



Government of **Western Australia**
Department of **Mines and Petroleum**
Resources Safety

Submission - Inquiry into safety related matters relating to FLNG projects

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July 2014

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Introduction

In response to the Economics and Industry Standing Committee letter 19 MAY 2014 (Ref: A448406): **Inquiry into safety-related matters relating to FLNG projects: Request for a submission** the following information relates to the requested points for consideration:

- the measures taken by project proponents to ensure the safety of workers on FLNG facilities, particularly in relation to extreme weather events and emergency evacuation preparedness;
- the adequacy of Western Australia's emergency capacity and preparedness to respond to a safety or environmental incident involving FLNG; and
- the role and responsibilities of the state and federal governments in relation to FLNG emergency situations.

No FLNG facilities have been built or commissioned to date. As such there are no comparable projects in the region. However there are a number of Floating Production Storage and Offloading (FPSO) facilities currently operating in the area which provide the closest parallel to the proposed Shell FLNG Prelude facility. The following FPSO facilities are operational in Western Australian waters:

- AED:
 - Puffin oil development
- PTTEP Australia
 - Jabiru and Challis oil field development
- Santos
 - Exeter/Mutineer oil field development
- Eni
 - Woolybutt oil field development
- BHP Billiton:
 - Griffin oil and gas project
 - Stybarrow oil field development
 - Pyrenees oil field development
- Woodside Energy:
 - Laminaria-Corallina oil field development
 - Cossack Pioneer development
 - Vincent oil field development
 - Enfield oil development
- Apache Energy
 - Van Gogh oil field development

This document has been prepared based on information in the public domain and available from Shell regarding the Prelude FLNG project and the available information from the above facilities.

This document provides an overview of the regulatory environment within which the Prelude FLNG project will be developed and operated; the main safety issues applicable to FLNG operations; and arrangements for incident reporting and response.

Regulatory Environment for Petroleum Resource Development

The location of the proposed Prelude FLNG Project is in Commonwealth waters and is therefore subject to Commonwealth legislation.

The current situation that applies in Commonwealth offshore areas is that the State Minister for Mines and Petroleum has an equal right, in the first instance, to approve major decisions with his Commonwealth counterpart. However, the Commonwealth Minister can override the State if he chooses to do so. Section 59(2) of the Commonwealth *Offshore Petroleum and Greenhouse Gas Storage Act 2006* (OPPGS Act) provides the Commonwealth Minister power to override the State.

Below are Commonwealth government policies regarding petroleum development and marine protection that are relevant to the Prelude FLNG Project.

Australian Offshore Petroleum Development Policy

Petroleum titles are issued by Commonwealth and State government agencies to facilitate exploration and development of petroleum reserves within Australia. As the title holder for Exploration Permit WA-371-P, Shell has an obligation to undertake exploration of its titles and to certify the nature and extent of the reserves within this area. As resources have been found in the WA-371-P title area, Shell is required to investigate the manner in which it can make these reserves available to resource buyers.

Commonwealth National Oceans Policy

Australia's Oceans Policy was introduced in 1998. The Policy has a number of aims, including:

- exercising and protecting Australia's rights over its marine jurisdictions;
- exercising its obligations under the United Nations Convention on the Law of the Sea (1982) which was ratified in 1994;
- understanding and protecting the marine environment; and
- promoting ecologically sustainable economic development and establishing integrated planning and management.

Under the Oceans Policy, a Nationally Representative System of Marine Protected Areas is currently being established. These are based on the principles of multiple use and ecologically sustainable development. This policy has been implemented through the EPBC Act, as outlined in the Strategic Plan of Action for the National Representative System of Marine Protected Areas (ANZECC, 1998).

There are six categories of marine protected area, none of which cover the location of the proposed Prelude FLNG facility. The Ashmore Reef and Cartier Island are the closest Marine Protected Areas, located approximately 200 and 175 km north of the WA-371-P title area, respectively.

Offshore Petroleum and Greenhouse Gas Storage Act 2006

Approval is required under the OPGGS Act from the Designated Authority to construct, operate and decommission a petroleum facility. The OPGGS Act came into effect on 1 July 2008, updating and replacing *the Petroleum (Submerged Lands) Act 1967* (PSLA) in its entirety. To date there have been no changes to the regulations under the PSLA 1967, which continue to apply under the OPGGS Act.

