Environment Protection and Biodiversity Conservation Act, 1989,

8) Petroleum (Submerged Lands) Act, 1967, Commonwealth Government.

9) Environmental Assessment Act, 1982, Northern Territory

10) Building Healthier Communities, A Framework for Health and Community Services 2004-2009, Northern Territory Government Department of Health and Community Services.

11) Blacktip Project Description (Drims # 277733, Ver 2) 2003, WEL

12) Blacktip Development Phase 2B- HSE Goals and Objectives (Drims # 402124, Ver 0) 2003, WEL

13) Blacktip Phase 2 & 3 Health, Safety and Environment Management Plan (Drims #381389, Ver 0) 2003, WEL

14) Blacktip Unmanned WHP Safety Philosophy (Drims # 251619, Rev 0) 2003, WEL

15) Blacktip Development Phase 2B – Onshore Gas Plant Safety Philosophy (Drims # 254669, Rev 0) 2003, WEL

16) BOD Data Sheet – Offshore Safety Requirements (Drims # 466709, Ver A) 2004, WEL

17) BOD Data Sheet – Onshore Safety Requirements (Drims # 466850, Ver A) 2004, WEL

18) BOD Data Sheet – HSE Management (Drims # 472620, Ver A) 2004, WEL

19) Blacktip Development Phase 3 Basis of Design Data Sheet Health and Ergonomics (Drims # 476360, Ver A) 2004, WEL

CONT

20) Blacktip Development Phase 3 Basis of Design Data Sheet Non-Flammable Hazard Requirements (Drims # 477556, Ver A) 2004, WEL

Appendix 1. – Design Office Health Risks

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Office Location													
Geographical Location													
Heat / Cold	*						*	Utilities Maintenance Program in Office	Typically low risk environment.	Low			
Humidity	*						*	Utilities Maintenance Program in Office	Typically low risk environment.	Low			
Daylight	*						*	Office blinds on windows / Lighting	Typically low risk environment.	Low			
Transport / Communications / Infrastructure	*						*	Town Supply	Perth facilities	Low			
Location of Health Facilities	*						*	Town Supply	Perth facilities	Low			
Standard of Facilities & staff Competency	*						*	Town Supply	Perth facilities	Low			
Security	*					*	*	Public do not normally have access to Project office locations, unless escorted	Typically low risk environment	Low			
Natural disasters	*						*	Perth is low risk location	Typically low risk environment. Public do not normally have access to office locations, unless escorted	Low			
Physical													
Noise	*						*	Typically low risk environment		Low			
Vibration	*							Not relevant		Low			
Pressure	*							Not relevant		Low			
Ionising Radiation	*							Not relevant		Low			
Non Ionising Radiations	*						*	Typically low risk environment	Recreational issue (out of working hours)	Low			
Thermal Work Environment	*						*	Air Conditioning / Heating		Low			
Ergonomic/manual Handling	*						*	Office Design & Furniture. Little Manual Handling. Lifting aids.		Low			
Machinery	*						*	Typically low risk environment		Low			
Sharp objects	*						*	Typically low risk environment		Low			
Display Screen equipment	*						*	Ergonomic assessment and information		Low			
Transport during work	*						*	Couriers used, Public Transport available.		Low			
Chemical													
Toxic Chemicals	*						*	Generally restricted to contract cleaners chemicals	Subcontracted specialist cleaners. Locked store. Periodic Audits	Low			
Dusts, mists & fumes	*						*	Hazardous materials, smoking etc,banned from workplace. Air Con/photocopier maintenance. Periodic HSE audits		Low			
Sensitisers	*						*	Not relevant		Low			
Carcinogens								Not revlevant	Smoking Banned within offices	Low			
Biological													
Wildlife (animals/reptiles/insects/plants)	*						*	Office Cleaning; periodic HES audits		Low			
Sexually Transmitted disease	*					*	*	Town available Medical Facilities	Pre Employment Medicals	Low			
Endemic/epidemic disease	*					*	*	Town available Medical Facilities	Pre Employment Medicals	Low			
Occupational Illness	*						*	Workplace ergonomic design/training	Pre Employment Medicals.	Low			
Food & Drink	*						*	Town Supply		Low			
Hygiene (catering/accommodation/toilet facilities/waste disposal)	*						*	Town Supply / Building Codes		Low			
Psyco-Social													
Isolation (access to social support)	*						*	Typically low risk environment.	Pre Employment Medicals	Low			
Communication problems (business & family)	*						*	Typically low risk environment.		Low			
Culture, local law, religion & language	*						*	Typically low risk environment.		Low			
Job design	*						*	Typically low risk environment. Office Ergonomics	Pre Employment Medicals	Low			
Job organisation	*						*	Design house management practice.		Low			
Leisure and recreational facilities	*						*	Typical Town Supply.	8 hour day (26 hr R&R)	Low			
Prostitution	*						*	Typical Town Supply		Low			
Stress factors	*						*	Typically a low risk environment	Pre Employment Medicals	Low			
Substance abuse	*						*	Drug & Alcohol Policy	Pre Employment Medicals	Low			
Smoking	*						*	Drug & Alcohol Policy	Pre Employment Medicals	Low			

