PRELUDE FLNG JOINT VENTURE

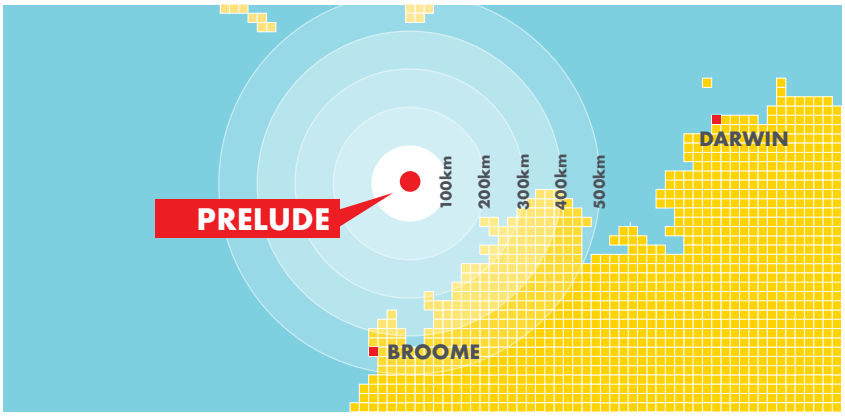
INPEX KOGAS OPIC

PRELUDE FLNG ENVIRONMENT PLAN

ABOUT PRELUDE

The Shell-operated Prelude FLNG facility is a floating liquefied natural gas facility located approximately 475km north-north east of Broome in Western Australia. Prelude is the first deployment of Shell's Floating Liquefied Natural Gas (FLNG) technology, which extracts, liquefies and stores gas at sea, before it is exported to customers around the globe.

Prelude is operated by Shell in joint venture with INPEX (17.5%), KOGAS (10%) and OPIC (5%).



Location of Prelude (Permit Area WA-44-L)

Location:
WA-44-L, in Commonwealth marine waters, 475 km north-north east of Broome in Western Australia

Facility Type:
Floating liquefied natural gas (FLNG) facility

Number of wells:
Seven

Production capacity:
3.6 million tonnes per annum (mtpa) LNG, 1.3 mtpa LPG, 1.3mtpa condensate

Water depths:
250m

Status:
In operation

For further detail on the location of Prelude and safety zones, visit www.shell.com.au/prelude

THE PRELUDE FLNG ENVIRONMENT PLAN

The Prelude Environment Plan covers the following activities within permit area WA-44-L and infrastructure license WA-2-IL:

- Operations and maintenance turnarounds of Prelude and its subsea facilities
- Operation within the designated safety zone of the installation, support, supply and in-field support vessels and helicopters required for the offshore works, commissioning & maintenance activities and operate phase
- Product offtake tankers or bunkering vessels only when they are attached to Prelude (considered as petroleum activity)
- Well intervention activities using a light well intervention vessel
- Inspections, maintenance and repairs of systems and subsea infrastructure
- Installation, commissioning and start-up activities for future tie-ins (e.g. the proposed Crux project - see www.shell.com.au/crux)
- Potential future tie-ins from within the Prelude field
- Emergency Response events

If a project scope has the potential to result in significant change to Prelude, or has potential environmental or social impacts, an assessment of whether an Environment Plan revision is required.

ENVIRONMENTAL APPROVAL

Before Shell begins substantial work on major projects or existing facilities, regulatory, environmental and social impacts are assessed, alongside commercial and technical considerations.

This process includes environmental, social and health impact assessments to help understand and manage risks and opportunities.

For Prelude's current operations, the Environment Plan was accepted by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) in 2016.

Shell plans to submit a revised Prelude Environment Plan to NOPSEMA in early 2020 for acceptance in accordance with the *Offshore Petroleum and Greenhouse Gas Storage (Environment) Regulations 2009.*

ENVIRONMENTAL MANAGEMENT

Prelude has been designed to operate to manage environmental risks to as low as reasonably practicable (ALARP) and acceptable levels. The table below provides a summary of key environmental aspects identified for Prelude's operations. The mitigations for these environmental aspects and risks are outlined in detail at www.shell.com.au/prelude.

Risk	Summary
Physical Presence	Prelude, its supporting subsea infrastructure and additional support vessels all have a physical presence in the operating area including lighting, noise, vessel movements and seabed disturbance.
Biosecurity	Invasive Marine Species are marine animals or plants which may be transported or introduced into an environment outside of their normal habitat. The primary means of introduction is via transport on one of the service vessels which support Prelude.
Liquid Discharges	**These may include:** ▪ Drainage and bilge effluent ▪ Food waste, greywater and sewage ▪ Cooling water ▪ Desalination brine, boiler blowdown and mixed bed polisher effluent ▪ Produced water ▪ Use and release of chemicals in ad-hoc discharges
Atmospheric Emissions	**These may include:** ▪ Gas combustion for power generation and compression ▪ Flaring of gases for safety purposes ▪ Disposal (venting) of reservoir CO2 ▪ Fugitive emissions ▪ Emissions from vessels supporting the operations ▪ Power generation (using diesel fuel) for essential or emergency duties
Waste Management	Both hazardous and non-hazardous wastes are generated by Prelude and other supporting vessels. **Non-hazardous wastes include domestic and industrial wastes such as:** ▪ bottles ▪ paper and cardboard ▪ scrap steel **Examples of hazardous wastes include:** ▪ oil contaminated materials (filters, rags) ▪ empty chemical containers ▪ empty aerosol containers ▪ light tubes Other wastes include by-products of production on Prelude, like sludges and sands. In some cases, these wastes may contain mercury or low level naturally occurring radioactive materials.
Unplanned Events	**This covers:** ▪ Risk of an unplanned emergency event ▪ Types of loss of containment which might result in an emergency response ▪ Potential impacts on the environment ▪ Potential impacts of clean-up activities

Prelude has been designed to operate in a way which reduces greenhouse gas emissions, including:

- Locating Prelude in close proximity to the gas field, eliminating the need for long pipelines to shore.
- Integrating product offloading facilities into Prelude's design, avoiding additional energy use for gas compression which is needed to export gas to an onshore terminal.
- Using Shell's proprietary double mixed refrigerant process, ensuring efficient use of power and less fuel gas demand.
- Using colder seawater from a depth of 150m, rather than surface water, reducing the need to cool the water and leading to greater LNG production using the same energy inputs.

FEEDBACK

Shell welcomes any feedback on the revised Environment Plan resubmission including requests to receive further information. Please contact us using the following details.

CONTACT US

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