Approvals required under the OPGSS Act and regulations include the following:

- production licence for the off shore facilities in Commonwealth waters;
- infrastructure licence;
- Safety Case assessment and acceptance (for more detail see next section on Safety of Workers on FLNG facilities); and
- Environment plan assessment and acceptance.

Production Licence

A petroleum production licence is required for offshore petroleum production facilities under the OPGGS Act. A production licence provides the legal right to recover petroleum from an area, subject to meeting conditions specified by the licence. The production licence is granted for an indefinite term and is called a life of field production licence. Shell has not yet applied for a production licence, which will only be issued after the necessary environmental approvals for the development have been secured.

Infrastructure Licence

An infrastructure licence is required prior to construction or operation of an infrastructure facility in an offshore area under the OPGGS Act. An infrastructure facility includes a facility engaged in petroleum activities that either rests on the seabed or is fixed or connected to the seabed (whether or not the facility is floating). An infrastructure licence remains in force indefinitely. Shell has not yet applied for an infrastructure licence, which will only be issued after the necessary environmental approvals for the development have been secured.

Safety Case (Not applicable to State controlled waters)

The Petroleum (Submerged Lands) (Management of Safety on Off Shore Facilities) Regulations 1996 require that an operator must not construct or install a facility until the operator has obtained a 'Consent to Construct and Install' from the Designated Authority (in this case the WA DMP). Before this may be granted, the National Offshore Petroleum Safety Authority (NOPSEMA) must have accepted a Facility Description, a Formal Safety Assessment and those parts of the Safety Management System that relate to construction and installation.

An operator must not operate a facility until it has obtained a 'Consent to Use'. This may only be granted if there is a Safety Case in force for the facility. For the Safety Case to be in force it must have been submitted by the operator and it must have been accepted, or provisionally accepted, by NOPSEMA. Shell will prepare and submit the required Safety Cases to NOPSEMA as the project is developed to ensure timely approvals prior to construction, installation and start-up.

Oil Spill Contingency Plans

An Oil Spill Contingency Plan will be developed for the FLNG facility's operation as part of its Emergency Response Plan, as specified in Section 202 of the PSLA Schedule of Specific Requirements as to *Offshore Petroleum Exploration and Production Act 2005*. Oil spill modelling has been carried for a number of spill scenarios.

Environment Plans

An Environment Plan (EP) is required under Part 2 of the Petroleum (Submerged Lands) (Management of Environment) Regulations 1999 for offshore petroleum activities in Commonwealth waters. The Regulations specify that an operator must not carry out a petroleum activity unless there is an accepted EP in force for the activity. An EP must describe the activity, the receiving environment, environmental aspects and an assessment of potential impacts. In addition, an EP must contain appropriate risk-based environmental performance objectives and standards, an implementation strategy and provide criteria for determining whether the objectives and standards are met. A series of EPs will be developed in reference to the relevant stages of the project life cycle as follows:

- drilling and well construction;
- installation, hook-up and commissioning;
- operations and maintenance; and
- decommissioning.

Environmental Management System

A Health, Safety, Security, Environment and Social Performance Management System (HSE-MS) will be developed to cover the project, and is the means by which Shell will implement its policy, practices and procedures for achieving specified environmental standards and delivering improvement in environmental performance. The HSE-MS will be developed to comply with Shell Group requirements and with the international standard on environmental management systems ISO 14001. The Prelude HSE-MS will be audited against the ISO 14001 standard, by an accredited independent third party, in order to achieve certification to this standard. To ensure that the project achieves the standards required, a systematic approach to monitoring and measuring performance and taking corrective action will be developed through the development of an Environmental Management and Monitoring Plan (EMMP) which will detail:

- statutory reporting requirements;
- commitments made in the draft EIS and EPs;
- success criteria in fulfilling the policy commitment to continuous improvement;
- monitoring to measure progress against objectives, targets and plans;
- data requirements to the Shell Group in order to fulfil corporate reporting requirements; and
- matrices outlining the responsibilities for monitoring and reporting.

The EMMP will be incorporated into the Prelude HSE-MS.