Appendix 2. – Offshore Platform Health Risks

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Field Work: Offshore													
On Unmanned Facility: Platform													
Geographical Location													
Heat / Cold		*	*	*	*		*	Tropical environmental concerns, typical of work in the area. Work planning & rotas.	Personal Protective equipment (boilersuits etc). Adequate supply of potable water. Local shade where practical & safe.	Low	See Health Aspects of Work in Extreme Climates within the E&P Industry: The Heat. E&P Forum Report No 6.70/279 1998	Awareness training	
Humidity		*	*	*	*		*	Work planning and rotas. Refuge with Air Conditioning (HVAC) to be evaluated in design	Acclimatisation and awareness training.	Low		Awareness training	
Daylight		*	*	*	*		*	normally unmanned. Shift routines, Platform lights		Low			
Transport / Communications / Infrastructure		*	*	*	*		*	Platform will have communications & transport Helicopter/vessel) when required. Shore based infrastructure & office support.	Vessel will be nearby when platform is manned	Low			
Location of Health Facilities		*	*	*	*		*	Emergency Response Procedures for onshore support. First aider on board.	(Medivac)	Medium	Local (onshore) medical facilities adequacy to be reviewed.		WEL Medical adsviser
(Limited Medical Facilities in field)							*	Standby Vessel Facilities	First Aid/Ships facilities	Low			
			*				*	Accommodation Barge Facilities	Medical Suite & Medic	Low			
						*	*	Helicopter on location. Visitors accompanied	Unlikely visitors will travel by boat	Low			
Standard of Facilities & staff Competency		*	*	*	*		*	Designed to Australian / International Standards. Staff competencies part of HR hire and contracting procedures and staff training. O'night refuge & toilet arrangements, to be considered in design.		Low	Bod		Engineering and HR support
Security		*	*	*	*		*	Unmanned facilities far offshore. Fishing/Pirates/Boatpeople risk: Radar, CCTVand 'difficult' access arrangements to be considered in design.		Medium	Security v Access to be studied in Design		Security study
Natural disasters		*	*	*	*		*	Installations designed to appropriate earthquake, cyclone, etc standards. Personnel should not be onboard if there is a risk.		Low	Shutdown / Cyclone and evacualtion philosophy to be defined.	Evacuation Procedures	Operations input to Design.
Physical													
Noise		*	*	*	*		*	Limited by design (predictions & modelling), Insulation, Hearing Protection.		Low	Commissioning validation survey for noise predictions.	BoD Data Sheet Health & Ergonomics Drims # 476360	
Vibration		*	*	*	*		*	Limited by design. Task design (eg paint chipping using vibrating tool or nail gun)		Low			
Pressure		*	*	*	*		*	Contained. Vents / Flare in safe location	Pressure Tests (controlled condtions)	Low			
Ionising Radiation		*	*	*	*		*	Closed source design if required and operating procedures ; only open source may be NORM, for which procedural controls exist.		Medium	Assessment of formation water chemistry/potential for NORM formation	BoD Data Sheet Health & Ergonomics Drims # 476360	Scale formation potential study
Non Ionising Radiations		*	*	*	*		*	Design, operating & maintainance procedures addresses safe distances and barriers for non ionising radiations (eg electromagnetic, microwave, radio wave). UV (sunlight) sunscreen provided to workforce.		Low	Commissioning validation survey for stray radiation.	BoD Data Sheet Health & Ergonomics Drims # 476360	
Thermal Work Environment		*	*	*	*		*	Geographical location dominant: hot-cold plant insulated / shielded. Vessel entry procedures & forced air if required.		Low		BoD Data Sheet Health & Ergonomics Drims # 476360	
Ergonomic/manual Handling		*	*	*	*		*	Ergonomics considered during design. Provision of cranes and lifting devices.		Low			
Machinery		*	*	*	*		*	Rotating machinery is guarded, noise insulated & accessible for maintenance.		Low			
Sharp objects		*	*	*	*		*	Sharp objects eliminated in design. Little / no requirement for eg glass or syringes etc.		Low			
Display Screen equipment		*	*	*	*		*	Considered as part of ergonomic design		Low			
Transport during work		*	*	*	*		*	Flying (noise/vibration) or sea transport, normal part of oilfield work: typical safety systems in place	Marine approach to Platform- Basket transfers would require special consideration, including personnel fitness.	Medium	Platform access-security arrangement study in Design		Security Study
Chemical													
Toxic Chemicals		*	*	*	*		*	Highest risk during construction: use experienced contractors and appropriate procedures, including chemical selection. MSDS must be available at location of use. Potential exposures to Commissioning fluids should be minimised by job design. Other Hazardous materials (eg mineral fibres) to be identified. Operational chemical use to be considered in design to minimise handling and exposures	Australian Institute of Petroleum (AIP) Health Watch program. Produced fluid compositional analysis underway: for eg polonium, radium and mercury. Preliminary data shows H2S 10ppmv, mercaptans not detected and an estimated BTEX of 20,20,10,10 ppmv respectivly, Ref Drims # 277733	Medium	Specific listing of chemicals and hazardous materials to be developed and assessed. Antidote to be available if any poisons are required. Future eg workover hazards are not assesed: but may be 'typical' and should be assessed when proposed. Health Risk Assessments.		Engineering and drilling to detail chemicals & hazardous materials
Dusts, mists & fumes		*	*	*	*		*	Highest risk during construction: use experienced contractors eg coded welders, procedures (habitat & extraction/forced air ventilation). Ensure maintanence addresses leaks (& eg oil mists)		Low	Health Risk Assessments.		
Sensitisers		*	*	*	*		*	Highest risk during construction & operations: procedures to address, if health risk assessment indicates potential.		Low			
Carcinogens		*	*	*	*		*	Generally not permitted as 'chemicals': product not expected to contain aromatics, BTEX, etc; health risk assessment, use of PPE		Medium	Confirmation that no carcinogens are present required.		
Biological													
Wildlife (animals/reptiles/insects/plants)		*	*	*	*		*	Vessels & Platform subject to Quarantine inspection on arrival in Australian waters. Personnel hygiene. Marine species generally do not present significant risk and marine staff are generally aware of the dangers of stinging jellyfish, sharks and sea snakes.		Low		Awareness Training	
Sexually Transmitted disease		*	*	*	*		*	Pre employment medicals. Onshore and Offshore medical facilities		Low		Awareness Training	
Endemic/epidemic disease		*	*	*	*		*	Pre employment medicals. Onshore and Offshore medical facilities		Low		Awareness Training	