Protection of the Sea (Prevention of Pollution from Ships) Act 1983

The *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* (PSPPS Act) regulates discharges from ships to protect the sea from pollution, and gives effect to the International Maritime Organization's International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL). This includes a prohibition against discharges of oil or oily mixtures, noxious liquid substances, packaged harmful substances, sewage and garbage to the sea. The Act also imposes a duty to report certain incidents involving prohibited discharges and maintain record books, a shipboard oil pollution emergency and shipboard waste management plan. The FLNG facility, once in place, is a petroleum facility under the OPGGS Act and is not subject to the PSPPS Act or MARPOL requirements. However, vessels travelling to or from the FLNG facility are subject to this act.

Australian Petroleum Production and Exploration Association Guidelines

In addition to the offshore environmental management procedures and reporting required under legislation, there are voluntary industry codes that are relevant to the project as discussed in this section. In Australia, the petroleum exploration and production industry operates within an industry code of environmental practice developed by the Australian Petroleum Production and Exploration Association (APPEA, 2008). This code provides guidelines for activities and has evolved from the collective knowledge and experience of the oil and gas industry both nationally and internationally. The code also provides the Australian petroleum industry with clear guidance on management practices and measures to protect the environment during exploration, production and decommissioning phases.

Shell is a signatory to the APPEA guidelines and will adhere to them in the implementation of the project.

Safety of workers on FLNG facilities

This section briefly outlines the main safety issues for FLNG facilities.

Extreme weather events

A key part of the safety studies has been the assessment of the effects of extreme weather events on the FLNG facility. The facility has been designed to withstand a 1 in 10,000 year storm event which corresponds to a maximum individual wave in excess of 28m and wind gusting at more than 300km/hr. Over a 25-year operating period, the probability of such an event happening is less than 0.25%.

Several model tank tests were performed to examine the response of the FLNG facility to different wave and wind loadings. In response to these studies key cyclone design and operational controls considered for the FLNG facility include:

- The FLNG facility is not self-propelled and has been designed so that it does not need to be decoupled from the turret mooring system during a cyclonic event. The turret structure and its associated 24 mooring chains, with anchors, will be designed to resist loads due to hull deflections, mooring loads and direct slamming loads that may be encountered in extreme 1 in 10,000 year weather event.
- Major overhauls and maintenance will be conducted outside the cyclone season wherever possible so as to minimise movements of equipment, materials and people during this time. Those personnel on the FLNG facility as a cyclone approaches will stay on board but will not be allowed on deck during passage of the cyclone.
- The FLNG facility is expected to continue production until wind speeds exceed 70 knots. Precautionary measures such as the timely securing of all loose materials and the movement of tugboats to safe location/ harbour will be clearly defined in the weather policy.
- Offloading of hydrocarbons to tankers will only occur in accordance with the Tanker Loading Operation Guidance Policy, which will detail the maximum allowable wind and wave conditions for tanker mooring and offloading. No mooring or offloading will occur during weather conditions that exceed the mooring and offloading design criteria

Emergency evacuation preparedness

After comprehensive studies, model testing and in-depth reviews by Shell, it is their consideration that Shell's FLNG design safety is considered equal to the latest FPSO or integrated off shore facilities.

In the unlikely event of a safety incident, emergency plans would be activated. The FLNG design incorporates security features to prevent unauthorised access and Prelude will work with Australian authorities to ensure a safe and secure operation.

An Emergency Response Plan has been developed to manage unplanned events and emergencies. The plan will include procedures to deal with the following events (as a minimum):

- hydrocarbon spills;
- chemical spills;
- damage to wells, pipes, flow lines and other subsurface, surface or suspended structures;
- fires and explosions;
- security issues or terrorism;
- medical evacuation;
- extreme weather conditions; and
- traffic or transport accidents.

The Emergency Response Plan will follow industry best practice, legislative requirements and Shell standards and procedures and will satisfy the following key requirements:

- it receives the approval of the relevant authorities;
- staff are trained in its activation and implementation;
- it is backed-up by the necessary resources, equipment and facilities;
- it is known to external agencies that may be called upon to respond; and
- drills are conducted and evaluated.