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Occupational Illness		*	*	*	*		*	Sprains & strains, potential chemical exposures; pre employment medicals, platform design, ergonomic guidance & procedures mitigate		Medium	Ongoing Safety awareness campaigns to minimise 'slips, trips and falls'.	Awareness Training	
Food & Drink		*	*	*	*		*	BYO Food & Water. Eski-Fridge facilities required for operational visits. Adequate water to be taken to platform on each visit.		Low			
Hygiene (catering/accommodation/toilet facilities/waste disposal)		*	*	*	*		*	Accommodation Barge- attendant vessel Facilities during periods of high manning. Platform fixed or temporary arrangement definition required. Use of professional catering company.	Galley, Water makers, ablutions	Low	Audit programme		
		*	*	*	*		*	Planned (Day) Work Program.	Accommodation Barge / Rig Facilities if onsite (24 hour work).	Low			
		*	*	*	*		*	Temporary Sanitary and waste arrangements (eg Chemical Toilets and all wastes removed each visit) to be defined (& approved). WEL Blacktip Project Waste Management Plan	On Platform / by helicopter (for eg day trippers). Correct Waste disposal (identification, labelling, manifesting etc) is important to minimising risks to onshore personnel.Use of IMDG trained logistics personnel mitigates risks.	Low - Medium		Waste Management Plan to address issues.	Engineering input and catering company input.
Psyco-Social													
Isolation (access to social support)		*	*	*	*		*	Available Communications. Normal offshore work practices & entertainments as available. Pre employment interview / medicals.		Low			
Communication problems (business & family)		*	*	*	*		*	Available Communications. Normal offshore management issues. Compassionate leave arrangements.		Low			
Culture, local law, religion & language		*	*	*	*	*	*	Normal offshore management issues. Pre employment interview. Catering facilities may need to consider dietary requirements		Low			
Job design		*	*	*	*		*	Planned Work Program. Ergonomics in Design. Lifting Aids	Pre Employment Medicals	Low			
Job organisation		*	*	*	*	*	*	Offshore job planning and experienced supervision / management.		Low			
Leisure and recreational facilities		*	*	*	*		*	Vessel and Rig facilities evaluated pre hire. Unmanned platform limited to comms & 'emergency' overnight accomodation.		Low	Pre Hire audit		
Prostitution								Not relevant offshore		Low			
Stress factors		*	*	*	*		*	Onshore Communications. Recreational Facilities. Emergency Response training	Pre Employment Medicals	Low			
Substance abuse		*	*	*	*	*	*	Pre employment medicals. Oilfield facilities are alcohol free. Heliport inspections and /or controls.	WEL Drug & Alcohol Policy	Low			
Smoking		*	*	*	*	*	*	Controlled (restricted) on offshore instalations and vessels for safety reasons	WEL Drug & Alcohol Policy	Low			

Appendix 3. – Marine Vessels and Drilling Rig Health Risks

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Field work on Subcontracted Vessels													
Pipelay Barge, Standby & Supply vessels, drilling rig													
Geographical Location													
Heat / Cold		*			*		*	Tropical environmental concerns, typical of work in the area. Work planning & rotas.	Personal Protective equipment (boilersuits etc). Adequate supply of potable water. Local shade where practical & safe.	Low		Awareness Training	
Humidity		*			*		*	Work planning and rotas. Accomodation with Air Conditioning (HVAC)	Acclimatisation	Low		Awareness Training	
Daylight		*			*		*	Standard (24 hour operation)rig shift & vessel watch routines, Onboard lighting		Low			
Transport / Communications / Infrastructure		*			*		*	Rig & Vessels have communications (& transport Helicopter/vessel) when required. Shore based infrastructure & office support.		Low			
Location of Health Facilities		*			*		*	Medic & First aider(s) on board. Emergency Response Procedures for onshore support.	(Medivac)	Medium	Local (onshore) medical facilities adequacy to be reviewed.		WEL Medical Adviser review
(Limited Medical Facilities in field)		*			*	*	*	First Aid, Rig and Ships facilities	Helicopter on location for rig visits. Visitors accompanied	Low			
Standard of Facilities & staff Competency		*			*		*	Designed to maritime etc Standards. Staff competencies part of HR hire and contracting procedures and appropriate (eg IADC/Maritime) training.		Low			
Security		*			*		*	24 hour operation and watch system, radar		Low			
Natural disasters		*			*		*	Seagoing design of vessels, mariner competency, meterological information, risk assesment (included in Safety Case) and emergency response procedures (including eg rig manning philosophy in Cyclones)		Low			
Physical													
Noise		*			*		*	Design, maintanance and insulation. Hearing protection . Flights at night to be avoided where practical; helicopter flight paths to avoid areas of habitation where practical.		Low			
Vibration		*			*		*	Limited by design. Task design (eg paint chipping using vibrating tool or nail gun)		Low			
Pressure		*			*		*	Contained: see Rig Safety Case which includes hazard assessments. Diving spread (if used) to have decompression facilities etc. Emergeny arrangements to be addressed in ERP / bridging documentation.		Low	Diving Emergency arrangements to be addressed in ERP / bridging documentation.		
Ionising Radiation		*			*		*	Closed source design, compliance with regulations and operating procedures. Pip tags and Well logging procedural controls exist. Prejob JHA to ensure awareness		Low		JHA procedure	
Non Ionising Radiations		*			*		*	Design, operating & maintainance procedures addresses safe distances and barriers for non ionising radiations (eg electromagnetic, microwave, radio wave). UV (sunlight) sunscreen provided to workforce.		Low			
Thermal Work Environment		*			*		*	Geographical location dominant: hot-cold plant insulated / shielded. Entry procedures & forced air if required.		Low			
Ergonomic/manual Handling		*			*		*	Ergonomics considered during design. Provision of cranes and lifting devices.		Low			
Machinery		*			*		*	Rotating machinery is guarded, noise insulated & accessible for maintenance.		Low			
Sharp objects		*			*		*	Sharp objects eliminated in design. Little / no requirement for eg glass or syringes etc.		Low			
Display Screen equipment		*			*		*	Considered as part of ergonomic design		Low			
Transport during work		*			*		*	Flying (noise/vibration) or sea transport, normal part of oilfield work: typical safety systems in place	Basket transfers require special consideration	Low	Crew change location and procedure to be defined.		Logistics support
Chemical													
Toxic Chemicals		*			*		*	Toxics avoided where possible. Any Poisons onboard registered and antidote locally available. Procedures devised for use. MSDS available (including emergency contact number). Secure storage of chemicals employed. Awareness presentation may be utilised where appropriate. Health Risk Assessment carried out and available to potential users.	Specialists (eg Mud and Cement Co) generally 'up to speed' on MSDS and Health Risks. Generic Health Risk assessments may be available from contractors.	Medium	Specific listing of chemicals and hazardous materials to be developed and assessed. Antidote to be available if any poisons are required.		Engineering and Drilling to detail chemicals & hazardous materials
Dusts, mists & fumes		*			*		*	Welding, soldering, mud, and cement handling carried out to procedure in controlled areas with forced air ventilation / extraction & shrouds/containment for dusts. Machinery oil mists minimised by good maintainance. Suitable PPE available as last resort.	Rig Health Risk Assessments for their operation may be available: issues to be addressed in the Rig Safety Case.	Medium	Specific listing of chemicals and hazardous materials to be developed and assessed, including mud formulation, cement and addatives, etc. Antidote to be available if any poisons are required.		Drilling and Engineering to detail chemicals and hazardous substances
Sensitisers		*			*		*	Sensitisers avoided where possible. Work practices designed to minimise exposures, barrier cream, PPE (respiratory and gloves) available. Awareness presentation may be utilised where appropriate. Health Risk Assessment carried out and available to potential users.	Medical surveliance: sensitised persons allocated alternative work where practical.	Low	May be dependant on mud type selected / drilling personnels previous sensitisation.		Drilling Contractor review
Carcinogens		*			*		*	Carcinogen use avoided where practical; procedural controls and PPE where use is unavoidable. Awareness presentation may be utilised where appropriate. Health Risk Assessment carried out and available to potential users.		Medium	Confirmation that no carcinogens are present required.		Engineering to detail chemicals & hazardous materials
Biological													
Wildlife (animals/reptiles/insects/plants)		*	*		*		*	Vessels Rig subject to Quarantine inspection on arrival in Australian waters. Personnel hygiene. Marine species generally do not present significant risk and marine staff are generally aware of the dangers of stinging jellyfish, sharks and sea snakes.		Medium - Low	Ensure dangers from Marine species to be addressed in awareness information and health related response actions detailed in emergency response procedures	Awareness training. Emergency Response training.	Contract HSE requirements
Sexually Transmitted disease		*			*		*	Pre employment medicals. Onshore and Offshore medical facilities		Low			
Endemic/epidemic disease		*			*		*	Pre employment medicals. Onshore and Offshore medical facilities		Low			
Occupational Illness		*			*		*	Sprains & strains, potential chemical exposures; pre employment medicals, rig / vessel design & procedures mitigate		Low			
Food & Drink		*			*		*	Vessel and Rig Watermakers approved. Routine water testing. Water may be bunkered from onshore.	Rig and vessel food supplies arrangements (eg ex Darwin) and transport/storage in refrigerated containers, to be assessed by Rig/Catering company.	Low			

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Hygiene (catering/accommodation/toilet facilities/waste disposal)		*			*		*	Use of professional catering company on Rig, normal ships cook/compliment.		Low	Pre Hire Audits		
		*			*		*	Vessels and Rig MARPOL certification. Garbage Management Plans and WEL Blacktip Project Waste Management Plan	Correct Waste disposal (identification, labelling, manifesting etc) is important to minimising risks to (onshore) personnel. Use of IMDG trained logistics personnel on Rig mitigates risks.	Low	Pre Hire Audits	Waste Management Plan to address issues.	
Psyco-Social													
Isolation (access to social support)		*			*		*	Available Communications. Normal offshore/marine work practices & entertainments as available. Pre employment interview / medicals.		Low			
Communication problems (business & family)		*			*		*	Available Communications. Normal offshore/marine management issues. Compassionate leave arrangements.		Low			
Culture, local law, religion & language		*			*		*	Normal offshore/marine management issues. Pre employment interview. Catering facilities may need to consider requirements		Low			
Job design		*			*		*	Planned Work Program. Ergonomics in Design. Lifting Aids. Vessel and Rig facilities evaluated pre hire.	Pre Employment Medicals	Low			
Job organisation		*			*		*	Offshore job planning and experienced supervision / management.		Low			
Leisure and recreational facilities		*			*		*	Onshore Communications. Rig & vessel Recreational Facilities.	Pre Employment Medicals	Low			
Prostitution		*			*		*	Not relevant offshore		Low			
Stress factors		*			*		*	Onshore Communications. Counselling, Recreational Facilities. Emergency Response	Pre Employment Medicals	Low			
Substance abuse		*			*		*	Pre employment medicals. Oilfield facilities are alcohol free. Heliport inspections and /or controls.	WEL Drug & Alcohol Policy	Low			
Smoking		*			*		*	Controlled (restricted) on offshore instalations and vessels for safety reasons	WEL Drug & Alcohol Policy	Low			