Evacuation, Escape and Rescue

The design of the Prelude FLNG facility has focused on the containment of hazards and incorporates extensive mitigation and recovery measures, should they be required. As for all offshore oil and gas production facilities, Shell's FLNG design includes Evacuation, Escape and Rescue (EER) features. The Prelude FLNG facility has an EER Strategy which is summarised below:

- personnel on Prelude can escape safely from an area where there is a hazardous event, via multiple escape routes forward and aft;
- temporary refuges are provided in multiple locations (main Temporary Refuge aft and Secondary Refuge forward) on Prelude with adequate sizing for maximum anticipated personnel and protection for as long as required to control an incident and/or effect a controlled evacuation (if necessary);
- a controlled safe evacuation from the facility with different means of evacuation at strategic low risk locations. There are primary, secondary and tertiary means of evacuation via helicopter, freefall lifeboats (located aft) and integrated chute-based life rafts respectively;
- once evacuation has been carried out, the rescue and recovery of personnel can be facilitated by external means (for example, using facility-based infield support vessels, acting as standby vessels).

Western Australia's emergency capacity and preparedness

With its location 200 km offshore the Prelude facility presents primarily the same risk characteristics as Floating Production Storage and Offloading (FPSO) facilities currently operating off the North West coast of Western Australia.

As noted in the introduction; there is already a large number of FPSOs operating in the region. Western Australia's preparedness for a safety or environmental incident is already at a level considered appropriate to deal with a situation from one of these other facilities, and it is considered that Prelude presents a very similar risk profile.

Prelude has in place an Emergency Response Plan, as per 'Emergency evacuation preparedness' above. This plan has not as yet been sighted, but assumptions on its acceptability can be made based on previously viewed examples from Shell and similar facilities.

Role and Responsibilities of the State and Federal Governments

Federal

The roles and responsibilities of the Federal government in relation to an emergency situation with Prelude are the same as those that apply to the other similar (FPSO) facilities operating of the North West.

In the event of an emergency, the facility comes under the jurisdiction of NOPSEMA, and that agency – in conjunction with Shell and Prelude management and team members – is responsible for the effective management of any emergency situation.

The Federal government departments that may be involved in an incident can include (but not limited to):

- National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA)
- Australian Maritime Safety Authority (AMSA)
- Attorney-General's Department (AG)
- Department of Health
- Department of Industry
- Australian Federal Police (AFP)

- Australian Government Solicitor (AGS)
- Comcare
- Safe Work Australia
- Commonwealth Director of Public Prosecutions (DPP)
- Department of Industry

State

The roles and responsibilities of the State government in relation to an emergency situation with Prelude are the same as those that apply to the other similar (FPSO) facilities operating of the North West, and relate primarily to the support role, but may be expanded dependant on the severity of the incident to include such agencies and facilities as:

- Department of Mines and Petroleum (DMP)
- Department of Fire and Emergency Services (DFAS)
- Department of Health (DoH)
 - Hospital facilities
 - Transport (Ambulance)
- Western Australia Police (WAPOL)
- Broome Port Authority
- Office of the State Coroner
- Department of the Attorney General

The State Government role is primarily one of oversight and monitoring. The company (Shell) will have the infrastructure and expertise to manage the evolution under the guidance of NOPSEMA. Once the situation is under control there may be investigation / enforcement actions that are required under state law.

Regional

The impact to the Broome region and local government is expected to relate primarily to medical facilities because of its proximity to the project area. The local authorities may also be requested to assist, along with any local DFAS, WAPOL, DoH, Ambulance or State Emergency Services.

It is expected that there will be a significant impact on Broome International Airport due to increased air traffic, transport and personnel access, and they have confirmed that the appropriate plans and procedures are in place to manage the event

In the event of an offshore incident or transportation accident of significant size, the emergency services in Broome and surrounding region may struggle to meet the emergency healthcare needs of both the project and the local community as health service ratios in Broome are already below the Australian average (Broome Community Guide, ABS).

Should a non-routine event occur, access for Broome residents to both regular and emergency health services could in the event of an emergency situations (e.g. an individual personnel injury or illness) be reduced. The effects of the service reduction would be limited in duration but could be highly disruptive for local residents and service providers. Shell's Emergency Planning will therefore include early discussions with the Broome health authorities on arrangements for triage, coordination of emergency response and maintenance of health services for local residents. Community health impacts associated with the project are expected to be unlikely and of medium magnitude for a major non-routine event, and hence their significance has been assessed to be minor.