Appendix 4. – Onshore Gas Processing Plant Health Risks

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Field Work Onshore													
On Site: Gas Processing Plant													
Geographical Location													
Heat / Cold		*	*	*	*		*	Tropical environmental concerns, typical of work in the area. Work planning & rotas.	Geographical Location issues are not expected to impact the local (resident) population, except where indicated. Workers will have Personal Protective equipment (boilersuits etc). Adequate supply of potable water. Local shade where practical & safe.	Low	See Health Aspects of Work in Extreme Climates within the E&P Industry: The Heat. E&P Forum Report No 6.70/279 1998	Blacktip Remote Area Access Guidelines Drims# 144703	
Humidity		*	*	*	*		*	Work planning and rotas. Maintainance and Accomodation with Air Conditioning (HVAC)	Acclimatisation and awareness training.	Low		Awareness Training	
Daylight		*	*	*	*	*	*	Normally daywork for operations. Shift routines & nightwork would utilise lights	Overnight work illumination during construction may be disruptive to nearby residents. Operational lighting to be designed for site safety and security, with minimum stray light.	Low			
Transport / Communications / Infrastructure		*	*	*	*	*	*	Site will have communications & transport. Increased road and air traffic , phone /internet line use, may impact local services availability. Dust suppression may be required during dry season and care during wet season		Medium	Transportation and telecoms studies to evaluate need for local upgrade. Information may be available from the Social Impact Assessment.		Engineering and Logistics support to address
Location of Health Facilities		*	*	*	*	*	*	Emergency Response Procedures to be developed for Medical Emergency and home office support. Emergency Response Procedures will address transportation logistics (and eg aircraft availability), major and multiple injury arrangements (via eg Medivac) Local facilities will be utilised as facilities allow. First aid equipment on site.	'Local' Medical Support eg Aerial Medical Support (Royal Flying Doctor), Darwin, Katherine and Alice Springs Hospitals and Dental Services.	Medium	Medical Support requirements to be reviewed for construction and operational phases; evaluate the need for an onsite contract medic and of proximity and type of available medical resources. Information may be available from the Social Impact Assessment.		WEL Doctor/ Medical Adviser to evaluate requirements and available facilities and make recommendations on any further support / upgrade required.
Standard of Facilities & staff Competency		*	*	*	*		*	Designed to Australian / International Standards. Staff competencies part of HR hire and contracting procedures and staff training.	BOD	Low			
Security		*	*	*	*	*	*	Security of Construction and operational site to be addressed in Construction and Operational Planning. Potential risk to intruders and plant. CCTV, lighting and fencing arrangements to be considered in design to ensure operational security. Visitors to site will be accompanied.	Risk to curious public may be highest during construction: security patrols and temporary barriers warning of risk may be required.	Medium	Security study recommended. Information may be available from the Social Impact Assessment.		Site specific Security study
Natural disasters		*	*	*	*	*	*	Installations designed to appropriate earthquake, cyclone, etc standards. With shutdown option evaluated. Non Operational / non emergency response personnel should be kept clear if there is an incident. Security and local services may be utilised to assist.	BOD	Low	Shutdown / cyclone operating philosophy to be defined.		Operations input to design
Physical													
Noise		*	*	*	*	*	*	Operational noise limited by design (predictions & modelling), Insulation, Hearing Protection. Emergency Blowdown to be evaluated. Commissioning /operational noise survey to confirm compliance.	Overnight work noise during construction may be disruptive to nearby residents. Operational noise to be designed for worker health and is not expected to be a public issue.	Low	Commissioning noise survey to confirm predictions; Operational changes to be evaluated	BoD Data Sheet Health & Ergonomics Drims # 476360	
Vibration		*	*	*	*		*	Limited by design. Task design (eg paint chipping using vibrating tool or nail gun)		Low	Commissioning vibration survey to confirm predictions; Operational changes to be evaluated		
Pressure		*	*	*	*		*	Contained. Vents / Flare in safe location	Controlled Pressure Testing	Low			
Ionising Radiation		*	*	*	*	*	*	Construction and maintenance NDT testing procedural controls (including competency, distance, shielding and storage), Operational Closed source design and operating procedures ; only open source may be NORM, for which procedural controls exist.	Potential risk to public during transportation of sources: which is a controlled operation. Transportation and emergency procedures to address	Low	Register of Sources to be initiated should Inising radiation sources be required.	BoD Data Sheet Health & Ergonomics Drims # 476360	
Non Ionising Radiations		*	*	*	*		*	Design, operating & maintainance procedures addresses safe distances and barriers for non ionising radiations (eg electromagnetic, microwave, radio wave). UV (sunlight) sunscreen provided to workforce.		Low	Commissioning non ionising radiation survey to confirm predictions; Operational changes to be evaluated	BoD Data Sheet Health & Ergonomics Drims # 476360	
Thermal Work Environment		*	*	*	*		*	Geographical location dominant: hot-cold plant insulated / shielded. Vessel entry procedures & forced air if required.		Low		BoD Data Sheet Health & Ergonomics Drims # 476360	
Ergonomic/manual Handling		*	*	*	*		*	Ergonomics considered during design. Provision of cranes and lifting devices. Normal construction and operational issues.		Low		BoD Data Sheet Health & Ergonomics Drims # 476360	
Machinery		*	*	*	*	*	*	Rotating machinery is guarded, noise controlled & accessible for maintenance. Machinery to be located in secure compound. Potential risk to public during construction to be minimised by use of barriers and security patrols.		Low			Security Study
Sharp objects		*	*	*	*		*	Sharp objects eliminated in design. Little / no requirement for eg glass or syringes etc.		Low			
Display Screen equipment		*	*	*	*		*	Considered as part of ergonomic design		Low		BoD Data Sheet Health	
Transport during work		*	*	*	*	*	*	Road vehicle movements normal part of construction / oilfield work: typical safety systems in place. Construction traffic and large machinery may impact on local road system, dusts may require suppression.	Suitability of airstrip and roads for construction operational and maintenance to be studied for adequacy. Any additional requirements to be addressed via normal planning approvals process.	Medium - Low	Information may be available from the Social Impact Assessment.		Engineering and Logistics support to address.
Chemical													
Toxic Chemicals		*	*	*	*	*	*	Toxics avoided where possible. Any Poisons onboard registered and antidote locally available. Procedures devised for use. MSDS available (including emergency contact number)Highest risk during construction: use experienced contractors and appropriate procedures, including chemical selection. Secure chemical storage to be implemented. Potential exposures to Commissioning fluids should be minimised by job design. MSDS to be available at location of use. Pigging wastes to be evaluated once operational.	Australian Institute of Petroleum (AIP) Health Watch program. Awareness presentation may be utilised where appropriate. Health Risk Assessment carried out and available to potential users. Operational chemical use to be considered in design to minimise handling and exposures	Medium - Low	Produced fluid compositional analysis underway: for eg polonium, radium and mercury. Preliminary data shows H2S 10ppmv, mercaptans not detected and an estimated BTEX of 20,20,10,10 ppmv respectivly, Ref Drims # 277733	BoD Data Sheet Health & Ergonomics Drims # 476360	Engineering to detail chemicals & hazardous materials, and their storage
Dusts, mists & fumes		*	*	*	*	*	*	Construction dusts minimised by damping down if required. Operational exhausts, cold vent, blowdown and flare typical and not expected to impact local communities: survey to confirm once operational. Operational maintainance to minimise mists and maintain exhaust efficiency (plant and vehicles)	Dusts generated should be suppressed: chemical composition of dusts should be determined.	Medium - Low	Construction planning to address dusts and fumes.		Engineering and planning to address.
Sensitisers		*	*	*	*		*	Highest risk during construction & operations: procedures to address, if health risk assessment indicates potential.		Low			
Carcinogens		*	*	*	*		*	Generally not permitted as 'chemicals': product not expected to contain aromatics, etc; health risk assessment, use of PPE		Low	Confirmation that there are no carcinogens present required.		
Biological													
Wildlife (animals/reptiles/insects/plants)		*	*	*	*		*	Plant, Equipment and vehicles etc subject to Quarantine inspection on arrival in NT. Potential hazard to construction and operational workers to be addressed via awareness information and programme. Personnel hygiene. Local facilities to treat insect/snake bites, etc. Presence of stinging trees, Crocodiles, snakes, bighting insects, etc to be assessed prior to construction, and on a daily basis during construction and operations.		Medium	Ensure dangers from Marine species are addressed in awareness information and health related response actions detailed in emergency response procedures	BoD Data Sheet Health & Ergonomics Drims # 476360	
Sexually Transmitted disease		*	*	*	*	*	*	Potential hazard to construction and operational workers to be addressed via awareness information and programme.		Low		Awareness Training	

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Endemic/epidemic disease		*	*	*	*	*	*	Pre employment medicals. Onshore medical facilities		Medium - Low	WEL Medical adviser to review endemic diseases and advise any vaccination program for work in the area. Updates regarding further preventative measures to be provided with respect to epidemics. (see eg Centre for Disease Control) Information may be available from the Social Impact Assessment.		WEL Medical adviser review
Occupational Illness		*	*	*	*		*	Sprains & strains, potential chemical exposures; pre employment medicals, plant design & procedures mitigate		Medium	Ongoing Safety awareness campaigns to minimise 'slips, trips and falls'.	Awareness Training	
Food & Drink		*	*	*	*		*	Local Food & Water. Fridge-Eski facilities required for operational visits. Bottled water may be taken to site on each visit. Project produced potable water to appropriate standard. Refrigerated containers required for transport and storage of food: logistics to address accessibility and manning through periods of high activity (eg construction and maintenance).		Medium - Low	Catering facilities and arrangements to be resolved. Logistics and contingency planning to address potential issues.		Logistics and Catering Contractor input
Hygiene (catering/accommodation/toilet facilities/waste disposal)		*	*	*	*		*	Construction and Plant fixed or temporary arrangement definition (eg local hotels, construction camp, use of professional catering contractor, Chemical Toilets, etc) required for periods of high manning. Construction waste disposal requirements to be identified. Waste disposal arrangements (with wastes removed on each operational visit) to be defined (& approved).	Site drainage to consider potential of waste water impacting local water supply / freshwater sources.	Medium - Low	Audit programme. Engineering to address drainage.	WEL Blacktip Project Waste Management Plan to be developed.	Catering Contractor input. Engineering to address drainage. Waste Disposal Contractor input
Psyco-Social													
Isolation (access to social support)		*	*	*	*		*	Available Communications. Normal remote site work practices & entertainments in planning and design. Pre employment interview / medicals. Local entertainments. The wet may impose additional difficulties and stress.		Low			
Communication problems (business & family)		*	*	*	*	*	*	Available Communications. Normal site management issues. Compassionate leave arrangements.		Low			
Culture, local law, religion & language		*	*	*	*	*	*	Normal remote site management issues. Pre employment interview. Catering facilities may need to consider dietary requirements	Local issues to be identified and addressed via social impact study and consultation. Heritage and aboriginal affairs issues to be identified via EIS and Social Impact studies.	Medium	Community Liaison support requirements to de assessed and expected to include identification of responsible person on-site, availability of local interpreter and cultural and heritage adviser. Information may be available from the Social Impact Assessment.		Land and Community Adviser review
Job design		*	*	*	*	*	*	Planned Work Program. Ergonomics in Design. Lifting Aids. Commissioning procedures	Pre Employment Medicals	Low	Commissioning Procedures		
Job organisation		*	*	*	*	*	*	Construction and operational job planning and experienced supervision / management.	Existing NT Planning Controls and consultation process.	Low			
Leisure and recreational facilities		*	*	*	*	*	*	Construction Camp facilities/ local (Wadeye) facilities		Medium	Construction camp entertainment facilities to be provided and designed to minimise risks of adverse interaction with local communities. Information may be available from the Social Impact Assessment.		Land and Community Adviser review
Prostitution		*	*	*	*	*	*	Potential hazard to construction and operational workers to be addressed via awareness information.		Low	Information may be available from the Social Impact Assessment.	Awareness Training	
Stress factors		*	*	*	*	*	*	Onshore Communications. Recreational Facilities. Emergency Response training	Pre Employment Medicals	Low		Awareness Training	
Substance abuse		*	*	*	*	*	*	Pre employment medicals. Construction Camp management. Awareness information onsite.		Low	Information may be available from the Social Impact Assessment.	Awareness Training	
Smoking		*	*	*	*	*	*	Controlled (restricted) on onshore plant and instalations for safety reasons. Awareness information onsite		Low	Information may be available from the Social Impact Assessment.	Awareness Training	