Shell will hold early discussions with Broome Health Authorities on coordinating emergency response requirements in a manner that also maintains health service for local residences. Shell will have detailed Workplace Health and Safety and Emergency Management Plans to meet all regulatory and Shell Group requirements. Workplace health and safety of the workforce is of the utmost importance to Shell. This is observed in Shell's HSE Policy which promotes the goal of no harm to people. This policy includes contractors working on the Prelude FLNG Project.

Reporting under the Petroleum Legislation

As Prelude will be operating in Commonwealth controlled waters, there is no obligation for Shell to report any incidents to the DMP or the Western Australian Government.

It is however expected that in the event of a significant incident, Shell and/or NOPSEMA would provide information to the DMP and other affected Western Australian Government agencies either voluntarily or on a 'by request' basis.

Conclusion

Overall, it is concluded that by implementing the design features and the control and mitigation measures, including the risk and safety, engineering, environmental, socio-economic and health management measures described above, the Prelude FLNG Project will have no significant impacts upon the areas of concern raised in the Economics and Industry Standing Committee letter 19MAY2014 (Ref: A448406): **Inquiry into safety-related matters relating to FLNG projects: Request for a submission.**

The Western Australian State Government has no jurisdiction or direct control over Prelude's approvals, licensing, reporting or operations; and therefore has no direct distinct obligation, commitments or responsibilities. However, the Department of Mines and Petroleum is taking special interest, and working closely with the Commonwealth under the Joint Authority, in the regulation of the Prelude FLNG facility by the Commonwealth as it is possible DMP will have to regulate a similar facility in State Waters sometime in the future. It is expected that in the event of a major incident that state resources will be made available as discussed.

References

*Economics and Industry Standing Committee letter 19MAY2014 (Ref: A448406): **Inquiry into safety-related matters relating to FLNG projects: Request for a submission***

Prelude Floating LNG Project Environmental Impact Statement Shell Development (Australia) Proprietary Limited EPBC 2008/4146

Broome Community Guide,

Australian Bureau of Statistics (ABS)

TELCON: Shane Daniel (DMP) / John Dagostino (Shell) 12:20WST 10 July 2014

TELCON: Shane Daniel (DMP) / John (surname not retained) (NOPSEMA) 12:40WST 10 July 2014

TELCON: Shane Daniel (DMP) / Rod Evans (Broome International Airport) 13:40WST 10 July 2014

Legislation

Key Commonwealth Legislation and Regulations pertaining to the Oil and Gas Industry

Environment Protection and Biodiversity Conservation Act 1999

Off shore Petroleum and Greenhouse Gas Storage Act 2006

Petroleum (Submerged Lands) (Management of Environment) Regulations 1999

Petroleum (Submerged Lands) (Management of Safety of Off shore Facilities) Regulations 1996

Petroleum (Submerged Lands) Act - Schedule of Specific Requirements as to Off shore Petroleum Exploration and Production 2005

Other Commonwealth Legislation and Regulations

Energy Efficiencies and Opportunities Act 2006

Environmental Protection (Sea Dumping) Act 1981

National Greenhouse and Energy Reporting Act 2007

Australian Heritage Council Act 2003

Australian Maritime Safety Authority Act 1990

Historic Shipwrecks Act 1976

National Environmental Protection Council Act 1998

Native Title Act 1993

Navigation Act 1912

Protection of the Sea (Oil Pollution Compensation Fund) Act 1983

Ozone Protection and Synthetic Greenhouse Gas Management Act 1989

Quarantine Act 1908 and Australian Ballast Water Management Requirements 2001

Protection of the Sea (Powers of Intervention Act) 1981

International Legislation and Regulations

Convention on Safety of Life at Sea (SOLAS), 1974

International Convention for the Prevention of Pollution from Ships, 1973 (MARPOL 73/78)

Protection of the Sea (Prevention of Pollution from Ships) Act 1983

Operating in Sensitive Environments 2003 – International Petroleum Industry Environmental Conservation Association (IPIECA)

Environmental Management in Oil and Gas Exploration and Production 1997

United Nations Environment Program Industry and Environment (UNEP IE)

Oil Industry International Explorations and Production Forum (E&P Forum)