Appendix 5. – Pipeline from Platform to Plant Health Risks

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Field Work Offshore and Onshore													
Pipeline to Plant (~<10 km) and to Offshore Produced Water discharge & Condensate Offload points.													
Geographical Location													
Heat / Cold		*	*	*	*		*	Tropical environmental concerns, typical of work in the area. For offshore work (eg Pipelay barge and attendant vessels) see Vessels & Rig matrix. Work planning & rotas.	Geographical Location issues are not expected to impact the local (resident) population, except where indicated. Workers will have Personal Protective equipment (boilersuits etc). Adequate supply of potable water. Local shade where practical & safe.	Low		Drims# 144730 Blacktip Remote Access Guidelines	
Humidity		*	*	*	*		*	Work planning and rotas. Refuge, with Air Conditioning (HVAC), to be evaluated in design	Acclimatisation and awareness training.	Low	Acclimatisation and awareness training.		
Daylight		*	*			*	*	Normally daywork for operations inspections. Shift routines & nightwork during construction / installation would utilise lights	Overnight work illumination during construction may be disruptive to nearby residents.	Low			
Transport / Communications / Infrastructure		*	*	*	*		*	Site will have temporary communications & transport. Increased road and vessel traffic during construction / installation. Dust suppression may be required during dry season and care during wet season		Medium	Transportation and telecoms studies to evaluate need for local upgrade. Information may be available from the Social Impact Assessment.	Drims# 144730 Blacktip Remote Access Guidelines	Engineering and Logistics support
Location of Health Facilities		*	*	*	*	*	*	Local support will be utilised as facilities allow. First aid equipment on site during construction / installation	'Local' Medical Support eg Aerial Medical Support (Royal Flying Doctor), Darwin, Katherine and Alice Springs Hospitals and Dental Services.	Medium	Medical Support requirements to be reviewed for construction and operational phases; evaluate the need for an onsite contract medic and of proximity and type of available medical resources. Information may be available from the Social Impact Assessment.	Drims# 144730 Blacktip Remote Access Guidelines	WEL Doctor/ Medical Adviser to evaluate requirements and available facilities and make recommendations on any further support / upgrade required. Information may be available from the Social Impact Assessment.
Standard of Facilities & staff Competency		*	*	*	*		*	Designed to Australian / International Standards. Staff competencies part of HR hire and contracting procedures and staff training.		Low			
Security		*	*	*	*	*	*	Security of construction and operational pipeline route to be addressed in Construction and Operational design and Planning: to ensure operational security. Visitors to site will be accompanied.	Risk to curious public may be highest during construction: security patrols and temporary barriers warning of risk may be required.	Medium	Security study recommended. Information may be available from the Social Impact Assessment.	Drims# 144730 Blacktip Remote Access Guidelines	Security adviser input
Natural disasters		*		*			*	Pipeline designed to appropriate earthquake, cyclone, etc standards. Emergency procedures to address any operational issues.		Low			
Physical													
Noise		*	*			*	*	Operational noise limited by design. Transient Construction noise eg Overnight work noise during construction may be disruptive to nearby residents. Local authorities should be notified of any planned noisy event (eg hydrotest/blowdown)	Overnight work noise during construction may be disruptive to nearby residents.Workplanning to minimise potential disruption	Low			
Vibration		*					*	Limited by design.		Low			
Pressure		*		*			*	Contained; any accessible pipeline valves secured.		Low			
Ionising Radiation		*			*		*	Construction and maintenance NDT testing procedural controls (including competency, distance, shielding and storage).		Low			
Non Ionising Radiations		*	*				*	UV (sunlight) sunscreen provided to workforce.		Low		Drims# 144730 Blacktip Remote Access Guidelines	
Thermal Work Environment		*					*	Geographical location dominant: hot cold pipe insulated / shielded.		Low			
Ergonomic/manual Handling		*	*				*	Ergonomics considered during design. Provision of cranes and lifting devices. Normal construction and operational issues.		Low			
Machinery		*	*			*	*	Potential risk to public during pipeline construction and installation to be minimised by use of barriers and security patrols.		Medium	Security study recommended. Information may be available from the Social Impact Assessment.		Security adviser input
Sharp objects		*					*	Sharp objects minimised in design.		Low			
Display Screen equipment							*	Considered as part of ergonomic design		Low			
Transport during work			*			*	*	Road vehicle movements normal part of construction / oilfield work (dusts may require suppression): typical safety systems in place. Construction traffic and large machinery may impact on local road system. Nearshore vessel movements controlled during shore crossing operations.		Medium - Low	Information may be available from the Social Impact Assessment. Contracted 'fly-in/fly out' aircraft to evaluate requirement to augment / carry bush survival emergency supplies	Drims# 144730 Blacktip Remote Access Guidelines	Potential Hydrocarbon exposures on 3rd Party offload tankers are not assessed here.
Chemical													
Toxic Chemicals		*					*	Highest risk during construction: use experienced contractors and appropriate procedures, including chemical selection. MSDS must be available at location of use, chemicals stored in secure area. Potential Hydrocarbon exposures on 3rd Party offload tankers are not assessed here.	Workers should be made aware of potential hazards.	Medium - Low	Exposure of any Acid Sulphate soils present may result in generation of Sulphuric acid causing water pH reduction (acidification), heavy metal mobilisation and potential fish kill/contamination.	Awareness training	Engineering to detail chemicals & hazardous materials
Dusts, mists & fumes		*					*	Operational spill risk response and potential health impacts to clean up workers to be addressed in Spill contingency plan. Authorities to be alerted to any associated blowdown or spill health hazards.	Dusts generated should be suppressed: chemical composition of dusts should be determined.	Medium - Low	Engineering studies	Emergency Response procedures to address	
Sensitisers		*					*	Highest risk during construction & operations: procedures to address, if health risk assessment indicates potential.		Low			
Carcinogens		*					*	Generally not permitted as 'chemicals'.		Low		Confirmation required that no carcinogens are specified.	

Key Issue	Design	Construction	Construction Transportation	Operations	Maintenance & Shutdowns	Public	Employees	How Addressed	Notes	Initial Risk Screening	Study	Procedure	Support
Biological													
Wildlife (animals/reptiles/insects/plants)		*	*	*	*		*	Plant, Equipment and vehicles etc subject to Quarantine inspection on arrival in NT. Potential hazard to construction and operational workers to be addressed via awareness information and programme. Personnel hygiene. Local facilities to treat insect/snake bites, etc. Presence of stinging trees, Crocodiles, snakes, bighting insectsetc to be assessed prior to construction, and on a daily basis during construction if required.		Medium	Ensure dangers from Coastal marine species are addressed in awareness information and health related response actions detailed in emergency response procedures	Drims# 144730 Blacktip Remote Access Guidelines	
Sexually Transmitted disease		*				*	*	Potential hazard to construction workers to be addressed via awareness information and programme.		Low		Awareness Training	
Endemic/epidemic disease		*	*			*	*	Pre employment medicals. Onshore medical facilities		Medium - Low	WEL Medical adviser to review endemic diseases and advise vaccination program for work in the area. Updates regarding further preventative measures to be provided with respect to epidemics. (see eg Centre for Disease Control) Information may be available from the Social Impact Assessment.		
Occupational Illness		*	*				*	Sprains & strains, potential chemical exposures; pre employment medicals, job design & procedures mitigate		Medium	Ongoing Safety awareness campaigns to minimise 'slips, trips and falls'.		
Food & Drink		*	*	*	*		*	Local Food & Water. Fridge-Eski facilities required for operational visits. Bottled water may be taken to site on each visit.		Medium - Low	Catering facilities and arrangements to be resolved. Logistics and contingency planning to address potential issues.		Catering Contractor input.
Hygiene (catering/accommodation/toilet facilities/waste disposal)		*	*	*	*		*	Construction temporary arrangement definition (eg local hotels, construction camp, use of professional catering contractor, Chemical Toilets, etc) required for construction and installation. Construction waste disposal requirements to be identified. Waste disposal arrangements (with wastes removed on each operational visit) to be defined (& approved).	Site drainage to consider potential of waste water impacting local water supply / freshwater sources.	Medium - Low	Audit programme.	WEL Blacktip Project Waste Management Plan to be developed.	Waste disposal Arrangements review. Engineering to address drainage. Catering Contractor input.Waste Disposal Contractor input
Psyco-Social													
Isolation (access to social support)		*	*					Available Communications. Normal remote site work practices & local entertainments as available. Pre employment interview / medicals. The wet may impose additional difficulties and stress.		Low			
Communication problems (business & family)		*	*					Available Communications. Normal site management issues. Compassionate leave arrangements.		Low			
Culture, local law, religion & language		*	*	*	*	*	*	Normal remote site management issues. Pre employment interview. Catering facilities may need to consider dietary requirements	Local issues to be identified and addressed via social impact study and consultation. Heritage and aboriginal affairs issues to be identified via EIS and Social Impact studies.	Medium	Community Liaison support requirements to de assessed and expected to include identification of responsible person on-site, availability of local interpreter and cultural and heritage adviser.		Land and Community Adviser review
Job design		*	*				*	Planned Work Program. Ergonomics in Design. Lifting Aids	Pre Employment Medicals	Low			
Job organisation		*	*				*	Construction and installation job planning and experienced supervision / management. Operational work largely inspections	Existing NT Planning Controls and consultation process. Realtime planning and notification of significant events.	Low			
Leisure and recreational facilities		*	*	*			*	Construction Camp facilities/ local (Wadeye) facilities		Medium	Construction camp entertainment facilities to be provided and designed to minimise risks of adverse interaction with local communities. Information may be available from the Social Impact Assessment.	Drimms# 144730 Blacktip Remote Access Guidelines	Land and Community Adviser review
Prostitution		*		*		*	*	Potential hazard to construction and operational workers to be addressed via awareness information.		Low	Information may be available from the Social Impact Assessment.		
Stress factors		*					*	Onshore Communications. Recreational Facilities. Emergency Response training	Pre Employment Medicals	Low			
Substance abuse		*	*				*	Pre employment medicals. Construction Camp management. Awareness information onsite.		Low	Information may be available from the Social Impact Assessment.	WEL Drug & Alcohol Policy	
Smoking		*	*				*	Controlled (restricted) on onshore plant and instalations for safety reasons. Awareness information onsite		Low	Information may be available from the Social Impact Assessment.	WEL Drug & Alcohol Policy	

Appendix 6. – Outline Health Programme

Outline Health Programme:

Specific issues identified during this preliminary study believed to require further work to ensure potential health impacts of the project are ALARP, are identified below; follow up of these specific issues, along with general project developing HSE studies during FEED, will contribute to the developing project HSE management system.

1) Develop a Medical Management Strategy and Plan.

   The Strategy and or Plan should include, but not be limited to, consideration of the following:

   Discussion with 'local' medical staff and facilities should be initiated directly from WEL's Medical Adviser (eg Company Doctor) to evaluate the adequacy of capability and the response time of local facilities.

   The need for, and standard of, additional (onshore) onsite medical support and supplies during construction and maintenance requires medical assessment and recommendation.

   Arrangements that may be required for local supply and storage of medicines (including through the operational phase) for eg prescription drugs, anti venoms and/or any chemical poison antidotes

   Advisory notes to be developed for site health hazards and any recommended vaccinations for employees (and contractors): notes to be updated (re eg new information or epidemics) throughout development life.

   Define training, refresher and competency of field First Aiders and Medics

   Recommended Field personnel fitness levels

   Provide input to, and/or participate in site HSE audits

2) Emergency Response: Medical, Medivac and Natural Disaster.

   Emergency Response Plans for the project should evaluate and address

   Transport and logistics considerations of Medical Emergency and Medivac and their inclusion in Emergency Response consultations, support contracts and procedures.

   Provision of support to the local emergency response organisations for project related issues, including potential multiple injury / fatality scenarios, of their, as well as project personnel.

   Worker wellbeing and support, including sustenance, for periods of isolation (flood, cyclone, etc.)

3) Develop an Health programme.

   Health Awareness and Health promotion: Determine medical (see 1 above) and Health advice to be included in eg Induction and Safety Awareness training, procedures or 'information sheets', to address local and site health concerns. Including, but not necessarily limited to, Health Procedural awareness (Ergonomics, Noise, Acclimatisation, etc) Exposure to sunlight,

Cont..

Ensure that the Regulatory Register contains all relevant Health Related Legislation and guidance. Review regulations and ensure appropriate guidance on health matters is disseminated to the project team.

Heat Exhaustion, Venomous creatures, stings and crocodiles, Diseases and their prevention, Food and water hygiene, Chemical Hazards, safe waste disposal.

Health Monitoring and Reporting: Determine and detail preliminary HSE audit schedule and content.

Onsite medic multiskilled work routines to be identified and evaluated.

Health (and First Aid) Procedures, to be developed or revised where needed, and maintained for the Project with location risks identified.

4) Design (Construction and Engineering) Health Inputs

Project HAZIDs and HAZOPs identify and evaluate Health Risks.

Construction camp food and water supply (and testing) storage, drains and sewage disposal arrangements to be defined (as should Operational site requirements , if different).

Early construction food and water supply and contingency (supply) arrangements to be identified.

Welfare and Entertainment facilities to be provided commensurate with management strategy for level of interaction with local community.

Chemical, and Hazardous material, selection to consider health aspects (including residue / container disposal) and maintenance/decommissioning.

Listing of hazardous materials (ie not limited to ‘chemicals’), and MSDS, to be compiled.

Project Waste Management Plan to be developed (addressing health issues as appropriate) to include safe storage and disposal.

Health Risk Assessments to be prepared.

Commissioning testing to confirm noise and radiation safe design criteria are met.

Formation water radioactivity, and construction site and onshore pipeline route inhalable ‘dust’ composition to be determined. Scaling predictions to address the likelihood of Low Specific Activity (LSA) scale (NORM) formation.

Process review to determine any concentration ‘hot’ spots for toxics (eg H_2S, Hg, BTEX), and project to assess the potential for worker, or 3rd party, exposures.

Determine the need and competencies for Community Liaison support personnel onsite during construction.

Design platform and site security for all operational scenarios (eg construction-unmanned, normal work and access – emergency escape).

Transportation and telecoms study to address normal operations, construction and emergency telecomm and transportation upgrade requirements (if any).

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Early identification of catering and waste disposal contractors to be considered to aid identification of logistical and storage requirement solutions.

5) Field Operations (Construction, Drilling, HU&C, Production Operations) to ensure

Project HSE Management System to be implemented both onshore and onsite.

Project Emergency Response Procedures and arrangements are appropriate to health risk management, and maintained as current documents.

Awareness of Health Regulations and maintenance of Regulatory Register as a current document

Adequate site security to be maintained.

Health Risk Assessments are carried out, when new information is available.

Health Risk Assessments are kept current and available to the workforce.

HSE Audits scheduled and include Health, hygiene and medical topics.

Job Hazard Analysis are utilised.

Operational (and Decommissioning) Plans, monitoring and procedures address health issues.

Health issues are included in induction training and Safety Meetings; procedures developed for Arrival and Departure from Normally unmanned sites address HSE issues.

Chemical Selection, transport, handling and disposal assesses Health risks.

Material Safety Data Sheets (MSDS) are available onsite, and antidotes to any specified poisons are available onsite.

A register of ionising radiation sources is available and current.

Adequate training in Personnel Protective Equipment (PPE), including sunscreen and shade, use is provided at site.

Programme of periodic atmospheric contaminant, noise and radiation monitoring when personnel are onsite.